



SITE OPERATIONS MANUAL  
KEKAHA MUNICIPAL SOLID WASTE  
LANDFILL – PHASE II  
KEKAHA, KAUA'I

**October 2017**



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**SECTION I**  
**GENERAL CONDITIONS**



**SECTION I - PART A**  
**GENERAL INFORMATION**



**GENERAL INFORMATION**  
**KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II**  
**KEKAHA, KAUA'I**



**PREPARED FOR**  
**WASTE MANAGEMENT OF HAWAII, INC.**  
**JANUARY 2016**



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## ACRONYMS AND ABBREVIATIONS

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CFR	Code of Federal Regulations
DOH	Department of Health, State of Hawaii
EP	Environmental Protection
ft	foot/feet
HAR	Hawaii Administrative Rules
KLF	Kekaha Municipal Solid Waste Landfill
MDOF	materials drop-off facility
msl	mean sea level
MSW	municipal solid waste
SWS	Solid Waste Section, Department of Health, State of Hawaii
USGS	United States Geological Survey
WMH	Waste Management of Hawaii, Inc.



# 1 INTRODUCTION

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The purpose of this Site Operations Manual is to establish and standardize the procedures needed to conduct daily operations at the Kekaha Municipal Solid Waste Landfill – Phase II (KLF), including the planned Cell 2 expansion project. The KLF is comprised of two refuse disposal areas, Phase I and Phase II. The KLF Phase I ceased operations in 1993, at which point Phase II area began operations. Phase II was constructed per the Resource Conservation and Recovery Act Subtitle D criteria and currently receives all Municipal Solid Waste (MSW) and demolition/construction debris generated on the island of Kaua'i. Several expansions of Phase II have occurred during the lifespan of the site: a vertical expansion in 1998 from 37 feet (ft) mean sea level (msl) to 60 ft msl; a second vertical expansion in 1998 to 85 ft msl; a lateral expansion in 2010, designated Cell 1; and a third vertical expansion in 2013 to 120 ft msl.

The proposed Cell 2 expansion will increase the Phase II landfill laterally and provide an additional 947,000 cubic yards of gross airspace. The expanded area will be located between the Phase I and Phase II portions of the landfill. Cell 2 will be approximately 6.6 acres in area and have a maximum final elevation of 120 ft msl. The Site O&M Manual will address all current operations and encompass future operational requirements associated with the Cell 2 expansion.

The KLF is owned by the County of Kaua'i, Department of Public Works, Solid Waste Division and operated by Waste Management of Hawaii, Inc. (WMH). This Site Operations Manual has been prepared in accordance with the requirements of the following:

- Federal Regulations (Federal Register, Code of Federal Regulations [CFR] Title 40 – Protection of the Environment)
- State of Hawai'i Regulations:
  - Hawai'i Revised Statutes
  - Hawai'i Administrative Rules (HAR):
    - Section (§)11-54 & 55, Water Quality Standards & Water Pollution Control
    - §11-58.1, Solid Waste Management Control
    - §11-60.1, Air Pollution Control
- Permits issued by the State of Hawai'i Department of Health (DOH):
  - Solid Waste Operating Permit No. LF-0052-13 (Solid Waste Section [SWS])
- Internal Policies of Waste Management, Inc.
- Environmentally sound operating practices & effective safety programs

The manual is intended to be a “living” document and will be reviewed at least annually by WMH / KLF staff and updated as necessary to reflect current operations at the KLF Phase II. The WMH Environmental Protection (EP) Manager is responsible for coordinating and implementing manual updates, including distributing controlled copies of the manual.

Keeping the manual current through updates is an on-going process. As updates are proposed, the EP Manager will assess whether an alteration requires notification of the DOH. This manual is a controlled document and copies are assigned as follows:

<u>Controlled Copy Number</u>	<u>Assigned</u>
1 & 2	KLF
3	Waimanalo Gulch Sanitary Landfill
4	DOH SWS
5	County of Kaua'i, Solid Waste Division

It is the responsibility of each manual holder to keep their copy current by inserting all changes into the manual and destroying/archiving the obsolete pages. The KLF Site Manager and WMH Management are responsible for ensuring that KLF personnel understand and adhere to the policies and procedures established in this manual.

## 2 SITE INFORMATION

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### 2.1 Site Description

The KLF property covers a total area of approximately 98 acres. The KLF is located near the southwest coast of the island of Kaua'i, approximately 1.5 miles northwest of the town of Kekaha, and approximately 2,000 ft from the Pacific Ocean shoreline. The Phase II facility is bounded by Kaunualii Highway to the northeast, an unpaved access road and agricultural land to the southeast, aquaculture facilities to the northwest, and the KLF Phase I area to the southwest.

KLF Phase II is hydraulically upgradient of the KLF Phase I, which is a closed and unlined MSW landfill. No established natural streams or lakes exist within or near the facility. Streams on the inland edge of the coastal plain are diverted to the sugarcane plantation irrigation system (R.M. Towill Corp 1993). The site location and topography are shown on Figure 1.

The current permitted waste footprint, which covers approximately 38.4 acres, is rectangular and includes the Phase II and Cell 1 expansion disposal cells (see Figure 2). Phase II includes 32 acres subdivided into 14 waste disposal sub-cells each about 2 acres (approximately 100 ft wide and 800 ft to 1,100 ft long), and the Cell 1 expansion, 6.4 acres subdivided into 4 smaller waste disposal sub-cells each about 1 acre (approximately 200 ft wide and 200 ft to 280 ft long). The proposed Cell 2 expansion of Phase II is 6.6 acres and will be subdivided into 4 smaller waste disposal sub-cells. The approximate maximum elevation of the Cell 2 expansion area will be 120 ft msl.

The landfill office, scale house, maintenance building, leachate evaporation pond, and infiltration basin are located along the northeast property line. A materials drop-off facility (MDOF) is located between the leachate evaporation pond and the office. The MDOF allows public drop-off of green waste, recyclables, MSW, tires, and white goods. A used oil drop-off is located in the maintenance building. The site layout is shown in Figure 2.

### 2.2 Climate and Topography

The Kekaha-Mana coastal plain is relatively arid compared to the rest of the island due to the "rain-shadow" effect. Average annual rainfall in the area averages between 10 to 40 inches per year, while areas near the center of the island average more than 280 inches of rain per year (Oregon Climate Services 1998).

The landfill base elevation of Phase II varies from approximately 6 ft to 16 ft above msl. The Phase II-Cell 2 expansion base elevation will vary from approximately 11 to 21 ft msl. The current maximum permitted elevation for Phase II of 120 ft msl is not proposed to increase as part of the Cell 2 expansion.

### 2.3 Regional Geology

The subsurface formations of the Kekaha-Mana coastal plain consist primarily of older alluvium and contemporary coralline and marl sedimentary rocks of marine, littoral, and terrestrial origin (Sanifill and Baquerizo 1996). These sedimentary rocks were deposited in

lagoon and estuarine environments and in a flanking terrestrial environment. The thickness of the coastal plain sedimentary deposits ranges from zero on the inland edge to more than 400 ft along the seaward edge of the plain. The surface deposits (to a depth of 50 ft) consist predominantly of loose sand, coral fragments, and shell debris. The sedimentary deposits beneath the Kekaha Landfill are estimated to be over 400 ft thick, and are underlain by basalt; the top of the basalt is a drowned, wave-cut bench sloping gently seaward (Sanifill and Baquerizo 1996).

## **2.4 Regional Hydrogeology**

Two aquifers with distinctly different hydrogeologic properties underlie the Kekaha-Mana coastal plain: a coastal plain aquifer within the near-surface sedimentary (cap rock) deposits and a deep aquifer within the underlying fractured basalt. The basaltic aquifer occurs within lava flows of the Nāpali Formation. This aquifer typically yields large quantities of water from wells and shafts with relatively little drawdown, reflecting generally high hydraulic conductivity, estimated by the United States Geological Survey (USGS) as approximately 400 ft/day. Saturated sediments of the cap rock formation (the cap rock aquifer) overlie the basaltic aquifer and retard the seaward discharge of groundwater from the deeper aquifer. According to the USGS, the regional average hydraulic conductivity of the coastal plain aquifer is relatively low, i.e., approximately 0.12 ft/day (Burt 1979).

The uppermost groundwater is encountered within the coastal plain aquifer at approximately 5 to 7 ft below ground surface, which is approximately 3 to 5 ft above msl. According to previous reports, the water table level in the site area is artificially controlled by the Kekaha Sugar Company's groundwater management system (Sanifill and Baquerizo 1996). If the groundwater management system pumps were shut down, lower elevations on the Mana Plain would reportedly be flooded due to a rise in the groundwater level (Sanifill and Baquerizo 1996).

## **2.5 Site Geology**

Borings have been advanced to more than 50 ft below existing grade without reaching the bottom of the coastal plain aquifer, and it is estimated that the thickness of the coastal plain aquifer may exceed 400 ft beneath the landfill area (Sanifill and Baquerizo 1996). The upper 50 ft of these deposits consist of surficial alluvial sediments composed of loose, sand-size coral and shell debris. Below a depth of 50 ft, these deposits become increasingly consolidated and indurated, and represent the coralline and marl sedimentary rocks reported in regional investigations.

## **2.6 Site Hydrogeology**

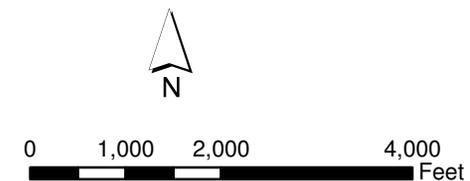
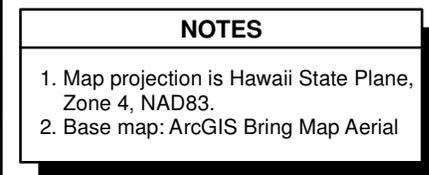
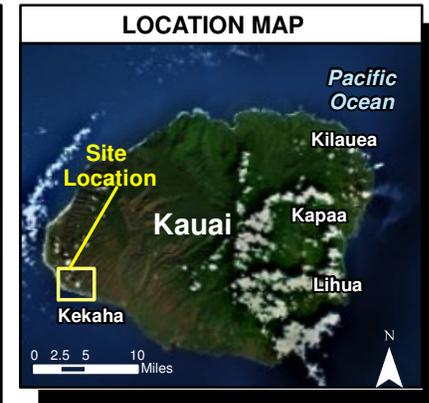
Shallow groundwater underlying the KLF occurs within the surficial sedimentary deposits of the coastal plain aquifer. The historical water level monitoring data indicate that groundwater typically flows toward the ocean in a west-southwest direction, with a hydraulic gradient of approximately 0.0005 feet per foot, and with an elevation of approximately 3 to 5 ft msl. The historical monitoring data indicate that the direction of groundwater flow at the site can periodically shift toward the north or south relative to the typical west-southwest flow direction, and the gradient sometimes becomes nearly flat.

Several factors may contribute to periodic shifts in the groundwater flow direction at the landfill. The direction of the local hydraulic gradient may be affected by variations in pumping rates for the agricultural wells and other production wells near the site. These nearby wells are used to supply water for irrigation and other non-potable purposes and to draw down the groundwater table to prevent saturation of surface soil by the brackish groundwater, thus allowing cultivation of sugarcane and other crops on the Mana Plain. Infiltration from leaks in the aquaculture (shrimp farm) ponds located immediately northwest of the Phase II landfill site may also contribute to periodic fluctuations in the hydraulic gradient. Similarly, the landfill's storm- and surface-water controls systems, particularly the infiltration basin, may affect localized groundwater patterns, especially after rain events. As discussed below, previous tidal study results suggest that tidal effects do not significantly influence the prevailing groundwater flow direction; however, short-term tidal effects may also contribute to the flow direction and gradient variations indicated by the historical monitoring data.

Although the shallow groundwater beneath the KLF occurs within the cap rock formation, the local hydraulic conductivity is significantly greater than the 0.12 ft/day regional average value reported by the USGS (Burt 1979). The results of an aquifer test performed during the week of October 16, 1995 indicate that the hydraulic conductivity of the cap rock aquifer underlying the KLF site is approximately 162 ft/day ( $6 \times 10^{-2}$  centimeters per second). The aquifer test was implemented by pumping monitoring well MW-I at a rate of 0.56 cubic feet per minute for approximately 36 hours while measuring the corresponding drawdown at monitoring well MW-II-5. The hydraulic conductivity value indicated by this test is about three orders of magnitude greater than the 0.12 ft/day value reported by the USGS for the regional coastal plain sedimentary aquifer (Burt 1979). This difference is likely due to field scale effects such as the unconsolidated nature of the surficial alluvial sediments in the shallow coastal plain aquifer underlying the KLF. Based on previous geotechnical investigations of soil types, and relatively flat groundwater gradients observed, the higher conductivity value is likely more representative of site conditions than the lower value reported in the literature.

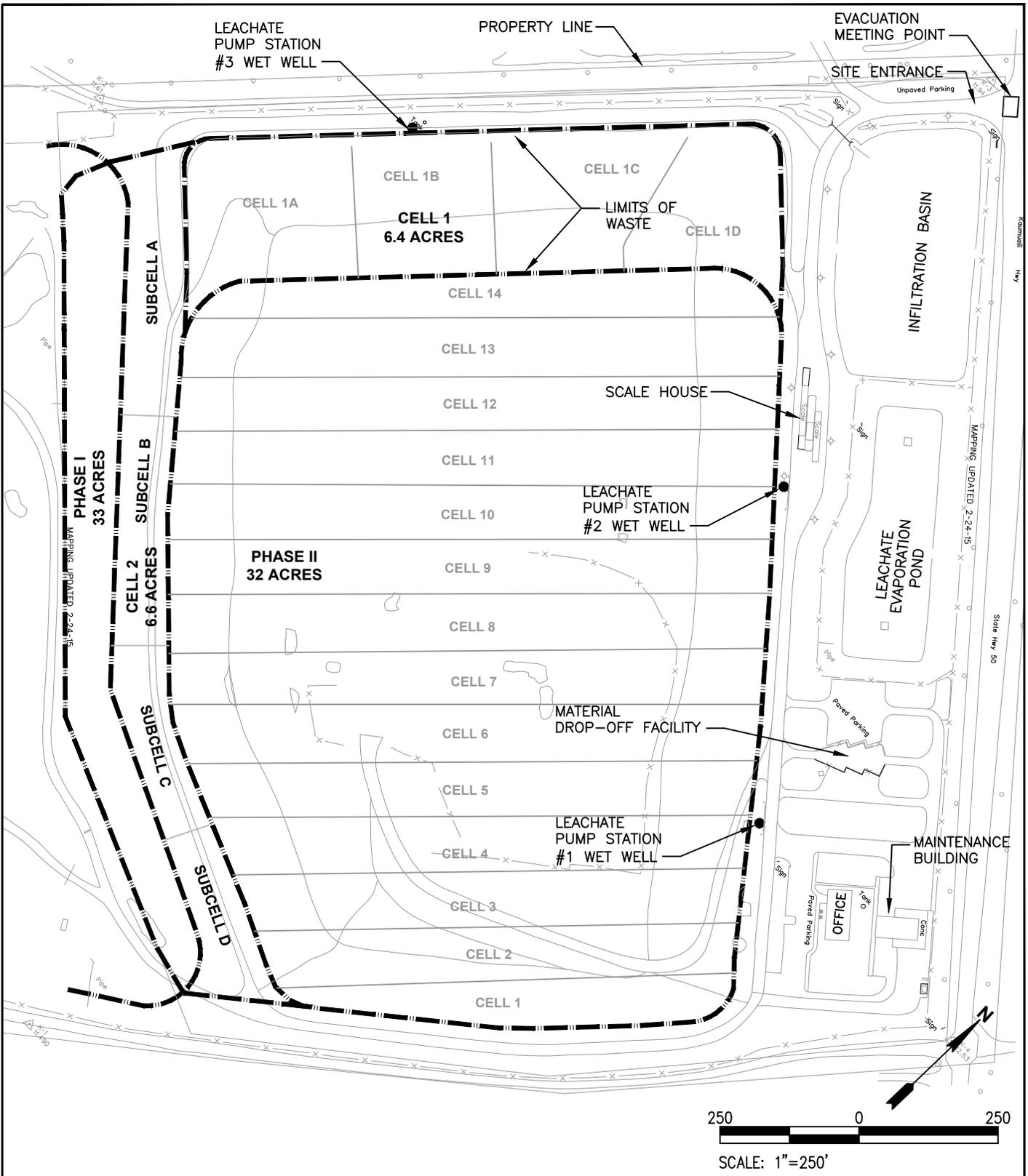
The vertical component of groundwater flow at the site is negligible; the groundwater flows horizontally beneath the facility, ultimately discharging to the ocean southwest of the site. The KLF Phase II monitoring wells therefore target the upper interval of the coastal plain aquifer.





**Figure 1**  
**Site Location Map**  
**Kekaha Landfill**  
**Kauai, Hawaii**





**Figure 2**  
**Site Layout Map**  
**Kekaha Municipal Solid Waste Landfill**  
**Kekaha, Hawai'i**



### 3 LOCATION RESTRICTIONS

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As detailed in 40 CFR 258 (Location Restrictions) and HAR §11-58.1-13 (Site Analysis), new, existing, and laterally-expanded MSW landfill units must comply with certain location restrictions. In compliance with 40 CFR 258 and HAR §11-58.1-13, the KLF Phase II site is not located:

- Within 10,000 ft of any runway used by turbojet aircraft or 5,000 ft of an airport runway used by piston-type aircraft (Airport safety)
- Within a 100-year floodplain area, as delineated by the Federal Emergency Management Agency of the Federal Insurance Administration (Floodplains)
- In or near a wetland, as defined by the U.S. Interior Department of Fish and Wildlife (Wetlands)
- Within 200 ft of a fault having had displacement in Holocene times (Fault areas)
- In a seismic impact zone (Seismic impact zones)
- Near any known geologic faults or rifts (Unstable areas)
- Within a tsunami hazard or floodway, as defined by HAR §11-58.1-13 (g) (1) (Tidal wave [tsunami] zone)

Detailed location restriction documentation is kept on site at the KLF Phase II in the Site Operating Record/Files.



## 4 OPERATING HOURS

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The KLF Phase II current operating hours are 8:00 a.m. to 4:00 p.m. 7 days per week, 351 days per year (closed New Year's Day, Martin Luther King Junior Day, President's Day, Prince Kuhio Day, Good Friday, Memorial Day, King Kamehameha Day, Independence Day, Admission Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day).

The normal operating hours are posted at the KLF Phase II entrance on the Kaumuali'i Highway. Pre-disposal activities including, but not limited to, equipment fueling/lubing, prior day daily cover removal/active face preparation may occur before the scale house is opened. Post-disposal activities including, but not limited to, equipment cleaning/maintenance, daily cover placement and litter management may occur after the scale house is closed. At least one KLF Phase II equipment operator shall be present at the landfill whenever loads are dumped.



## 5 PERSONNEL

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Duties for managing and operating the KLF Phase II are assigned to a variety of staff positions, both on and off site. WMH and the County of Kaua'i provide trained personnel and appropriate equipment to safely and efficiently manage the incoming waste volume at the KLF Phase II. WMH is under contract with the County of Kaua'i to manage Phase II according to best practices, permits, and County, State, and Federal Regulations. Under that contract, the County of Kaua'i provides adequate staff to execute those items as identified by WMH. The staff and equipment, as listed below are adequate to handle the daily volume of waste accepted for disposal at the site.

Personnel	Number of Personnel
Manager/Supervisor	3 (2 WMH and 1 County)
Operations Specialist	1 (1 WMH)
Equipment Operators	15 (15 County)
Traffic Controller/Laborer	1 (1 County)
Scale Attendant	3 (3 County)
Total	23

The WMH Site Manager does not have overall responsibility for all operational, administrative, environmental, and fiscal activities conducted at the site, which include the following specific activities: site safety; financial management; operational practices; and compliance with Federal, State, and local rules, regulations, and permits. The Site Manager directly oversees and manages KLF Phase II operations personnel involved in the daily operation of the landfill.

WMH directs the day-to-day activities at the KLF Phase II. The County Landfill Supervisor receives direction from WMH, then uses the information to direct and supervise the equipment operators and other County landfill employees.

KLF equipment operators and traffic controllers work under the direct supervision of the Landfill Supervisor, and are responsible for the safe and efficient operation of heavy or specialized equipment. Principal duties performed consist of the following:

- Screening waste at the landfill working face
- Checking random loads
- Directing the unloading of waste at designated locations
- Spreading and compacting refuse at the landfill working face
- Placing daily cover at the end of each day
- Keeping the unloading area accessible

Additionally, WMH personnel provide operational, managerial, engineering, and compliance support to the KLF Phase II and are listed below.

- **General Manager/Site Manager** – Responsible for overall planning, operations, environmental and contract compliance, business development, customer relations, engineering support, and financial management for WMH. Develops the capability of managers and other staff to meet or exceed objectives.
- **EP Manager** – Responsible for overall environmental management, and monitoring and reporting of environmental control systems and networks of the WMH landfills. Provides leadership, communication, and training on topics such as waste acceptance, permit compliance, regulatory requirements, landfill environmental control plans, operating plans, and environmental audits. Monitors compliance status of WMH landfills with applicable Federal, State, and local regulations, and company policies. Also acts as the point of contact for regulatory agencies.

## 6 EQUIPMENT

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The equipment at the KLF Phase II is adequate to handle the daily volume of waste accepted for disposal at the site, to provide support for routine and non-routine related tasks, and to conduct the ongoing excavation and construction activity needed for cell development and generation of cover soil. The current inventory (including County of Kaua'i equipment) is as follows:

- One compactor (CAT 826G) – used to push and compact MSW.
- One (1) bulldozer (CAT D6) – used to push/cover MSW, and for excavation and construction activities.
- One (1) dump truck (International) – used to move cover material from the soil stockpile to the fill area, or excavated rock and soil to the processing area.
- One (1) front end loader (CAT 950G) –used to load cover material, handle excavated materials, site maintenance.
- One (1) excavator (CAT 330) – used to load trucks with cover material and other site development and maintenance requirements.
- .
- One (1) 4,000-gallon international water truck (Ford) – used for application of water on landfill roads for dust control, and fire control.
- One (1) roll-off truck – used for transport refuse and recyclable materials from the public drop-off area.
- One (1) maintenance truck (Ford) – used for light maintenance such as lubrication and fueling of onsite equipment.
- Auxiliary equipment – pickup trucks, pumps, etc.



## **7 ACCESS CONTROL**

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In accordance with HAR 11-58.1-15(f), public access to the KLF Phase II is controlled by site perimeter chain link fencing to prevent unauthorized vehicular traffic and illegal waste dumping and protect human health and the environment. Scavenging is not allowed. A gate to the main access road from Kaumuali'i Highway is locked during non-operating hours.

Only KLF Phase II personnel have unrestricted access to the site and only authorized vehicles have access beyond the scale house. All trucks/vehicles enter the facility from Kaumuali'i Highway. Waste haulers proceed directly to the scale house, check in with the scale house attendant and have their loads weighed prior to proceeding to the disposal area. All site visitors must proceed to the main office to sign in.

During working hours, the attendant in the scale house provides security to prevent unauthorized access or illegal dumping at the KLF.



## 8 WASTE ACCEPTED AT THE KLF

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### Types and Quantities of Waste

- **Municipal Solid Waste**

The KLF Phase II receives approximately 230 tons per day of non-hazardous MSW from residential, commercial, and industrial sources on the island of Kaua'i.

- **Other**

The KLF Phase II receives certain "special wastes" that must be managed under special operating procedures for disposal, including but not limited to wastewater treatment sludge, septic tank and cesspool pumpings, petroleum-contaminated soil, treated medical waste, dead animals, and asbestos-containing materials. Refer to Section I – Part B, *Waste Acceptance / Hazardous Waste Exclusion Program*, for a detailed description of the KLF Phase II's waste acceptance policy and methods used to prevent and detect the disposal of unacceptable waste at the landfill.



## 9 TRAINING

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KLF / WMH management conduct weekly, monthly, and annual training sessions for all KLF Phase II personnel to establish and maintain a high level of employee knowledge of safety and emergency procedures, as well as compliance and waste acceptance policies at the KLF Phase II. Annual training for supervisors, equipment operators, traffic controllers, and other personnel involved with site operations and maintenance includes sessions to familiarize them with the contents of this Site Operations Manual. Training topics and modules are discussed in more detail throughout the various sections of this manual. Copies of applicable portions of the manual may be handed out during training sessions for KLF Phase II personnel to review and refer to as needed. In addition, employees are informed of their responsibilities to implement procedures specified in the manual. Records of personnel attending each training session and the topics covered are maintained on site as part of the KLF Phase II Operating Record/Files.



## 10 RECORDKEEPING REQUIREMENTS

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The following records are maintained on site at the KLF as part of the Site Operating Record/Files in accordance with State and Federal requirements, as detailed in HAR §11-58.1-15(j) and 40 CFR 258:

- Location restriction demonstration
- Inspection records, training procedures, and notification procedures
- Perimeter gas monitoring results and any associated remediation plans
- Any MSW landfill unit design documentation for placement of leachate in a MSW landfill unit
- Any demonstration, certification, finding, monitoring, testing, or analytical data relating to groundwater protection (including calibration & maintenance records & original recordings of monitoring instrumentation)
- Closure and post-closure care plans and any associated monitoring, testing, or analytical data
- Cost estimates and financial assurance documentation

### 10.1 KLF Phase II Operational Records

The KLF Phase II maintains records of operational information as part of the Site Operating Record/Files that include, but are not limited to:

- Type, volume/weight, and origin/source of waste received/rejected/disposed
- Type & quantity of cover material used
- Number of vehicles disposing of waste
- Asbestos waste disposal locations
- Random load checks (waste accepted & rejected)
- Facility (vector control) and environmental (spill prevention, control, and countermeasures) inspections
- Special waste loads/handling, waste manifest forms, and special waste profile sheets
- Equipment breakdowns causing interruption of services
- Equipment repairs
- Incident reports (spills, fires, accidents, natural disasters, odorous loads, complaints)
- Climatic data (temperature, wind speed & direction, humidity, rainfall, solar radiation, evaporation, etc.) (evaporation data are collected from an offsite source)

- Leachate levels and quantity pumped
- Personnel training records

The Site Operating Record / Files are maintained in various forms such as spreadsheets, logbooks, scale house tickets, files / filing system, binders, etc. that allow the information to be easily located and retrieved. Any information, records, or plans contained in the Site Operating Record / Files that must be kept under the conditions of the KLF Phase II Solid Waste Permit must be furnished upon request to the DOH or made available for inspection by authorized DOH personnel.

The KLF Phase II Solid Waste Permit, this Site Operations Manual, and any other required plans or reports (e.g., Groundwater & Leachate Monitoring Reports; Annual Operating Reports, etc.) are maintained on site at the KLF as part of the Site Operating Record / Files for a minimum of 5 years. Refer to Section IX – *Permits* for copies of the above-listed KLF permits.

## 11 REPORTING

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### 11.1 Incident Notification Reporting

The KLF Phase II shall notify the DOH by phone or facsimile within 24 hours (8 hours if possible) when there are incidents such as fire, explosion, or release of regulated material/waste, which could threaten human health or the environment. Notification requirements for releases only apply to releases of quantity equal or exceeding the reportable quantity listed in HAR § 11-451.

A written or facsimile Incident Notification Report shall be submitted to the DOH within 3 days of the incident and include the following:

- Owner and operator information (name, address, and telephone number)
- Facility information at which the incident occurred (name, address, and telephone number)
- Date, time, and type of incident (i.e., fire, explosion, release, etc.)
- Name and quantity of material involved
- Extent of injuries, as applicable
- An assessment of the actual or potential hazards to human health or the environment, as applicable
- Estimated quantity and disposition of recovered and un-recovered material that resulted from the incident
- Evaluation of the circumstances that led to the incident
- Steps being taken to reduce, eliminate, and prevent recurrence, including an implementation schedule
- Other information or monitoring as required by the DOH

### 11.2 Non-Compliance Reporting

The KLF Phase II shall notify the DOH if the facility is unable to comply with the conditions of the solid waste permit. Verbal notification must be given to the DOH within 24 hours of the occurrence, and the written report must be filed within 3 days of the occurrence. Each Incident Report shall contain the following information (at a minimum):

- A description and cause of the non-compliance
- The period of non-compliance (dates and times), or the length of time the period of non-compliance is expected to last
- Steps being taken to correct the area of non-compliance
- Steps being taken to reduce, eliminate, and prevent recurrence of the issue
- Other information or monitoring as required by the DOH

### **11.3 Annual Surface Water Management Plan**

The KLF Phase II shall update the Surface Water Management Plan annually and submit to the DOH by September 1 of each year. Additional information on the Surface Water Management Plan is presented in Section V – *Surface Water Management Plan*.

### **11.4 Annual Operating Report**

The KLF Phase II shall submit an Annual Operating Report for the annual reporting period of July 1 – June 30. The Annual Operation Report shall be submitted to the DOH by July 31 of each year and contain the following information:

- Types of solid waste received (MSW, green waste, industrial/commercial, tires, wood, metals, asbestos, and other special wastes).
- Quantities of solid wastes received, by type with totals using an appropriate unit of measure.
- Quantities of leachate generated and how it was handled or disposed of.
- Results of the Hydrologic Evaluation of Landfill Performance model using site specific data and a demonstration of the validity of the alternative liner design with respect to point of compliance requirements (to be submitted as meteorological conditions require further evaluation).
- Quantities of filled airspace for the present year, past filled airspace, and remaining airspace (provided in both cubic yards and years). The airspace information shall be provided in both numerical and graphical presentations.
- An annual topographic survey prepared by a land surveyor registered in the state of Hawaii, aerial surveys, or an approved alternate method. The survey shall show the vertical and horizontal dimensions of the landfilled area in comparison to the final grades as outlined in the solid waste permit.
- A Sequencing Plan, including a drawing identifying the cell areas planned to be filled in the coming year, including identification of wet weather areas. The square footage or acreage of cells and wet weather areas will be computed and shown on the plan.
- Final fill areas, intermediate fill areas, and future unused fill areas projected for the next year.
- Daily MSW cell construction plan, including cell geometry, estimated daily cover volumes, and soil to waste ratios.
- A soil-balance report of the reporting year and the coming year (reported separately).
- Date of final receipt of waste at each cell in the landfill, including a schedule and description of anticipated closure and post-closure activities to be performed within the next five years.

- A summary of closure and post-closure activities performed during the reporting period.
- A copy of the detailed written estimates and documentation of financial assurance.

## **11.5 Environmental Monitoring Reports**

The KLF Phase II shall submit environmental monitoring reports for perimeter gas monitoring and groundwater/leachate monitoring.

### **11.5.1 Perimeter Gas Monitoring**

Perimeter gas monitoring reports shall be submitted to the DOH within 60 days of each monitoring event and include the following information:

- Date and time of monitoring
- Gas concentrations by volume
- Barometric pressure
- Site conditions
- Name of personnel conducting monitoring
- Description of equipment and calibration results
- Description of monitoring procedure
- Identification of any procedures or observations outside of normal conditions

Additional information on the gas migration monitoring is presented in Section VII - *Perimeter Gas Monitoring Plan*.

### **11.5.2 Groundwater and Leachate Monitoring**

Groundwater and leachate monitoring reports shall be submitted to the DOH within 90 days of each sampling event and include the following information:

- Identification of wells/manholes sampled during the event
- Sample collection dates and methodology
- Identification of analytical laboratory which performed the sample analysis
- Statistical evaluation of analytical data
- Identification of deviations from sampling plan, including reason for deviation and any impact to sample results
- Statement of any detections of volatile organic compounds or statistically significant increases were identified

Additional information on the groundwater and leachate mentoring is presented in Section VI – *Groundwater and Leachate Monitoring Plan*.



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**SECTION I - PART B**

**WASTE ACCEPTANCE / HAZARDOUS WASTE EXCLUSION PROGRAM**



**WASTE ACCEPTANCE / HAZARDOUS WASTE EXCLUSION  
PROGRAM**

**KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II**

**KEKAHA, KAUA'I**



**PREPARED FOR  
WASTE MANAGEMENT OF HAWAII, INC.  
JANUARY 2016**



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## ACRONYMS AND ABBREVIATIONS

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%	percent
CESQG	conditionally exempt small quantity generator
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
DOH	Department of Health, State of Hawaii
DOT	Department of Transportation, United States
EPA	Environmental Protection Agency, United States
ft	feet or foot
HAR	Hawaii Administrative Rules
KLF	Kekaha Municipal Solid Waste Landfill
MDOF	materials drop-off facility
msl	mean sea level
MSW	municipal solid waste
PCB	polychlorinated biphenyl
TSCA	Toxic Substances Control Act
WMH	Waste Management of Hawaii, Inc.



# 1 INTRODUCTION

---

Waste Management of Hawaii, Inc. (WMH) has implemented a Waste Acceptance / Hazardous Waste Exclusion Program at the Kekaha Municipal Solid Waste Landfill (KLF) – Phase II to:

- Define acceptable and unacceptable wastes.
- Establish procedures for preventing, detecting, and managing wastes that are not suitable for disposal at the landfill.
- Define special wastes.
- Establish procedures for reviewing, approving, and handling special wastes for disposal at the landfill.

This program complies with the operating criteria for municipal solid waste (MSW) landfills as detailed in the Code of Federal Regulations (CFR) [40 CFR §258.20] and the Hawai'i Administrative Rules (HAR §11-58-15a):

*“Owners or operators of all MSWLF units must implement a program at the facility for detecting and preventing the disposal of regulated hazardous wastes as defined in part 261 of this chapter and polychlorinated biphenyls (PCB) wastes as defined in part 761 of this chapter.”*

The specific requirements of these regulations include: 1) random inspections or other steps to ensure incoming loads do not contain regulated hazardous waste or polychlorinated biphenyl (PCB) waste; 2) records of inspections; 3) training personnel to recognize regulated hazardous waste or PCB waste; and 4) notification of the State of Hawai'i Department of Health (DOH) if a regulated hazardous waste or PCB waste is discovered.

These regulations define "regulated hazardous waste" as solid waste that is a hazardous waste, as defined in 40 CFR §261.3, that is not excluded for regulation as a household hazardous waste under 40 CFR §261.4(b), or was not generated by a conditionally exempt small quantity generator (CESQG) as defined in 40 CFR §261.5. Household hazardous waste and hazardous waste generated by a CESQG are exempt from the screening requirements (see Attachment A for a CESQG certification form).



## 2 SITE INFORMATION

---

The KLF property covers a total area of approximately 98 acres. The KLF is located near the southwest coast of the island of Kaua'i, approximately 1.5 miles northwest of the town of Kekaha, and approximately 2,000 feet (ft) from the Pacific Ocean shoreline. The Phase II facility is bounded by Kaumuali'i Highway to the northeast, an unpaved access road and agricultural land to the southeast, aquaculture facilities to the northwest, and the KLF Phase I area to the southwest. The site location and topography are shown on Figure 1.

### 2.1 Site Description

The KLF is comprised of two refuse disposal areas, Phase I and Phase II. Phase I began operations in 1953 and continued until ceased on October 8, 1993. Phase II began operations on October 9, 1993 and was originally permitted to reach a height of 37 feet (ft) above mean sea level (msl), which was expected to allow municipal solid waste (MSW) filling operations through 2003. However, due to the additional MSW resulting from Hurricane Iniki, Phase II quickly reached capacity and was expanded vertically in 1998 to accommodate more MSW by increasing the height limit to 60 ft msl. A second vertical expansion of Phase II was approved in 2005 allowing a maximum permitted height of 85 ft msl, followed by a lateral expansion (Cell 1) in 2010. A third vertical expansion of Phase II was approved in 2013, which allowed the current maximum permitted height of 120 ft msl.

The current permitted waste footprint of 38.4 acres is roughly square and includes the Phase II disposal sub-cells and Cell 1 (see Figure 2). The original Phase II area is subdivided into 14 waste disposal cells each about 2.3 acres in size and approximately 100 ft wide and 800 ft to 1,100 ft long. The Cell 1 lateral expansion of Phase II is comprised of 6.4 acres subdivided into 4 smaller waste disposal sub-cells (each about 200 ft wide and 200 ft to 280 ft long). The Phase II landfill (including the Cell 1 expansion) is currently permitted to receive waste up to 120 ft msl.

The proposed Phase II-Cell 2 lateral expansion will increase the horizontal limits of waste by approximately 6.6 acres and have a final cover elevation of 120 ft msl.

The landfill office, scale house, maintenance building, leachate evaporation pond, and infiltration basin are located along the northeast property line. A materials drop-off facility (MDOF) is located between the leachate evaporation pond and the office. The MDOF provides residential drop-offs of green waste, recyclables, MSW, tires, and white goods. A used oil drop-off is located in the maintenance building. The site layout is shown on Figure 2.



## **3 WASTE ACCEPTANCE POLICY**

---

The KLF Phase II's waste acceptance policy is described below. The lists of acceptable, unacceptable, and special wastes are subject to change as regulatory requirements warrant.

### **3.1 Acceptable Wastes**

The following waste materials are accepted for disposal at the KLF Phase II:

- Non-hazardous solid waste from municipal, commercial, industrial, and household sources
- Construction and demolition debris (as allowed by local regulations)
- Used tires (recycling only)
- White goods (recycling only)
- Used oil (recycling only)
- CESQG waste
- Scrap metal
- Pre-approved special waste (see Section 3.3 for details regarding special waste)

### **3.2 Unacceptable Wastes**

The following waste materials are not accepted for disposal at the KLF Phase II:

- Regulated hazardous waste (as defined in HAR 11-261 through 268)
- Radioactive waste
- PCB-containing waste (as defined in 40 CFR Part 761)
  - PCB concentration >50 milligrams per kilogram or parts per million (small non-leaking capacitors contained in fluorescent light ballasts, white goods, and other electrical appliances are not considered regulated PCB wastes)
- Explosive materials
- Untreated infectious waste
- Bulk or non-containerized liquids, as provided in HAR 11-58.1-15(i)
  - Any waste determined to contain "free liquids" by the paint filter test (United States Environmental Protection Agency [EPA] Method 9095A)
- Containers holding liquid waste, as provided in HAR 11-58.1-15(i)(2)
- Commercial loads containing >25 percent (%) green waste and household loads containing >50% green waste, in accordance with HAR 11-58.1-65(b)
- Any waste that:

- Is deemed to have a reasonable likelihood of damaging the facility or processing equipment
- May pose a threat to health or safety
- May cause a violation of any applicable law
- Chlorofluorocarbon (CFC) - containing appliances (except for residential, see Appendix B)
- Electronic waste (e-waste) (except for residential, see Appendix C)
- Lead acid batteries, in accordance with Hawaii Revised Statutes 3421
- Tires (whole, cut, sliced, chipped or shredded)
- Hot loads
  - Waste that is on fire or capable of igniting other materials; smoldering waste
- Compressed gas tanks
- Scrap metal

### 3.3 Special Waste

The term "special waste" refers to non-hazardous waste that requires special processing and handling/disposal techniques due to the quantity or volume of the material, or its unique physical, chemical, or biological characteristics. Types of special wastes that are accepted at the KLF Phase II include, but are not limited to:

- Asbestos (friable and non-friable) (See Appendix A for the *Asbestos Management & Disposal Plan*)
- Water separation, car and equipment washes (residues from water separators/steam car washes/equipment washes)
- Sewage sludge
- Underground storage tank and other sludges
- Off-specification and outdated products
- Used oil-contaminated debris\*
- Solid resins and chemical debris\*
- Petroleum (and other) contaminated soils
- Gasoline/jet fuel/kerosene-contaminated debris\*
- Diesel/motor-type fuel-contaminated debris\*
- Sandblast grits
- Baghouse dusts
- Inorganic filter cakes
- Paint waste from removal, construction, and demolition

- Treated poles and lumber
- Empty containers
- Dead animals and offal
- Treated (non-infectious) medical waste
- Properly managed/treated (rendered non-hazardous) materials that are of a toxic nature, such as insecticides, poisons, or radioactive materials
- Other contaminated industrial/commercial waste & non-Toxic Substances Control Act (TSCA) regulated PCB soils, provided such materials are not regulated hazardous waste. Certain exempted TSCA-regulated waste may also be accepted.
- Fresh or frozen uncooked shrimp and other crustaceans (Ordinance No. 893)

**NOTE:** debris\* = contaminates / waste generated when manufacturing a product or performing a service

See Section 5 for an explanation of the KLF Special Waste Acceptance Program.



## **4 KLF PERSONNEL TRAINING**

---

The KLF Phase II provides special waste training to all employees specific to their responsibilities in the hazardous waste exclusion program. KLF Phase II personnel involved in disposal operations are trained to recognize, identify, and handle hazardous waste, PCB waste, and unacceptable waste. Training will also include safety precautions, proper use of personal protective equipment (as required and emergency response procedures), typical hazardous waste labels, container identification, and notification and record-keeping requirements associated with the hazardous waste exclusion program.

Upon completion of the training, each employee will sign and date a Hazardous Waste Exclusion Program Training acknowledgment form. All training records are maintained on site in the KLF Phase II Operating Record/Files.



## 5 SPECIAL WASTE ACCEPTANCE PROGRAM

---

All special waste materials must be pre-approved prior to acceptance at the KLF. Generators are required to properly characterize their waste through analysis or process knowledge to determine if the waste is non-hazardous. After the waste has been characterized, the generator completes a *Generator's Waste Profile Sheet* (see Attachment B or online at [www.wmsolutions.com](http://www.wmsolutions.com)) for submittal to the landfill. The generator is also required to sign a *Disposer's Indemnification Agreement*, which certifies as to the truth, completeness, and accuracy of the information provided (see Attachment B).

### 5.1 Special Waste Evaluation

Information about the waste and its process of generation, along with laboratory analyses, or other information, such as Material Safety Data Sheets are required as part of the waste profile submittal. All profile sheets, laboratory analyses, and supporting documentation are reviewed and evaluated by a WMH Waste Approvals Manager. The use of process/generator knowledge may be utilized to modify or reduce the analytical testing required for a given waste stream. Factors considered include state regulations, the process by which the waste was generated, its physical and chemical properties, its volume, and its method of packaging.

Certain special waste streams may also require individual approval by the DOH or the County of Kaua'i. Any required special management / handling of the waste (to ensure compliance with permit conditions and regulations) will be noted by the Waste Approvals Manager on the waste approval form.

Generators of special waste are required to re-analyze their waste every three years (after the approval date), or when there is a change in the process or chemical make up of the product or waste stream. This requirement is needed to ensure that the waste has not significantly changed from the initial characterization.

### 5.2 Special Waste Receiving and Verification

The KLF Phase II must be notified 24 hours prior to receipt of waste that requires special handling. Special wastes are accepted for disposal at the KLF Phase II between 8 a.m. and 2 p.m., Monday through Saturday.

A Non-Hazardous Waste Manifest must accompany all special waste loads. Upon arrival at the KLF, the scale house attendant will direct the customer to the landfill office where the manifest will be checked with the schedule and the approved special waste profile sheet. The waste being delivered must be the same as that described on the profile sheet. Customers are required to identify any material changes in the waste stream or the process generating the waste that might affect the status of the approval. The KLF reserves the right to inspect or sample any load to verify that the load conforms to the information provided by the generator. Undocumented special waste loads or loads that are not consistent with the approved profile will be rejected.



## **6 EXCLUDING UNACCEPTABLE & HAZARDOUS WASTE**

---

Procedures implemented at the KLF Phase II to detect and control the inadvertent receipt of hazardous and other unacceptable waste include notification, ongoing visual screening, and random load checks.

### **6.1 Notification**

KLF Phase II customers are informed of wastes prohibited from disposal at the landfill by means of published information or signs posted at the facility. A one-page flyer or handout is available to the general public and KLF Phase II customers, which describes the landfill's waste acceptance policy and provides a list of acceptable and unacceptable wastes. The KLF also communicates with local transporters, generators, and state agencies regarding waste management issues.

### **6.2 Ongoing Visual Screening**

All incoming waste is subject to visual screening. Visual screening begins at the scale house. The scale house attendant questions incoming customers about the contents and source of their load. Cameras are set up at the scale house to allow for visual examination of a truck's load. If the scale house attendant encounters a questionable looking load, KLF Phase II Management will be called for further evaluation of the load.

Questionable waste loads or customers who have a history of attempting to deliver inappropriate material to the landfill may also be inspected. If unacceptable wastes are detected by the scale house, the attendant will reject the load and direct the transporter to seek appropriate resources for proper disposal of the rejected waste. The scale house attendant must notify KLF Phase II Management so the incident can be documented in the *KLF Daily Log Book*.

KLF Phase II equipment operators and traffic controllers at the landfill working face also observe and monitor disposal operations for hazardous and other unacceptable wastes. Should wastes that contain questionable looking materials be observed, the KLF Phase II Supervisor or Site Manager will be called upon to determine the acceptability of the waste. If unacceptable wastes are detected at the working face, the procedures listed in Section 7 will be followed.

### **6.3 Random Load Checks**

Random load checks are conducted at the KLF Phase II by WMH or a County employee or other designated and trained person at the working face to detect unacceptable wastes, such as hazardous waste, tires, batteries, PCB waste, CFC-containing appliances, etc. One random load check is performed daily. All waste loads brought to the KLF Phase II are subject to random load checks.

### **6.3.1 Random Load Check Procedures**

A load will be selected for inspection at random and the driver will be notified at the working face. The randomly selected transporter will then be directed to a designated area of the working face. Prior to the load check, the inspector will give the driver/transporter a brief explanation of the load check program, and then instruct the driver to pull forward while dumping so the waste load can be adequately inspected for the presence of hazardous or other unacceptable wastes.

If unacceptable wastes are identified during a load check, the prohibited portion will be rejected. If hazardous or PCB wastes are detected, the entire load will be rejected and the generator will be notified. Arrangements will be made with the generator to have the waste retrieved or otherwise properly managed (transporters / generators will be directed to appropriate state or local agencies or vendors, for assistance in finding appropriate handling or disposal of their wastes).

Information such as the date and time of inspection, transporter information (vehicle license plate number, name, phone number, type of vehicle), generator information (source of the load as stated by the driver), description of the load, and actions taken are recorded on a *Load Check Data Sheet* (see Attachment C). At the end of the inspection, both the driver and the inspector sign the load check sheet. These sheets are maintained on site as part of the KLF Phase II Operating Record/Files.

## 7 ON-SITE MANAGEMENT OF WASTE

---

The following procedures are implemented at the KLF Phase II when unacceptable waste is detected:

1. If the waste has not been unloaded, reject the load and notify the generator/transporter that unacceptable waste was in the load. Document the incident in the KLF Phase II Daily Log Book.
  - (a) If it is a hazardous waste or PCB waste, follow the notification procedures listed in Section 7.3.
2. If the waste has been unloaded (i.e., the waste cannot be returned to the transporter), segregate or cordon off the material. KLF Phase II personnel will decide if the waste can be handled/managed on site (i.e., hazardous vs. non-hazardous):
  - (a) If the material is a hazardous waste, segregate or cordon off the material to establish a safe zone. Other vehicles will be directed to dump in another location.
    - i.) The KLF Phase II will contact the generator so they can coordinate a qualified contractor to undertake proper management methods (see Section 7.2.2).
    - ii.) The KLF Phase II will follow notification procedures in Section 7.3.
  - (b) If the waste material is unacceptable but non-hazardous (tires, vehicle batteries, compressed gas tanks, white goods), it will be managed in a manner appropriate to the risks of handling/storing the material (see Section 7.2.1).

If the characteristics of the waste are unknown, the procedures detailed in 2(a) should be followed. Handling and management procedures will be determined on a case-by-case basis in consultation with experienced personnel or agencies.

### 7.1 Hazardous Waste Management

In the event a generator cannot effect the removal of a delivered load determined to be unacceptable/hazardous, the KLF Phase II will contact a licensed contractor to respond to and manage the removal and disposal of the load. Hazardous wastes will be removed from the site by a licensed hazardous waste transporter under proper manifesting, and disposed or treated at a permitted facility. Anyone transporting hazardous waste from the landfill must comply with 40 CFR §262, and is required to:

- Obtain an EPA identification number.
- Package the waste in accordance with the United States Department of Transportation (DOT) regulations under 49 CFR §173, 178, and 179. The container must be labeled, marked, and a placard must be displayed in accordance with DOT regulations for hazardous waste materials (49 CFR §172).
- Properly manifest the waste designating a permitted facility to treat, store, or dispose of the hazardous waste.

## **7.2 On Site Storage of Waste**

### **7.2.1 Unacceptable Waste Storage**

If the wastes are characterized as unacceptable *but non-hazardous* (tires, compressed gas tanks, white goods), KLF Phase II personnel will transport the wastes to designated materials storage area. The waste will be identified, logged, placed in bins or separated onto pallets, labeled, and stored until a contractor transports the waste off site for proper disposal as required by Federal and State regulations.

### **7.2.2 Hazardous Waste Storage**

The KLF Phase II is classified as a conditionally exempt small quantity generator. Hazardous wastes may be stored at the KLF Phase II indefinitely provided that the procedures required by 40 CFR §261 are followed. In general, the following practices will be followed for the storage of hazardous wastes:

- The waste is placed in tanks or containers.
- The date of receipt of the waste is clearly marked and visible on the container.
- The container is clearly marked with the words "Hazardous Waste."
- The employee designated as the emergency coordinator is responsible for coordinating all emergency response measures.
- The name and telephone number of the emergency coordinator and the number of the fire department is posted next to the facility phone. Emergency response telephone numbers are posted throughout the site.

## **7.3 Agency Notification**

If a regulated hazardous waste or PCB waste is detected during a random load check or at the KLF Phase II, a written report will be sent to the DOH Solid and Hazardous Waste Branch within 24 hours, or the next working day. The report will include the following information:

- Date of detection
- Type and volume of waste
- Generator and transporter, if known
- Any environmental or safety issues or mitigation measures conducted

- Anticipated or final disposition of waste



## 8 RECORD KEEPING

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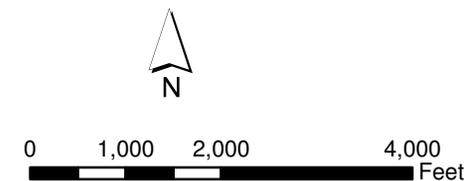
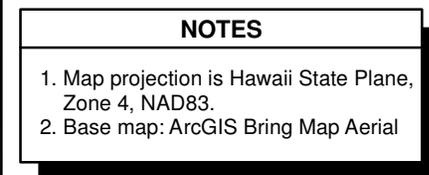
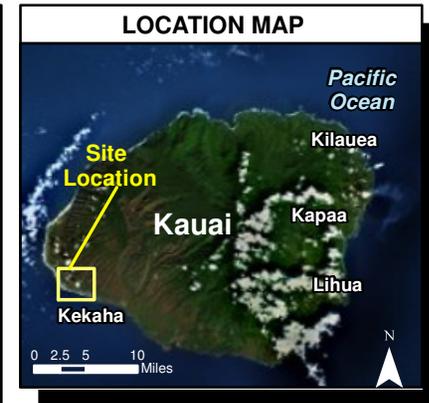
The following records are maintained on site as part of the KLF Site Operating Record/Files that relate to the *KLF Waste Acceptance / Hazardous Waste Exclusion Program*:

- Records of employee training in the prevention, detection, and management of acceptable and unacceptable wastes, including hazardous waste and PCBs
- Records documenting results of random load checks and rejected loads
- Records of special waste approvals, special waste schedules, approvals with conditions, and rejections
- Records of hazardous and unacceptable wastes found at the facility where the generator is unknown and anticipated or final disposition of waste
- Agency correspondence and notifications



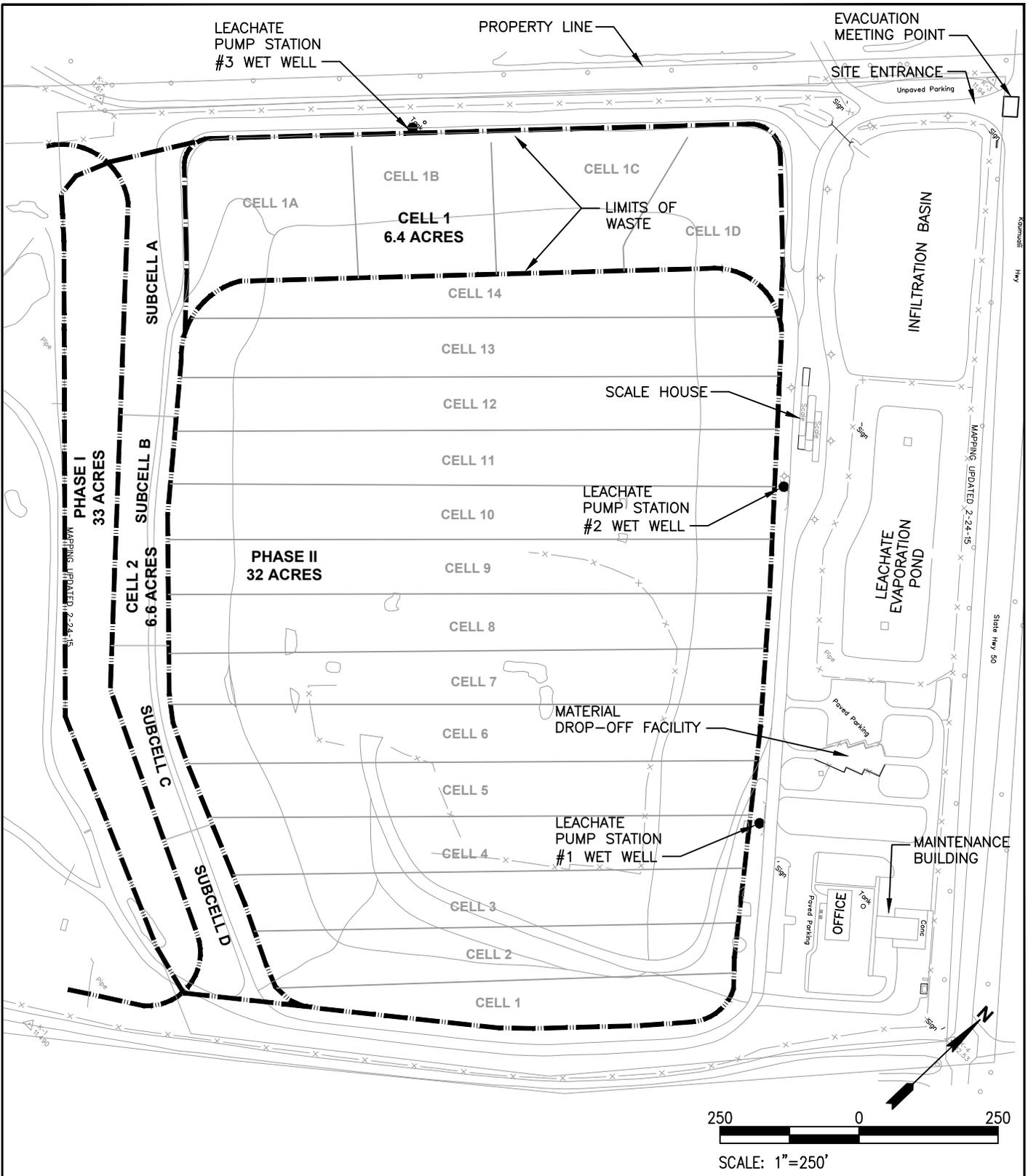
## FIGURES





**Figure 1**  
**Site Location Map**  
**Kekaha Landfill**  
**Kauai, Hawaii**





**Figure 2**  
**Site Layout Map**  
**Kekaha Municipal Solid Waste Landfill**  
**Kekaha, Hawai'i**



**APPENDIX A:**

**ASBESTOS MANAGEMENT & DISPOSAL PLAN**



**ASBESTOS MANAGEMENT AND DISPOSAL PLAN**

**KEKAHA SANITARY LANDFILL**

**KEKAHA, KAUA`I**



**PREPARED BY**

**WASTE MANAGEMENT OF HAWAII, INC.**

**JUNE 2016**



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## ACRONYMS AND ABBREVIATIONS

%	percent
ACM	asbestos-containing material
CAB	Clean Air Branch, Department of Health
CFR	Code of Federal Regulations
DOH	Department of Health, State of Hawaii
DOT	Department of Transportation, United States
EL	Excursion Limit
EPA	Environmental Protection Agency, United States
GPS	global position system
HAR	Hawaii Administrative Rules
KLF	Kekaha Sanitary Landfill
MSW	municipal solid waste
NESHAP	National Emissions Standard for Hazardous Air Pollutants
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PCB	polychlorinated biphenyls
PPE	Personal Protective Equipment
TWA	time weighted average
WMH	Waste Management of Hawaii, Inc.

# 1. INTRODUCTION

In accordance with the requirements of the Code of Federal Regulations (CFR) 1910.1001 “Asbestos”, 40 CFR Subpart M “National Emission Standard for Hazardous Air Pollutants (NESHAP [Asbestos])” 61.154 “*Standard for active waste disposal sites*”, and the Hawai`i Administrative Rules (HAR) Title 11, Chapters 501 through 504, Waste Management of Hawaii (WMH) has implemented this *Asbestos Management And Disposal Plan* at the Kekaha Sanitary Landfill (KLF) in order to provide site-specific guidelines for the safe management and disposal of asbestos-containing materials (ACM), and to describe procedures utilized to minimize potential exposure to asbestos or ACM at the site.

# 2. DEFINITIONS

- **Asbestos** – There are two general forms of asbestos:

1. “**Friable asbestos materials**” contain more than 1 percent (%) asbestos (as determined by 40 CFR 763), and when dry, can be crumbled, pulverized, or reduced to powder by hand.

Dry, friable asbestos becomes an inhalation hazard when it is broken up or damaged because asbestos fibers are released into the air. Some examples of friable asbestos materials are sprayed-on acoustic ceiling material and ceiling tiles, pipe and duct insulation, insulating boards, and insulating textiles.

2. “**Non-friable asbestos-containing materials**” contain more than 1% asbestos, as determined (as determined by 40 CFR 763), and when dry, cannot be crumbled, pulverized, or reduced to powder by hand.

Dry, non-friable asbestos materials are not likely to release asbestos fibers because the fibers have been bound in a tight matrix. Only sanding or cutting this type of material could release asbestos fibers. Materials such as floor tile, sheet vinyl flooring, roof felts, asphalt tiles, ceiling tiles and caulking are considered non-friable forms of asbestos, unless they are or will be damaged during demolition or renovation activities.

- **Excursion Limit (EL)** – The 30-minute time weighted average (TWA) airborne concentration of asbestos (1 fiber per cubic centimeter) to which no employee shall be exposed.
- **Permissible exposure limit (PEL)** – The 8-hour TWA airborne concentration of asbestos (0.1 fiber per cubic centimeter) above which no employee shall be exposed.

### **3. KLF PERSONNEL AND TRAINING**

It is the responsibility of all KLF personnel to follow the work practices/requirements of this Plan. KLF personnel involved with asbestos management and disposal operations and/or have waste screening responsibilities are trained annually on the following topics:

- Health effects associated with asbestos exposure
- Relationship between smoking and exposure to asbestos, producing lung cancer and access to smoking cessation programs
- Quantity, location, manner of use, release, and storage of asbestos, and the specific nature of operations that could result in exposure to asbestos
- Engineering controls and work practices associated with the employee's job assignment
- Specific procedures implemented to protect employees from exposure to asbestos, such as appropriate work practices, emergency and clean-up procedures, and personal protective equipment (PPE) to be used
- Purpose, proper use, and limitations of respirators and protective clothing
- Purpose and description of the medical surveillance program
- Content of the Occupational Safety and Health Administration (OSHA) asbestos regulations, including the appendices
- Labeling and signage requirements

The following documentation is maintained for each KLF employee on-site, as part of the KLF Operating Record/Files:

- Medical and health surveillance records (retained for employees working history plus 30 years).
- Training records (retained for a minimum of one year after the end of employment).

### **4. HEALTH SURVEILLANCE**

#### **4.1 EXPOSURE MONITORING**

Past air monitoring activities at the KLF demonstrated that ACM disposal operations do not result in exposures to airborne concentrations of asbestos fibers at or above the PEL or EL (KLF operations personnel do not handle or offload ACM waste). Therefore, KLF personnel are not required to wear Level C PPE (air-purifying respiratory protection and disposable body covering). KLF personnel wear only standard, Level D safety apparel (hard hat, safety vest, steel toes, steel shank boots).

If necessary, the KLF will ensure that any potential employee exposure to ACM at or above the PEL will result in the initiation of a respiratory protection program in accordance with applicable regulations.

## **4.2 MEDICAL SURVEILLANCE**

WMH institutes a medical surveillance program for KLF operations personnel, even though they are not exposed to asbestos above the PEL. This program consists of pre-employment, post-employment, and annual physical medical examinations. All exams and procedures are performed by or under the supervision of a licensed physician under the medical surveillance provisions of the applicable standard.

## **5. ACM DISPOSAL AREA**

The perimeter of the KLF property is fenced to adequately deter non-authorized public access. Asbestos is disposed at the KLF by creating disposal areas separate from the daily municipal solid waste (MSW). These designated disposal areas follow the leachate collection lines. The active ACM disposal area is a controlled area and access is restricted to authorized personnel and approved customers. This area of the landfill is the only reasonably anticipated area of any exposure, however, since exposures have not been found to be at or above the PEL or EL, the area is not considered an OSHA regulated area. In areas that may pose a potential for exposure to asbestos at or above the PEL or EL, OSHA regulated areas shall be established.

When an asbestos load is scheduled for disposal at the KLF, the designated disposal area is prepared by KLF personnel, and temporary warning signs to identify and restrict access to the disposal location are clearly posted. In accordance with regulatory requirements, the temporary warning signs (20 inches x 14 inches, with a yellow background and black appropriately sized letters/fonts) display the following:

**ASBESTOS WASTE DISPOSAL SITE**  
**DO NOT CREATE DUST**  
**BREATHING ASBESTOS DUST IS HAZARDOUS TO YOUR HEALTH**

KLF employees who work with or near ACM must wash prior to eating, drinking, smoking, or chewing tobacco or gum, and employees are not to engage in these activities in an area where asbestos waste is being disposed.

## **6. PRE-DISPOSAL PROCEDURES**

In accordance with the Special Waste Guidance Manual requirements for approvals and appointments, 40 CFR part 61 subpart M (NESHAP), 29 CFR 1910.1001 (OSHA), and 49 CFR 100-199 United States Department of Transportation (DOT), a *Generator's Waste Profile Sheet* and *Waste Shipment Record* must be completed by the generator and submitted to the KLF for approval prior to transporting ACM to the site.

- At least 24-hours advance notice must be given by the generator/hauler before ACM can be delivered to the site. Coordination for ACM disposal is handled by the WMH. ACM is accepted only on Tuesdays and Thursdays (2 loads per day on a first come first serve basis). The same contractor cannot occupy both slots on the same day.
- ACM pipe is not accepted.
- Each load shall not exceed five (5) cubic yards
- A certified/licensed asbestos contractor shall accompany the ACM delivery and shall remain on-site until landfill management gives clearance for the unloaded ACM.
- Each incoming asbestos load must be accompanied by properly completed documentation. All asbestos waste loads are verified prior to disposal. The scale house attendant weighs all ACM loads and checks that the ACM is properly packaged and labeled. *All asbestos-containing waste is required to be contained in metal or plastic drums or barrels, or be double-wrapped or double-bagged in six millimeter-thick (minimum) plastic or 55-gallon or smaller bags. The generator/hauler is responsible for providing proper packaging and labeling of the ACM. Certain ACM, may make use of packaging alternatives that meet OSHA and NESHAP requirements. Void space within the packaging should be minimized to reduce the potential for puncturing the plastic and causing airborne emissions.*
- The scale house attendant will then check the quantity of the ACM designated on the waste shipping papers vs. the quantity actually received. Attempts will be made to reconcile quantity discrepancies, if any, with the generator, so that reportable discrepancies do not occur. Loads may be rejected if the manifests are not properly completed or ACM are not properly prepared for disposal.
- The scale house attendant will direct the transporter to the landfill working face, and notify KLF operators via two-way radio so that a disposal trench can be excavated (i.e. the designated disposal area).

Note: See attached *General Notice to All Contractors for Asbestos Disposal at the Kekaha Landfill* provided by the County of Kaua`i, Department of Public Works

## **7. ASBESTOS DISPOSAL PROCEDURES**

KLF equipment operators oversee the unloading of ACM at the designated disposal area. All asbestos loads are visually inspected prior to being unloaded, to ensure all packaging and labeling requirements are met. Improper packaging includes torn bags, broken or unsealed containers, or any loose material visible in the load. If the asbestos load is not properly contained, it must be wetted prior to unloading to prevent any potential asbestos particulates from becoming airborne. If significant tearing of the plastic wrapping is noted, the customer may be required to re-wrap and properly seal the waste prior to unloading.

KLF personnel have the right to reject ACM loads that are improperly packaged and/or labeled.

Following the visual inspection, KLF personnel will determine the method by which ACM will be unloaded. The method used shall minimize the risk of rupture to containers or bags. The asbestos load will be placed in a trench, pit or otherwise pre-prepared area at the designated disposal area. If possible, trenches will be cut perpendicular to the prevailing wind. Trenches should be cut in an area that is at least 100 feet away from other site activities. The trench should not be within 10 feet of the perimeter or the side slopes of any fill area, or within 10 feet of the base of any final cover.

The hauler is directed (by the operator or traffic controller) to dump their load directly into the trench/pit, and reminded not to break the seal on any containers, or rupture any bags.

***UNDER NO CIRCUMSTANCES ARE KLF PERSONNEL ALLOWED TO HANDLE OR UNLOAD ANY ACM UNLOADING IS PERFORMED BY THE HAULER.***

There must be no visible asbestos emissions to the outside air from any active waste disposal site where asbestos-containing waste material have been deposited. The disposal trench is covered with 24 inches of MSW immediately after dumping, and daily cover at the end of the day. In order to maintain the integrity of the double wrapping, asbestos waste is not directly compacted or otherwise disturbed by equipment after being unloaded.

The KLF utilizes the leachate collection lines as coordinates for the disposal of asbestos. In addition, a handheld global positioning system (GPS) is used to obtain X-Y coordinates (latitude-longitude) and elevations of ACM disposal locations.

## **8. ASBESTOS EMERGENCY RESPONSE PROCEDURES**

The emergency procedures listed below will be implemented if asbestos fibers become airborne (due to a rupture or breach in the integrity of a bag/container) above the PEL or EL in an uncontrolled manner.

***KLF OPERATORS WILL NOT HANDLE, RELOCATE, OR REPAIR ANY IMPROPERLY PACKAGED ACM CONTAINERS.***

1. All landfill operations will cease within 100 feet of the release until the area is remediated.
- If there is a tear in a bag or container at the designated disposal area, the equipment operator will immediately cover the material with at least 15 centimeters (6 inches) of compacted non-ACM (cover soil) or a minimum of 2 feet of MSW. The material may be remotely (50 to 100 feet and upwind from the release) wetted prior to covering.
- If there is a spill or release of friable asbestos outside of the designated disposal area, the following actions will be taken:
  - Cease all disposal operations and evacuate all personnel/landfill customers to an upwind location.

- ❑ Notify KLF management immediately.
- ❑ Prevent and control access to the location of the release and downwind areas until clean up is complete.
- ❑ Quantify the release and identify potential receptors.
- ❑ Contact local hazardous material emergency response company to complete appropriate response actions (i.e. air or waste sampling, designate safe zones, remediate the spill, and dispose of contaminated media). The spilled ACM shall be double-bagged/containerized and properly labeled and sealed. The bag will then be placed in an excavated disposal trench.
- ❑ Ensure that the emergency response company cleans any KLF equipment that may have been contaminated by the release.
- ❑ Notify agency(s) as required.
  - The Reportable Quantity for asbestos = 1 pound (of actual asbestos, not just ACM). Call the National Response Center @ (800) 424-8802.

Although an off-site abatement contractor would be called in to deal with an emergency, on-site personnel will be part of the initial response. In the event of a ruptured ACM bag, KLF personnel will take immediate action to contain the release and prevent unnecessary exposures. Any KLF personnel that enter the regulated area must wear a respirator, be medically qualified, and will have been properly trained (complete “first responder operations level” training [8 hours plus annual refresher]), and fit-tested.

## **9. REPORTING REQUIREMENTMENTS**

The KLF maintains the following information for all ACM waste shipments received at the landfill.

1. Waste shipment records documenting:
  - The name, address, and telephone number of the generator.
  - The name, address, and telephone number of the transporter(s).
  - The quantity of the asbestos-containing waste material in cubic yards. The scale at the KLF records asbestos loads in tons, and the tonnage is then converted into cubic yards.
  - If a significant amount of improperly packaged ACM is brought to the landfill, written notification (and a copy of the waste shipment record) will be submitted to the State of Hawaii Department of Health (DOH) by the next working day.
  - Disposal date.

2. A copy of the signed waste shipment record is sent back to the generator as soon as possible, and no longer than 30 days after receipt of the ACM.
3. Any discrepancies in the quantity of ACM received vs. the quantity designated on a waste shipment record will be reconciled with the generator. If the discrepancy is not resolved within 15 days after receiving the waste, written notification describing the issue and a copy of the waste shipment record will be submitted to the DOH immediately.
4. Copies of all required records and reports are maintained on-site as part of the KLF's Operating Record/Files for at least 2 years. All ACM disposal location and quantity (cubic yards) records are maintained until closure.

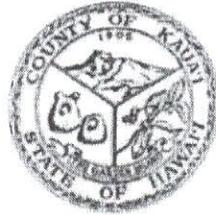
## **10. ASBESTOS EXCAVATION**

The DOH Clean Air Branch (CAB) and United States Environmental Protection Agency (EPA) will be notified, in writing, at least 45 days prior to excavating or disturbing any ACM that has been landfilled. The notification will include:

- Scheduled starting and completion dates.
- Reason for disturbance of waste.
- Procedures that will be used to control emissions during excavation, storage, transfer, and final disposal of the excavated ACM.
- The temporary storage location of the ACM and its final disposition.

If any changes are made to the scheduled start date or completion date, the KLF will re-notify the DOH CAB and the EPA at least 10 days prior to the scheduled change.

**Bernard P. Carvalho, Jr.**  
Mayor



**Larry Dill, P.E.**  
County Engineer

**Gary K. Heu**  
Managing Director

**Lyle Tabata**  
Deputy County Engineer

**DEPARTMENT OF PUBLIC WORKS**

**County of Kaua'i, State of Hawai'i**

4444 Rice Street, Suite 275, Lihue, Hawai'i 96766  
TEL (808) 241-4992 FAX (808) 241-6604

April 18, 2012

**GENERAL NOTICE TO ALL CONTRACTORS**

**SUBJECT: Asbestos Disposal at the Kekaha Landfill**

The Kekaha Landfill will continue operations to accept asbestos containing materials effective April 24, 2012 on a limited basis subject to the following additional conditions:

1. Asbestos Containing Materials (ACM) will be accepted on Tuesdays and Thursdays by scheduled appointment only.
2. ACM pipe will not be accepted.
3. Appointments shall be made by calling the landfill 24-hours in advance of a planned delivery, and will be on a first-come first-serve basis.
4. Each Generator entity may be allowed a maximum of one ACM load per day.
5. At a minimum, all ACM shall be delivered double bagged in 55 gallon or smaller plastic bags of the appropriate thickness.
6. Each ACM load shall not exceed five (5) cubic yards.
7. The Landfill will accept a maximum of two (2) ACM loads per day designated for ACM acceptance.
8. Appointments are not transferable.
9. All deliveries shall be accompanied by the appropriate waste manifest. Loads may be rejected if the manifests are not properly completed or if ACM are not properly prepared.
10. ACM shall be unloaded in the area designated by the County.
11. A certified/licensed asbestos contractor shall accompany the ACM delivery and shall remain onsite until landfill management gives clearance for the unloaded ACM.

Please contact the Kekaha Landfill at (808) 337-1416 to schedule appointments.

Sincerely,

LARRY DILL  
County Engineer

Cc: County PIO  
Division of Solid Waste Management  
Landfill Supervisor  
Waste Management of Hawai'i at the Kekaha Landfill

**APPENDIX B:**

**REFRIGERANT MANAGEMENT PLAN**



**REFRIGERANT MANAGEMENT PLAN**  
**KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II**  
**KEKAHA, KAUA‘I**



**PREPARED FOR**  
**WASTE MANAGEMENT OF HAWAII, INC.**  
**JANUARY 2016**



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## ACRONYMS AND ABBREVIATIONS

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CFC	chlorofluorocarbon
EPA	Environmental Protection Agency, United States
KLF	Kekaha Municipal Solid Waste Landfill
MDOF	materials drop-off facility
WMH	Waste Management of Hawaii, Inc.



# 1 OVERVIEW

---

Title VI (Stratospheric Ozone Protection) of the Clean Air Act (Public Law 101-549) Amendments of 1990 establishes regulatory and voluntary programs to monitor ozone depleting substances such as chlorofluorocarbons (CFCs). CFCs are used as refrigerant for air conditioners, freezers, and refrigeration equipment in buildings, homes, supermarkets, and automobiles. Sections within Title VI cover the production of ozone depleting chemicals; recycling and handling requirements; bans on intentional venting or releasing of CFCs; evaluation of substitutes; and public education programs.



## 2 PURPOSE

---

The United States Environmental Protection Agency (EPA) has numerous federal regulations about protecting the stratospheric ozone. These regulations include equipment certification, maintenance and service practices, refrigerant reclaiming requirements, training, and record keeping for the purchase, use, sale, transfer, and disposal of these substances.

This Refrigerant Management Plan has been prepared for the Kekaha Municipal Solid Waste Landfill (KLF) – Phase II by Waste Management of Hawaii, Inc. (WMH) to ensure compliance with 40 CFR Part 82, Subpart B & F – *Management & Disposal of Freon (CFCs) Containing Appliances*.



### 3 FACILITY ACTIVITIES

---

The KLF Phase II does **not** accept items or appliances for disposal that contain refrigerants (i.e., refrigerators, air conditioners, or freezers). Residential users may drop off such items at a designated area within the KLF Phase II's Materials Drop-Off Facility (MDOF). These items are removed from the MDOF by a certified contractor working for the County of Kaua'i. They are transported off site to a scrap metal contractor, who properly removes the refrigerant and recycles the appliance.

KLF Phase II employees are trained to correctly handle refrigerant-containing appliances using the following procedures. All incoming waste is subject to ongoing visual screening, which begins at the scale house and includes random and select load checks. KLF Phase II operators monitor incoming waste loads as they are tipped at the landfill working face. If a residential hauler/customer brings refrigerant-containing appliances into the landfill, KLF Phase II personnel will direct the customer not to unload the items and refer them to the MDOF or scrap metal yard. If a commercial hauler/customer brings refrigerant-containing appliances into the landfill, KLF Phase II personnel will reject the item and instruct the hauler to take the item with them out of the facility to be disposed of by other approved means. Per the EPA and State of Hawai'i Department of Health requirements, commercial refrigerant-containing appliances must be properly emptied of refrigerants prior to being accepted by the scrap metal yard.

If refrigerant-containing items are discovered at the working face and the hauler/landfill customer cannot be identified, KLF Phase II personnel will remove the items from the active disposal area. They will transfer the items to the MDOF. The MDOF is away from normal traffic flow, which provides a safe storage environment.



## **4 REFRIGERANT REMOVAL**

---

KLF Phase II personnel do not perform refrigerant removal procedures. Therefore, since items discovered at the working face may not have undergone refrigerant removal procedures, KLF Phase II employees are instructed to handle items as if they contain refrigerant. Items are handled with care to prevent damages to the refrigerant system.

Refrigerant-containing items are removed from the MDOF by a certified contractor working for the County of Kaua'i. The items are transported off site to the scrap metal contractor, who properly removes the refrigerant and recycles the appliance.

When it is necessary to remove refrigerant at the landfill, a certified contractor is hired to perform the process. The contractor assumes all responsibility for the proper management of the refrigerant.



## 5 TRAINING & RECORD KEEPING

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KLF Phase II operations personnel are trained in the proper management of refrigerant-containing appliances and are instructed to carefully remove these items from the landfill. Documentation of completed training sessions is maintained on site in the KLF Phase II Site Operating Record / Files.

Refrigerant-containing items recovered from the working face are inventoried on the *KLF Daily Operations Log*. No other documentation is required by this plan or the EPA, unless the facility begins managing refrigerant recovery operations.



## **6 RELEASE REPORTING**

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In the case of a refrigerant release or spill occurs on site, the KLF Phase II Site Manager will record the incident in the facility's operating files. The WMH Environmental Protection Manager will work with the KLF Phase II Site Manager to notify the appropriate agencies.



**APPENDIX C:**  
**ELECTRONIC WASTE PLAN**



**ELECTRONIC WASTE PLAN**  
**KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II**  
**KEKAHA, KAUA‘I**



**PREPARED FOR**  
**WASTE MANAGEMENT OF HAWAII, INC.**  
**JANUARY 2016**



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## ACRONYMS AND ABBREVIATIONS

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CESQG	conditionally exempt small quantity generator
CRT	cathode ray tube
EPA	Environmental Protection Agency, United States
e-waste	electronic waste
KLF	Kekaha Municipal Solid Waste Landfill
LCD	liquid crystal display
TCLP	Toxicity Characteristic Leaching Procedure
WMH	Waste Management of Hawaii, Inc.



# 1 HAZARDOUS WASTE EXCLUSION PLAN – ELECTRONIC WASTE

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Federal and state laws prohibit hazardous waste disposal at solid waste landfills. To protect human health and the environment, the Kekaha Municipal Solid Waste Landfill (KLF) – Phase II and Waste Management of Hawaii, Inc. (WMH) have developed and implemented a program to detect and prevent the disposal of these regulated hazardous wastes.

One of these programs is the KLF Phase II Hazardous Waste Exclusion Program. This program requires the generator of a commercial/industrial waste stream to properly characterize the waste and complete a special waste profile. Only waste characterized as non-hazardous is accepted for disposal. While this requirement also applies to electronic wastes (e-waste), the WMH is submitting an amended hazardous waste exclusion plan to further describe e-wastes. A summary of the changes are found below:

## 1.1 Electronic Wastes

E-waste is increasing in volume and contains substances such as lead, mercury, and polychlorinated biphenyls that can pollute air and water. The United States Environmental Protection Agency (EPA) has defined e-waste as:

*“...electronic products being discarded by consumers. These include a wide range of items, such as: televisions; computers and computer peripherals; audio and stereo equipment; VCRs and DVD players; video cameras; telephones; cellular phones and other wireless devices; fax machines; copy machines; and video game consoles.”*

As stated in a June 9, 2006 letter from the State of Hawai'i Department of Health to the City and County of Honolulu, recent studies have indicated that some e-waste have tested as hazardous, (“Based on studies conducted by the EPA, the CRTs [Cathode Ray Tubes] and LCDs [Liquid Crystal Displays] will fail the Toxicity Characteristic Leaching Procedure (TCLP) test for heavy metals such as lead, mercury, and cadmium”).

Additionally, testing conducted on other e-wastes in California suggests that non-CRT electronic materials can exhibit the characteristic of hazardous waste. E-waste items such as CPUs, printers, cell phones, radios, and VCRs tested above Resource Conservation and Recovery Act hazardous waste levels for lead.

([http://www.dtsc.ca.gov/HazardousWaste/EWaste/upload/HWMP\\_REP\\_SB20\\_LCD.pdf](http://www.dtsc.ca.gov/HazardousWaste/EWaste/upload/HWMP_REP_SB20_LCD.pdf))

WMH encourages customers to donate working electronics to organizations in need. Recycling these devices is the best course of action whenever possible.

## 1.2 Electronic Waste Disposal

Commercial/business generators of computer and television monitors are subject to hazardous waste laws and must determine whether items are hazardous waste using one of following methods:

- Determine whether the item is listed under Hawai'i Administrative Rules 11-261.
- Test for hazardous waste constituents under the TCLP.
- Use generator knowledge of the waste.

The KLF Phase II has determined that there is adequate empirical evidence to suggest that CRTs (from computer monitors/televisions) and LCDs (from flat screen panels, plasma screens, and laptops) are hazardous wastes. These items are prohibited from being disposed at the landfill. Signs will be posted to that effect at the facility entrance. KLF employees and County of Hawai'i scale house personnel will be trained accordingly.

Commercial/business shipments suspected of containing regulated hazardous e-waste will be prohibited unless TCLP data is submitted to support the non-hazardous classification made by the generator.

## 1.3 Household E-Waste Exemption

Used CRTs and LCDs generated by households are not considered hazardous waste and are not regulated under federal regulations. 40 CFR 261.4 (b)(1):

*(b) Solid wastes which are not hazardous wastes. The following solid wastes are not hazardous wastes:*

*(1) Household waste, including household waste that has been collected, transported, stored, treated, disposed, recovered (e.g., refuse-derived fuel) or reused. "Household waste" means any material (including garbage, trash and sanitary wastes in septic tanks) derived from households (including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds and day-use recreation areas).*

\*Note (1) above applies only to residents of the facilities listed above and should not be construed to mean the commercial or government entities controlling the listed facilities.

CRTs and other e-wastes in non-bulk shipments from residential sources will be *accepted* for disposal. It will be assumed that these items are from households and therefore exempt from federal hazardous waste disposal restrictions. As such, the items will be accepted at the landfill as long as they are delivered in household quantities (one per household).

## 1.4 Conditionally Exempt Small Quantity Generators:

Businesses and other organizations that discard less than 100 kilograms (approximately 220 pounds) per month of hazardous waste (including e-waste) are considered conditionally exempt small quantity generators (CESQG). CESQGs are not regulated under most federal requirements (See 40 CFR 261.5).

However, to apply this exemption, WMH and the KLF Phase II must rely on the generator to appropriately monitor and apply the correct generator status. Therefore, only e-waste shipments accompanied by a statement certifying the material was generated by a CESQG will be accepted. Copies of the statement will be maintained on site.

E-waste that has been properly tested and profiled may be accepted from commercial/industrial sources.



**ATTACHMENT A:**

**CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR CERTIFICATION**





**WASTE MANAGEMENT, INC.**

***Kekaha Sanitary Landfill***

6900-D Kaunaulii Highway

Kekaha, Hawai'i 96752

**Conditionally Exempt Small Quantity Generator  
Certification**

\_\_\_\_\_, certifies to any interested parties, that we are a Conditionally Exempt Small Quantity Generator (CESQG) based on conditions specified in 40 CFR 261.5, Resource Conservation and Recovery Act (RCRA). We certify that we:

1. generate no more than 100 kilograms (Kg) (220 pounds) in one calendar month, of RCRA regulated hazardous waste in one calendar month.
2. generate no more than 1 Kg (2.2 pounds) of acutely hazardous waste as per RCRA.
3. did not exceed the storage limits of 1,000 Kg (2,200 pounds) of RCRA regulated hazardous waste at any one time.

\_\_\_\_\_  
Authorized Representative Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Business/Organization

\_\_\_\_\_  
Date



**ATTACHMENT B:**

**GENERATOR'S WASTE PROFILE SHEET**  
**&**  
**DISPOSER'S INDEMNIFICATION AGREEMENT**



# GENERATOR'S WASTE PROFILE SHEET

PLEASE PRINT IN INK OR TYPE

Service Agreement on File?  YES  NO  
 Hazardous  Non-Hazardous  TSCA

Profile Number: WMI \_\_\_\_\_  
 Renewal Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

## A. Waste Generator Information

1. Generator Name: _____ 3. Facility Street Address: _____ 5. Facility City: _____ 7. Zip/Postal Code: _____ 9. County: _____ 11. Customer Name: _____ 13. Customer Contact: _____ 15. Billing Address: _____	2. SIC Code: _____ 4. Phone: _____ 6. State/Province: _____ 8. Generator USEPA/Federal ID#: _____ 10. State/Province ID#: _____ 12. Customer Phone: _____ 14. Customer Fax: _____ <div style="text-align: right;"><input type="checkbox"/> Same as above</div>
--	---

## B. Waste Stream Information

1. Description  
 a. Name of Waste: \_\_\_\_\_  
 b. Process Generating Waste: \_\_\_\_\_

c. Color	d. Strong odor (describe):	e. Physical State @ 70°F	f. Layers	g. Free liquid range to %
		<input type="checkbox"/> Solid <input type="checkbox"/> Liquid <input type="checkbox"/> Gas <input type="checkbox"/> Sludge <input type="checkbox"/> Other	<input type="checkbox"/> Single Layer <input type="checkbox"/> Multi-Layer	
				h. pH: Range to %

i. Liquid Flash Point:  <73°F     73-99°F     100-139°F     140-199°F     ≥200°F     Not applicable

j. Chemical Composition (List all constituents [including halogenated organics, debris, and UHCs] present in any concentration and submit representative analysis):

Constituents	Concentration Range	Constituents	Concentration Range

**TOTAL COMPOSITION MUST EQUAL OR EXCEED 100%**

k.  Oxidizer     Pyrophoric     Explosive     Radioactive  
 Carcinogen     Infectious     Shock Sensitive     Water Reactive

l. Does the waste represented by this profile contain any of the carcinogens which require OSHA Notification? (list in Section B.1.j) .....  YES  NO

m. Does the waste represented by this profile contain dioxins? (list in Section B.1.J) .....  YES  NO

n. Does the waste represented by this profile contain asbestos? .....  YES  NO  
 If yes .....  friable  non-friable

o. Does the waste represented by this profile contain benzene? .....  YES  NO  
 If yes, concentration \_\_\_\_\_ Ppm  
 Is the waste subject to the benzene waste operations NESHAP? .....  YES  NO

p. Is the waste subject to RCRA Subpart CC controls? .....  YES  NO  
 If yes, volatile organic concentration \_\_\_\_\_ ppm

q. Does the waste contain any Class I or Class II ozone-depleting substances? .....  YES  NO

r. Does the waste contain debris? (list in Section B.1.j) .....  YES  NO

2. Quantity of Waste  
 Estimated Volume \_\_\_\_\_  Tons     Yards     Drums     Other (specify) \_\_\_\_\_

3. Shipping Information  
 a. Packaging:  
 Bulk Solid; Type/Size: \_\_\_\_\_     Bulk Liquid; Type/Size: \_\_\_\_\_  
 Drum; Type; Size: \_\_\_\_\_     Other: \_\_\_\_\_

b. Shipping Frequency: Units \_\_\_\_\_ Per:  Month  Quarter  Year  One time  Other \_\_\_\_\_

c. Is this a U.S. Department of Transportation (USDOT) Hazardous Material? (If No, skip d, e, and f) .....  YES  NO

GENERATOR'S WASTE PROFILE SHEET

PLEASE PRINT IN INK OR TYPE

Profile Number: WMI \_\_\_\_\_

- d. Reportable Quantity (lbs; kgs.): \_\_\_\_\_ e. Hazard Class/ID#: \_\_\_\_\_
f. USDOT Shipping Name: \_\_\_\_\_
g. Personal Protective Equipment Requirements: \_\_\_\_\_
h. Transporter/Transfer Station: \_\_\_\_\_

C. Generator's Certification (Please check appropriate responses, sign and date below.)

- 1. Is this a USEPA hazardous waste (40 CFR Part 261)? If the answer is no, skip to 2. YES NO
a. If yes, identify ALL USEPA listed and characteristic waste code numbers (D, F, K, P, U)
b. If a characteristic hazardous waste, do underlying hazardous constituents (UHCs) apply? (If yes, list in Section B.1.) YES NO
c. Does this waste contain debris? (If yes, list size and type in Chemical Composition - B.1.) YES NO
2. Is this a state hazardous waste Identify ALL state hazardous waste codes YES NO
3. Is the waste from a CERCLA (40 CFR 300, Appendix B) or state mandated clean-up? YES NO
4. Does the waste represented by this waste profile sheet contain radioactive material, or is disposal Regulated by the Nuclear Regulatory Commission? YES NO
5. Does the waste represented by this waste profile sheet contain concentrations of Polychlorinated Biphenyls (PCBs) regulated by 40 CFR 761? (If yes, list in Chemical Composition - B.1.) YES NO
a. If yes, were the PCBs imported into the U.S.? YES NO
6. Do the waste profile sheet and all attachments contain true and accurate descriptions of the waste Material, and has all relevant information within the possession of the Generator regarding known or Suspected hazards pertaining to the waste been disclosed to the Contractor? YES NO
7. Will all changes which occur in the character of the waste be identified by the Generator and disclosed to the Contractor prior to providing the waste to the Contractor? YES NO

Check here if a Certificate of Destruction or Disposal is required.

Any sample submitted is representative as defined in 40 CFR 261 - Appendix I or by using an equivalent method. I authorize WMI to obtain a sample from any waste shipment for purposes of recertification. If this certification is made by a broker, the undersigned signs as authorized agent of the generator and has confirmed the information contained in this Profile Sheet from information provided by the generator and additional information as it has determined to be reasonably necessary. If approved for management, Contractor has all the necessary permits and licenses for the waste that has been characterized and identified by this approved profile.

Certification Signature: \_\_\_\_\_ Title: \_\_\_\_\_

Name (Type or Print): \_\_\_\_\_ Company Name: \_\_\_\_\_ Date: \_\_\_\_\_

Check if additional information is attached. Indicate the number of attached pages \_\_\_\_\_

D. WMI Management's Decision

FOR WMI USE ONLY

- 1. Management Method Landfill Non-hazardous Solidification Bioremediation Incineration Hazardous Stabilization Other (Specify)
2. Proposed Ultimate Management Facility:
3. Precautions, Special Handling Procedures, or Limitation on Approval:

Special Waste Decision Approved Disapproved

Salesperson's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Division Approval Signature (Optional): \_\_\_\_\_ Date: \_\_\_\_\_

Special Waste Approvals Person Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**DISPOSER'S INDEMNIFICATION  
AGREEMENT REGARDING DISPOSAL  
OF NON-HAZARDOUS WASTES**

\_\_\_\_\_ warrants that all wastes that are directed to KEKAHA SANITARY LANDFILL for disposal are non-hazardous wastes as defined by all applicable federal, state and local laws, rules, regulations, permits, and administrative and judicial decisions.

In order that we may continue to service you, please acknowledge your receipt and comprehension of this letter by having an officer or an authorized signature places in the space provided below and return this letter as soon as possible.

Should you determine that you transport or generate a hazardous waste, we would welcome the opportunity to assist you through the services of our affiliated hazardous waste companies.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Officer or Agent (print or type)

\_\_\_\_\_  
Signature of Officer or Agent

\_\_\_\_\_  
Title of Officer or Agent

\_\_\_\_\_  
Witness



**ATTACHMENT C:**  
**LOAD CHECK DATA SHEET**







**SECTION I - PART C**  
**ENVIRONMENTAL PROTECTION PROGRAM**



**ENVIRONMENTAL PROTECTION PROGRAM  
KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II  
KEKAHA, KAUA‘I**



**PREPARED FOR  
WASTE MANAGEMENT OF HAWAII, INC.  
JANUARY 2016**



## ACRONYMS AND ABBREVIATIONS

---

KLF	Kekaha Municipal Solid Waste Landfill
WM	Waste Management
WMH	Waste Management of Hawaii, Inc.



## **ENVIRONMENTAL PROTECTION – WASTE MANAGEMENT**

*Mission: To advance environmental stewardship by aligning company environmental priorities with those of our customers, potential customers, communities and regulators, and through a commitment to:*

- *Continuously reduce our use of natural resources and potential for environmental impacts*
- *Foster and maintain a culture that respects the environment in every business decision*
- *Implement proactive practices that target tangible industry differentiation based on environmental sustainability and leadership*

The purpose of this section is to describe Waste Management of Hawai'i, Inc.'s (WMH) Environmental Protection Program for the Kekaha Municipal Solid Waste Landfill (KLF) – Phase II. The program ensures that KLF Phase II personnel understand the facility's environmental protection goals and objectives and to operate the site in full compliance with regulatory requirements and Waste Management (WM) policies.

WM provides environmental protection and compliance support to WMH through *WMVisor*, a WM intranet-based system that provides managers at each operating district with online access to corporate policies, training materials, compliance software, regulatory updates, and technical guidance documents.

WMH believes that environmental protection is neither a one-time exercise nor mere compliance with a regulation or standard. Environmental protection is a continual advancement of environmental stewardship and pollution prevention. Environmental compliance is the responsibility of every district and facility manager throughout the company. WMH's Environmental Protection Manager is responsible for ensuring timely and accurate completion of environmental tasks that are key to meeting the company's operational and environmental goals. Compliance and environmental protection are continuously integrated into daily operations at the KLF Phase II and are based on:

- **Planning** – Identifying environmental aspects, establishing goals, writing plans
- **Implementing and Training** – Educating employees on environmental and operational procedures, plans, controls to prevent environmental issues/incidents
- **Monitoring** – Inspecting, mitigating, and tracking site self-assessments
- **Reviewing** – Following up and engaging site personnel so learning is achieved through action and change

The KLF Phase II's Environmental Protection Program is primarily tracked and monitored using computer databases.

- The first Environmental Protection database provides a standard method of tracking environmental compliance across the entire WM organization, and allows for information sharing among facilities, market areas, groups/districts, and corporate levels. The database incorporates applicable site-specific environmental permits and regulations into a user-friendly computer program that documents completion of scheduled compliance-related tasks, such as annual reports, inspections, and environmental sampling.
- The second Environmental Protection database is a tool that helps measure a site's environmental performance through self-assessment. Action items are created based on issues that are identified at the site level, and the computer software assists in tracking and resolving action items.

An environmental protection training program is implemented at the KLF Phase II by WMH's Environmental Protection Manager. The program provides each employee with the knowledge and skills necessary to complete (and document where necessary) their work in compliance with regulatory requirements and company policies. Each employee is responsible to conduct their work in a manner that is conscious of both environmental and safety factors, and to bring any work-related questions or comments to his or her supervisor's attention. The environmental plans and compliance topics that KLF Phase II personnel are trained on may include:

- Spill Prevention Control and Countermeasures Plan
- Hazardous Waste Exclusion & Special Waste Acceptance
- Vector Control
- Mud and Dust Control
- Incident Reporting
- Emergency Action & Contingency Plan
- Asbestos Awareness

KLF Phase II Environmental Protection trainings are conducted in conjunction with the site's Landfill Operations Safety Communication Program to bring together overlapping training topics and present them to KLF Phase II personnel from both a compliance and safety standpoint. This fosters a more complete understanding and awareness of the landfill's permits, operating plans and procedures, as well as defining an individual's roles and responsibilities as members of the KLF Phase II team. Ultimately, it is the responsibility of the KLF Phase II Site Manager to oversee site operations. To ensure overall environmental compliance, the WMH Environmental Protection Manager works with the Site Manager to ensure that daily operations are conducted in compliance with the site's operating permits.

**SECTION I - PART D**  
**SAFETY AND HEALTH**



## *Safety Vision Statement*

World-class safety is achieved when committed employees embrace safety as a core value and act consistently to influence behavior.

Safety should not be considered a priority, but a core value with no compromise. It requires:

**Leadership to:**

- Clearly communicate and model safe behavior
- Genuinely care and demonstrate concern for their employees
- Accept nothing less than a safe operation

**Employees to:**

- Accept responsibility for their safe behavior
- Actively care about the safety of others
- Participate in all aspects of the WM safety programs

The employees of WM are responsible for safety and maintaining a zero tolerance for unsafe actions and decisions. Together, everyone can achieve the level of safety that WM wants for the Company and its employees.



**Bill Cole**  
President WM Safety Services, L.L.C.





**INJURY AND ILLNESS PREVENTION PROGRAM  
KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II  
KEKAHA, KAUA‘I**



**PREPARED FOR  
WASTE MANAGEMENT OF HAWAII**



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## INJURY AND ILLNESS PREVENTION PROGRAM

**Program: Injury and Illness Prevention Program (IIPP)**

**Facility: Kekaha Sanitary Landfill**

**Facility Location: Kekaha, Kauai, Hawaii**

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### **SAFETY POLICY STATEMENT**

At **Kekaha Sanitary Landfill Phase II**, we are committed to health and safety. We want to provide a clean and healthful workplace for our employees and avoid the needless pain and suffering associated with accidents. We are committed to a successful accident prevention program that includes the identification and correction of hazards and training of employees in safe work practices. We strive to comply with all safety and health standards and we expect the full cooperation of our employees so that we can be proud of our safety record.

**Kekaha Sanitary Landfill Phase II** has developed a comprehensive Injury and Illness Prevention Program. The goal of this program is to minimize the frequency and severity of employee accidents and comply with the laws and regulations that pertain to our operation. The program has been designed to eliminate physical hazards from the work environment and train employees in safe work practices.

Accident prevention is an integral part of any successful organization. We recognize that accidents not only cause physical and mental pain to employees, but are also costly in terms of dollars and lost production. Efficient accident prevention can be directly related to increased profitability for our business.

ALTHOUGH THE ULTIMATE RESPONSIBILITY FOR THE SAFETY PROGRAM LIES WITH THE MANAGERS AND SUPERVISORS, THE PROGRAM CANNOT SUCCEED WITHOUT THE COOPERATION OF ALL OUR EMPLOYEES. EVERYONE MUST BE ONE HUNDRED PERCENT SAFETY CONSCIOUS IN EVERYTHING HE OR SHE DOES WHILE ON THE JOB. WE ARE CONFIDENT THAT WITH A SINCERE AND CONCENTRATED EFFORT FROM EVERYONE, OUR SAFETY GOALS CAN BE ACHIEVED.

### **NOTICE TO ALL EMPLOYEES**

As District Manager, I am concerned about personal injuries and vehicle accidents. Accidents cause suffering and financial loss to employees and their families.

I believe there is a safe way to do every job and to reach this goal, a comprehensive Injury and Illness Prevention Program has been established to develop, implement and educate all employees about safety and health policies and procedures.



## INJURY AND ILLNESS PREVENTION PROGRAM

### RESPONSIBILITY

**John Ruiz**, District Manager has been assigned the responsibility and authority to manage the Injury and Illness Prevention Program for **Kekaha Sanitary Landfill Phase II**. We realize that the ultimate responsibility for safety and health in the workplace still rests with:

**SENIOR MANAGEMENT**...has the ongoing responsibility to ensure departmental implementation of the IIP Program and to ensure the health and safety of our employees. This is accomplished by communicating **Kekaha Sanitary Landfill Phase II** emphasis on health and safety, analyzing work procedures for high hazard identification and correction, ensuring regular workplace inspections, providing health and safety training, and encouraging prompt employee reporting of health and safety concerns without fear of reprisal.

**LINE SUPERVISORS**...are responsible for implementing and maintaining the IIP Program in their work areas and for answering worker questions about the Program.

**ALL EMPLOYEES**...are responsible for the timely reporting of safety hazards in the workplace. Employees are also responsible for following general safe work practices, as well as the safe work practices specific to their jobs.

### COMPLIANCE

Management is responsible for ensuring that all safety and health policies and procedures are clearly communicated and understood by all employees. Managers and supervisors are expected to enforce the rules fairly and uniformly.

All employees are responsible for using safe work practices, for following all directives, policies and procedures, and for assisting in maintaining a safe work environment.

Our system for ensuring that all employees comply with the rules and maintain a safe work environment include:

- Informing employees of the provision of our IIP Program;
- Evaluating the safety performance of all employees;
- Recognizing employees who perform safe and healthful work practices;
- Providing training to employees whose safety performance is deficient;
- Conducting Observation Behavior Assessments;
- Coaching employees for failure to comply with safe and healthful work practices; and
- Discipline or corrective action.
- Corrective action steps: 1) Written Warning; 2) Three (3) Day Suspension; 3) Suspension subject to termination; 4) Termination.



### COMMUNICATION

Supervisors are responsible for communicating with all employees about safety and health issues in a form readily understandable by all employees. All department personnel are encouraged to communicate safety concerns to their supervisor without fear of reprisal.

We recognize that open, two-way communication between management and staff on health and safety issues is essential to an injury-free, productive workplace. The following system of communication is designed to facilitate a continuous flow of safety and health information between management and staff in a form that is readily understandable and consists of the following items:

- New work orientation including a discussion of safety and health policies and procedures. [**Employee Orientation Form**]
- Review of our Injury and Illness Prevention Program.
- Workplace safety and health training programs.
- Regularly scheduled safety meetings.
- Effective communication of safety and health concerns between employees and supervisors, including translation where appropriate.
- Posted or distributed safety information.
- A system for employees to anonymously inform management about workplace hazards. [**Employee Report of Unsafe Condition or Hazard Form**]
- A labor/management safety and health committee that meets regularly, prepares written records of the safety and health committees meetings, reviews results of periodic scheduled inspections, reviews investigations of accidents and exposures and makes suggestions to management for the prevention of future incidents.

The Health and Safety Committee includes representatives from:

- Various Landfill Employees
- Supervisor – Ian Imamura
- Manager – John Ruiz

The Safety Committee membership rotates annually.



**HAZARD ASSESSMENT**

Periodic inspections to identify and evaluate workplace hazards will be performed by a competent observer(s) in the following areas of our workplace:

Periodic inspections are performed according to the following schedule:

1. When we initially established our IIP Program;
2. When new substances, processes, procedures or equipment which present potential new hazards are introduced into our workplace;
3. When new, previously unidentified hazards are recognized;
4. When occupational injuries and illnesses occur; and
5. Whenever workplace conditions warrant an inspection.

Periodic safety inspections:

Inspection frequency will depend on the type of inspection to be completed - weekly, monthly or quarterly intervals. The following will be used as a guideline:

- Daily: High hazard or frequently changing operations or equipment  
  
(Commercial vehicles, forklifts, over the road vehicles, wheel loaders, heavy equipment).
- Monthly: Facility inspection of the entire facility.

**[Facility Inspection Form]**

**INCIDENT/EXPOSURE INVESTIGATIONS**

***INJURY REPORTING***

Employees who are injured at work must report the injury immediately to their supervisor. If immediate medical treatment beyond first aid is needed, call 911. The injured party will be taken to the appropriate hospital or medical center. If non-emergency medical treatment for work-related injuries or illnesses is needed, notify supervisor or District Manager. The supervisor of the injured employee must work with the District Manager to ensure that the “Employer’s First Report of Occupational Injury or Illness” and a “Workers’ Compensation Claim Form” are completed properly and submitted. If the injured employee saw a physician, the supervisor should obtain a medical release before allowing the employee to return to work. The health care provider may stipulate work tasks that must be avoided or work conditions (restricted duty) that must be altered before the employee returns to work.



### ***INJURY INVESTIGATION***

The employee's supervisor and/or District Manager are responsible for performing an investigation [**Employee Incident/Injury Form**] to determine and correct the cause(s) of the incident. This form should be completed within 24 hours of the occurrence. Specific procedures to be used to investigate workplace accidents and hazardous substance exposures include:

- Visiting the accident scene as soon as possible;
- Interviewing injured employees and witnesses;
- Examining the workplace for factors associated with the accident/exposure;
- Determining root cause of the accident/exposure;
- Taking corrective action to prevent the accident/exposure from reoccurring; and
- Recording the findings and corrective actions taken.

### **HAZARD CORRECTION**

Unsafe or unhealthy work conditions; practices or procedures shall be corrected in a timely manner based on the severity of the hazards. Hazards shall be corrected according to the following procedures:

- When observed or discovered;
- When an imminent hazard exist which cannot be immediately abated without endangering employee(s) and/or property, we will remove all exposed employees from the area except those necessary to correct the existing condition. Employees necessary to correct the hazardous condition shall be provided with the necessary protection; and
- All such actions taken and dates they were completed shall be documented on the "Hazard Correction Report" [**16A Corrective Action Form**].

### **TRAINING AND INSTRUCTION**

All employees, including managers and supervisors, will have training and instruction on general and job-specific safety and health practices. Training and instruction will be provided as follows:

- When the IIP Program is first established;
- To all employees given new job assignments for which training has not previously been provided;
- Whenever new substances, processes, procedures or equipment are introduced to the workplace and represent a new hazard;
- To supervisors to familiarize them with the safety and health hazards to which employees under their immediate direction and control may be exposed; and
- To all employees with respect to hazards specific to each employee's job assignment.



## INJURY AND ILLNESS PREVENTION PROGRAM

Workplace safety and health practices include, but are not limited to, the following:

- Explanation of **Kekaha Sanitary Landfill Phase II** IIP Program, emergency action plan and fire prevention plan, and measures for reporting any unsafe conditions, work practices, injuries and when additional instruction is needed.
- Use of appropriate clothing, including gloves, footwear and personal protective equipment (PPE).
- Information about chemical hazards to which employees could be exposed and other hazard communication program information.
- Availability of toilet, hand-washing and drinking facilities.
- Provisions for medical services and first aid including emergency procedures.

In addition, **Kekaha Sanitary Landfill Phase II** provides specific instructions to all employees regarding hazards unique to their job assignment, to the extent that such information was not already covered in training.

### RECORDKEEPING

Documents related to the IIP Program are maintained in the landfill office. Retention of records relating to the IIP Program are as follows:

- Records of hazard assessment inspections [**Inspection Form**] including the person(s) conducting the inspection, the unsafe conditions and work practices that have been identified and the action taken to correct the identified unsafe conditions and work practices, are recorded and retained for a minimum of one (1) year; and
- Documentation of safety training for each worker, including the worker's name, training dates, type(s) of training, and training providers are recorded on a worker-training sheet [**Safety Training Attendance Sheet**] and retained for a minimum of one (1) year.



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## INJURY AND ILLNESS PREVENTION PROGRAM

The following specific programs are part of the overall IIP Program effort. Each has its own written program:

### ADD/DELETE APPLICABLE PROGRAMS

- BLOODBORNE PATHOGENS / ECP
- CONFINED SPACE ENTRY
- EMERGENCY ACTION PLAN
- FIRE PREVENTION PLAN
- FORKLIFT OPERATIONS & CERTIFICATION
- HAZARD COMMUNICATIONS
- HEARING CONSERVATION
- HAZARDOUS ENERGY CONTROL PROGRAM
- PERSONAL PROTECTIVE EQUIPMENT
- RESPIRATORY PROTECTION

This Program is hereby approved:

---

SIGNATURE

---

DATE



**LANDFILL SAFETY RULES**

Welcome to Kekaha Sanitary Landfill Phase II. While on landfill property, please follow these simple safety rules:

- Seat belts must be worn while driving on the Kekaha Sanitary Landfill property.
- The speed LIMIT on the landfill is 15 mph.
- Please follow the landfill signs directing you to the offloading area. This location changes day to day. Residents must offload at the material drop off facility.
- Scavenging is strictly prohibited.
- Always wait for the spotter to instruct you where to dump your load. If there is no spotter, the bulldozer operator will provide instructions to you.
- Operators must maintain a safe distance between vehicles while in the offloading area. This means 15 feet between non-tipping vehicles and 1.5 times the length of the trailer or bed for tipping vehicles.
- While in the offloading area, a high visibility safety vest/shirt and safety boots must be worn by all government and commercial drivers anytime you get out of your vehicle and hard hats are recommended. Homeowners are exempt from this requirement.
- While in the offloading area, only the driver and one helper (if necessary) may get out of the truck. While out of the truck, you must remain within 6 feet of your vehicle.

Failure to follow any of the above safety rules may result in you being prohibited from entering the site in the future.



**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Employee Orientation Form**

**EMPLOYEE ORIENTATION FORM**

**EMPLOYEE ORIENTATION**

NAME: \_\_\_\_\_ DATE EMPLOYED: \_\_\_\_\_

DEPARTMENT ASSIGNED: \_\_\_\_\_

JOB ASSIGNMENT: \_\_\_\_\_

The following items should be discussed during orientation:

\_\_\_\_\_ Company safety policies and programs - employee to be given a copy of the Injury and Illness Prevention Program and be required to read it.

\_\_\_\_\_ Safety rules, both general and specific to job assignment.

\_\_\_\_\_ Safety rule enforcement policy (disciplinary procedures).

\_\_\_\_\_ Where, when and how to report injuries.

\_\_\_\_\_ Where, when and how to report unsafe conditions.

\_\_\_\_\_ Review of fire and emergency evacuation plan.

\_\_\_\_\_ Location and use of fire extinguishers.

\_\_\_\_\_ Requirements for safe work clothing, footwear, and other PPE.

\_\_\_\_\_ Importance of housekeeping (spills, etc.)

\_\_\_\_\_ Special job hazards (chemicals, special precautions, etc.)

\_\_\_\_\_ Assignment and use of personal protective equipment

\_\_\_\_\_ Proper lifting procedures (include demonstration)

\_\_\_\_\_ Employee is certified in the following:

**ADDITIONAL TRAINING REQUIREMENTS:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**IMPORTANT:** If employee is transferred to another job, a new safety orientation form should be completed.

SIGNED: \_\_\_\_\_ DATE: \_\_\_\_\_  
Supervisor

SIGNED: \_\_\_\_\_ DATE: \_\_\_\_\_



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**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Employee Orientation Form**



**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Employee Report of Unsafe Condition or Hazard Form**

**EMPLOYEE REPORT OF UNSAFE CONDITIONS OR HAZARD FORM**

**EMPLOYEE REPORT OF UNSAFE CONDITION OR HAZARD**

Name: (optional) \_\_\_\_\_

Department: \_\_\_\_\_

Job Title: \_\_\_\_\_

Location of condition believed to be unsafe/hazardous:

\_\_\_\_\_  
\_\_\_\_\_

Date and time the condition or hazard was observed: \_\_\_\_\_

Description of unsafe condition or hazard:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

What changes would you recommend to correct the condition or hazard?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Employee Signature: (optional) \_\_\_\_\_

Date: \_\_\_\_\_

Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_

Corrected by: \_\_\_\_\_ Date: \_\_\_\_\_



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**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Facility Inspection Form**

**MONTHLY SAFETY & HOUSEKEEPING INSPECTION CHECKLIST**



# INJURY AND ILLNESS PREVENTION PROGRAM

## Facility Inspection Form



### WASTE MANAGEMENT

#### Monthly Safety & Housekeeping Inspection Checklist

Inspection Date: \_\_\_\_\_ Inspector: \_\_\_\_\_

Location Name: \_\_\_\_\_ Location Code: \_\_\_\_\_

Fully explain all items that need immediate attention at the end of the checklist. Include the item letter, number, location of the deficiency, and the corrective action necessary.

A = Adequate at time of inspection

N= Needs attention

N/A = Not applicable

**A** **N** **N/A**

#### GENERAL FACILITY

##### A. Order/Sanitation

		A	N	N/A
1	Aisles and floors free of slip and trip hazards			
2	Corners, out-of-way places clean and orderly			
3	Work places, tables, and benches clean and orderly			
4	Desks, files, supervisor's areas, office neat			
5	Wash rooms, locker rooms and fountains clean and sanitary, disposal containers adequate			
6	Is hand soap or other cleaning agent and warm water provided?			
7	Are hand towels or some other means of drying hands available?			
8	Railings and surrounding areas clear of obstructions with 5 feet of centerline			
9	Sidewalks and parking lots in good condition (walking surface, holes, ice)			
10	Employee break areas clean and orderly			

##### B. Hazard Communication Program

		A	N	N/A
1	Company Health and Safety Policy current and posted? ( IIPP)			
2	Are regulatory posters current and posted (WCB/WSIB, OHS)?			
3	Company H&S documentation posted (Safety Alerts etc)			
4	Material safety data sheets up to date & available to employees			
5	Hazardous materials properly labeled			
6	Piping systems labeled			
7	Hazard Communication Program current and accessible to employees			

##### C. Lights and Ventilation

		A	N	N/A
1	General lighting adequate and working properly? Do			
2	Task lighting adequate			
3	Ventilation system adequate and working properly.			
4	Emergency lighting in place and working? Are monthly inspections conducted?			
5	Air recirculating systems inspected on a regular basis			

##### D. Fire Prevention, Emergencies and Exits

		A	N	N/A
1	Safety rules enforced ( posted ?)			
2	Are exterior and interior lights adequate and in working order?			
3	Are exits and aisles leading to exits visible, clearly marked, kept clean and with a pathway of at least 28 inches wide?			
4	Non-exits properly labeled			
5	Exit signs illuminated?			
6	Extinguishers provided and checked Monthly, training conducted with all persons expected to use extinguishers?			



## INJURY AND ILLNESS PREVENTION PROGRAM

### Facility Inspection Form

7	Accessibility of fire extinguishers ( easily accessible and identified )			
8	Hoses, sprinkler heads and valves unobstructed			
9	sprinklers & material below at least 18 inches (36 inches for bales)			
10	Flammable liquids stored in approved safety can/cabinet, with self closing doors/ lids.			
11	No oxidizing materials stored in Flammable liquids cabinet			
12	Test emergency lighting equipment as required			
13	Test fire/security detection/protection devices as required			
14	Fire doors kept closed at all times. ( most office doors are designated as fire doors)			
15	"No Smoking" signs posted in required areas			
16	No Smoking rules/regulations enforced			
17	are emergency valves / switches clearly marked and accessible?			

#### E. Walking and Working Surfaces

		A	N	N/A
1	Are floor openings and platforms or workstations 48 inches or higher guarded by a cover, a guardrail? (top rails must be a minimum of 42" with a mid rail. 4" toe boards must be in place if potential for falling objects)			
2	Are grates or covers over floor openings such as floor drains, secured			
3	Are step risers on stairs uniform from top to bottom			
4	Are steps on stairs and stairways provided with a surface that renders slip resistant? Handrails provided?			
5	Aisles, stairs and passageways kept clear			
6	Aisles clearly marked for pedestrian traffic			
7	Wet surfaces cleaned up or covered with non-slip materials			
8	Mirrors used at intersections and adjusted properly			
9	Are changes of direction or elevations readily identifiable? (painted yellow)			
10	Seasonal hazards are addressed; snow removal, salt, sand etc			
11	Mezzanines marked with rating and not overweight			

#### F. First Aid

		A	N	N/A
1	Emergency eye washes and showers properly located, identified, inspected, (with tag) unobstructed, and training conducted.			
2	Sufficient water pressure to eye wash and showers			
3	First aid cabinets well stocked, clean & accessible, no items have expired use dates			
4	Bloodborne pathogens kits available			
5	First aid providers names/certificates posted			
6	Medical waste container available			
7	emergency response numbers posted?			

#### G. Trash Receptacles

		A	N	N/A
1	Trash receptacles provided and used			
2	Trash receptacles emptied regularly			

#### H. Electrical

		A	N	N/A
1	Electrical boxes provided with required covers ( all open spaces are have block outs)			



## INJURY AND ILLNESS PREVENTION PROGRAM Facility Inspection Form

2	Temporary wiring in safe condition			
3	Temporary wiring only used on temporary projects			
4	Permanent wiring in safe condition No open or exposed plugs or wires, all wires are protected from abrasion.			
5	Electrical panels closed when not being accessed .			
6	Electrical rooms are kept locked			
7	Electrical panels unobstructed must be clear for 30" wide and 36" to the front			
8	all disconnects must be clearly labeled, and legible.			
9	Power tools grounded or double insulated ( 3 prong )			
10	Are All electrical outlets marked for Voltage ( Over 110 Volts )			

### I. Yard and Fueling Areas

		A	N	N/A
1	Are spill kits readily available around fueling areas ( training conducted and procedures posted )			
2	Are nozzles and hoses in good condition			
3	Is the emergency shut-off clearly marked			
4	The hose emergency break-away is in place			
5	Fueling areas are inspected daily for spills/leaks			
6	Yard is clean; snow removal, free from debris etc			
7	Yard lights are working			
8	Fencing is in good condition and free from debris			
9	LNG fueling area has appropriate PPE ( cryogenic gloves and apron, face shield, safety goggles)			
10	LNG off loading procedures posted at fueling area?			

### J. Ladders and Elevated Platforms

		A	N	N/A
1	Are portable ladders numbered and in good condition with slip proof feet and no cracks, paint or splinters on the rungs (inspected and steamed cleaned monthly)			
2	Are fixed metal ladders painted or treated to resist corrosion & rusting			
3	between the nearest permanent object and the centerline of the rungs			
4	Is the fixed ladder's clearance distance at least 7 inches between the backside of the ladder from the center of the rung to the nearest permanent object			
5	Does the ladder extend 3.5 feet above the parapet or landing			
6	Elevated platforms (over 4 feet high) equipped with 42" railing, intermediate railing and toe boards			
7	Head clearance (7' or more) provided from the floor to the ceiling			

### Maintenance Areas

#### K. Personal Protective Equipment & Housekeeping

		A	N	N/A
1	Safety glasses with approved side shields ( meeting Z87.1 )			
2	Proper safety boots worn (CSA approved)			
3	Chemical resistant gloves worn where appropriate			
4	Hearing protection properly used ( when required and training conducted )			
5	Hearing protection dispensers appropriately positioned ( free from contamination? ) 3 different styles available?			
6	Bloodborne pathogens equipment available			
7	Are respirators clean, properly stored, and respirator program in effect			



## INJURY AND ILLNESS PREVENTION PROGRAM

### Facility Inspection Form

8	Face shield properly used and appropriate for the task?			
9	Are closed containers provided for soiled rag disposal and emptied daily?			
10	Are unused portions of service pits and pits not actually in use either covered or protected by guardrails or equivalent.			
11	Other (Personal Protective Equipment)			

#### L. Cranes, Hoists, & Slings

		A	N	N/A
1	Is the rated load of the crane, hoist and sling (for each type of hitch) plainly marked on each component.			
2	Are all functional operating mechanisms checked on a daily basis for maladjustment that could interfere with proper operation			
3	Are lines, tanks, valves, drain pumps and other parts of the air or hydraulic system inspected daily			
4	Does rope reeving comply with manufacturer's recommendations			
5	Is a Chain, Sling and Hoist inspection program implemented			
6	Are cranes used only by designated personnel in accordance with their rated load and operation specifications with brakes tested each time a load approaching the rated limit is handled			
7	Is each sling in use free from excessive wear or defects and securely attached to their load when in use			
8	is training conducted at least annually			
9	Is annual certification being conducted on hoists, cranes rated over 2 tons			
10	The overhead hoist have a warning devices for each crane equipped with a power traveling mechanism			

#### M. Electrical and Fire Safety

		A	N	N/A
1	Are combustible liquids (fuels, lubes, solvents, paints etc) stored in non-combustible cabinets with self closing doors.			
2	Are flammable liquids contained in approved safety cans and (except aerosol cans) stored in a fire resistant cabinet			
3	Are Class 1 liquids dispensed into containers after the nozzle and container are electrically grounded			
4	Are electrical circuit breakers (and fuel pump switches) identified and labeled and are outlet boxes in good condition			
5	Do electrical cords, extension cords, and trouble lights have approved 3-wire ground type and in good condition			
6	Is pressure washer in good working order (hoses, vent and fuel lines)			
7	Is "Eye Protection Required" sign posted			
8	Are overhead doors and controls in good working order			
9	Are All electrical outlets marked for Voltage ( Over 110 Volts )			

#### N. Welding, Cutting, Burning, Brazing

		A	N	N/A
1	Fire precautions being used (extinguisher nearby)			
2	Personal protective equipment used			
3	Electrodes removed/gas valves closed when not used			
4	Welding curtains used			
5	Welder cables, clamps and guards in good condition and are torch hoses, regulators and valves equipped with anti-flash back valves			



## INJURY AND ILLNESS PREVENTION PROGRAM Facility Inspection Form

6	Are "Hot Work Permits" used or is welding conducted in designated areas, at least 35 feet from combustible materials, spray painting, etc.			
7	Are fire watch employee(s) required whenever welding or cutting is performed in location where other than a minor fire might develop, and the fire watch maintained for at least 1/2 hour after completion.			
8	Compressed gas cylinders stored and secured properly (double chained and protected from any heat source)(sunlight)			

### O. Compressed Gas Cylinders

		A	N	N/A
1	Cylinders legibly marked and labeled to clearly identify the gas contained			
2	Are oxygen & acetylene tanks stored properly and secured, separated by 20 feet or with a 5 foot high fire resistant wall between oxygen and fuels			
3	Are cylinders stored in areas that are protected from heat and flame and located at least 25 feet from electrical equipment and people and at least 20 feet from flammable liquids or combustible materials			
4	Are cylinders transported in a manner to prevent them from creating a hazard by falling or rolling			
5	Are all valves closed off before a cylinder is moved, when the cylinder is empty, and at the completion of each job and are valve protectors used when cylinders are not in use.			

### P. Machine Guarding

		A	N	N/A
1	Is tire repair equipment in good condition ( instructions posted?)			
2	Are saws, used for ripping equipment with anti-kick back devices and spreaders			
3	Are radial arm saws so arranged that the cutting head will gently return to the back of the table when released			
4	Are power machines, shears, grinders, saws, drill presses etc properly anchored and guarded? "Eye Protection" signs posted?			
5	Do fixed grinders have side guards that cover the spindle, nut, and flange and 75% of the wheel diameter, a tool rest adjusted to within 1/8" and a tongue guard adjusted to within 1/4" of wheel			
6	Before new abrasive wheels are mounted, are they visually inspected and ring tested			
7	Are splash guards mounted on grinders that use coolant to prevent the coolant reaching employees			

### Q. Hand Tools, Power Operated Tools & Equipment

		A	N	N/A
1	Are all tools and equipment in good condition and used with the correct shield or guard or attachment recommended by the manufacturer			
2	Are hand tools such as chisels, punches, wrenches etc which are worn bent or mushroomed during use, reconditioned or replaced as necessary			
3	Are appropriate handles used on files and similar tools			
4	Are jacks checked periodically to assure they are in good operating condition			
5	Are tool cutting edges kept sharp so the tool will move smoothly without binding or skipping			
6	Are rotating or moving parts of equipment guarded to prevent physical contact			



## INJURY AND ILLNESS PREVENTION PROGRAM Facility Inspection Form

7	Are all cord connected, electrically operated tools and equipment effectively grounded or of the approved double insulated type			
8	Are portable fans provided with full guards or screens having openings 1/2" or less			
9	Are ground fault circuit interrupters provided on all temporary electrical 15 and 20 amperes circuits, used during periods of construction			
10	Are pneumatic and hydraulic hoses on power operated tools checked regularly for deterioration or damage			
11	Do all air hose ends have restraining devices on the quick release side? ( not applicable on hose reels )			
12	Are all air outlets regulated at proper PSI for tool being use (usually 90 PSI or Less)			
13	Have all personnel using Pneumatic tools been trained on regulator use.			

### OPERATIONS AREAS

#### R. Personal Protective Equipment & Housekeeping

		A	N	N/A
1	Safety glasses with approved side shields ( Z87.1)			
2	Proper safety boots worn (CSA approved)			
3	Chemical resistant gloves worn where appropriate			
4	Hearing protection properly used			
5	Hearing protection dispensers appropriately positioned( free from contamination? ) 3 different styles available?			
6	Bloodborne pathogens equipment available			
7	Are respirators clean, properly stored, and respirator program in effect			
8	Face shield properly used and appropriate for the task?			
9	Are closed containers provided for soiled rag disposal emptied daily?			
10	Is visible protective clothing being worn in designated areas and jobs			
11	Are hard hats worn where designated to do so			
12	Other (Personal Protective Equipment)			

#### S. Material Handling and Storage

		A	N	N/A
1	Where mechanical handling equipment is used, are there sufficient safe clearance allowed for aisles, at loading docks, through doorways and wherever a turn or passage must be made (doorways must be marked for height)			
2	Are the aisles-ways and passageways kept clean and in good repair and are there no obstructions across aisle-ways that could create a hazard.			
3	Does the storage of material not create a hazard - stacked, blocked, interlocked and limited in height to ensure they are stable and secured against sliding or collapse			
4	Are storage areas kept free from accumulation of materials that constitute hazards from tripping, fire, explosion or harborage of pests			

#### T. Powered Industrial Trucks - Maintenance & Fueling

		A	N	N/A
1	Are all nameplates and markings in place and legible on powered industrial trucks and visible from the driver's seat.			
2	Are industrial trucks kept in a clean condition, free of lint, excess oil/grease			
3	Is directional lighting provided on each industrial truck			



**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Facility Inspection Form**

4	Does each industrial truck have a warning horn or other device that can be clearly heard above the normal noise in the areas where operated			
5	Does each industrial truck have a reverse signal alarm audible above the surrounding noise level			
6	Are the brakes on each industrial truck capable of bringing the vehicle to a complete and safe stop when fully loaded and does the parking brake effectively prevent the vehicle from moving when unattended			
7	Are industrial trucks when found to be in need of repair, defective or in any way unsafe taken out of service and repaired by an authorized mechanic using replacement parts and handling clean, free from combustibles			
8	Are fuels storage and handling clean, free from combustibles and cigarette butts and is there always metal contact between the container and the fuel tank and are fuel tank caps replaced and secured before starting the engine			
9	Are precautions taken to prevent open flames, sparks or electric arcs in battery charging areas			
10	front Guard in place to prevent operator from pinch point? Not welded to overhead guard.			

**U. Powered Industrial Trucks - Operations**

		A	N	N/A
1	Are industrial trucks with internal combustion engines, operated in buildings or enclosed areas, carefully checked to ensure such operations do not cause harmful concentrations of dangerous gases or fumes			
2	Are industrial trucks driven by authorized personnel only			
3	Do personnel stay clear of the elevated portion of the trucks whether loaded or empty			
4	Are pre-trip/post-trip inspections done on industrial trucks daily			
5	Are industrial trucks left in an "off" position when unattended or when the operator is more than 25 feet from the vehicle			
6	Are loads only handled within the rated capacity of the truck and is the backrest extension used when necessary to stabilize the load			
7	Are industrial trucks operated at safe speeds and stopped with the horn sounded at across aisles and other locations where vision is obstructed			
8	Are the brakes of highway trucks set and wheel chocks placed under the rear wheels while trucks are boarded with industrial trucks			
9	Are fixed jacks used to support a semi trailer during loading and unloading when the trailer is not coupled to a tractor and wheels chocked.			
10	Is regular protection used to prevent railcars from being moved when dock boards or bridge plates are in position			

**V. Electrical Safety**

		A	N	N/A
1	Is each disconnect legibly marked to indicate its purpose			
2	Is clear working space in front of an electrical panel maintained at no less than 36" and 30" wide			





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**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Corrective Action Tracking Form**

**CORRECTIVE ACTION TRACKING FORM**



### CORRECTIVE ACTION TRACKING FORM

All items listed and/or identified to be repaired or replaced on this Corrective Action Tracking Form MUST be justified for purchase, prior to purchase, by the District Manager and/or Market Area Manager.

District: \_\_\_\_\_  
Date: \_\_\_\_\_  
Type of Review: \_\_\_\_\_

Generated by: \_\_\_\_\_  
District Manager: \_\_\_\_\_  
Contact Person: \_\_\_\_\_

No.	Concern/ Observation/ Improvement Opportunity	Recommended Preventative Corrective Action	Person Responsible	Level	Target Date	Completion Date
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						

**Level One - High Priority.** Issue identified is to be completed as soon as possible but no later than 10 days from the date of the MSQA/Safety Review.

**Level Two - Serious.** Issue identified is to be completed as soon as possible but no later than 30 days from the date of the MSQA/Safety Review.

**Level Three - Non-Serious.** Issue identified is to be completed as soon as practical or 90 days (or more with approval)

Use full name for person responsible.

Do not put multiple items in one cell.

**Use this form for all updates.**



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**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Employee Incident/Injury Form**

**EMPLOYEE INCIDENT/INJURY FORM**



**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Employee Incident/Injury Form**

**EMPLOYEE INCIDENT/INJURY FORM**

Site Number	Site Name	City/State		
<b>Employee Data</b>				
First Name, Last Name, Initial			Social Security Number	
Date of Birth	Sex ____M ____F	Hourly Wage	Average Hours p/wk	
Start Time	Job Description		Department/LOB	
Job Class: WMI, Casual/Temp ____ Casual/Temporary ____ Leased ____ Part Time ____ WMI/Full Time			Hire Date	
Married ____ Yes ____ No	Is Spouse a Dependant? ____ No ____ Yes		Total # of Dependants	
Home Address			Phone #	
City			State	Zip
Driver's License Number		Class Type	State	Expiration Date
<b>Incident Location</b>				
Date	Time	Type of Incident: Accident	Deny Claim? Yes	Subrogate? Yes
Accident or Injury Occurred: ____ On Premises ____ Off		Address or Site Area Incident Occurred:		
Description of Incident:				



**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Employee Incident/Injury Form**

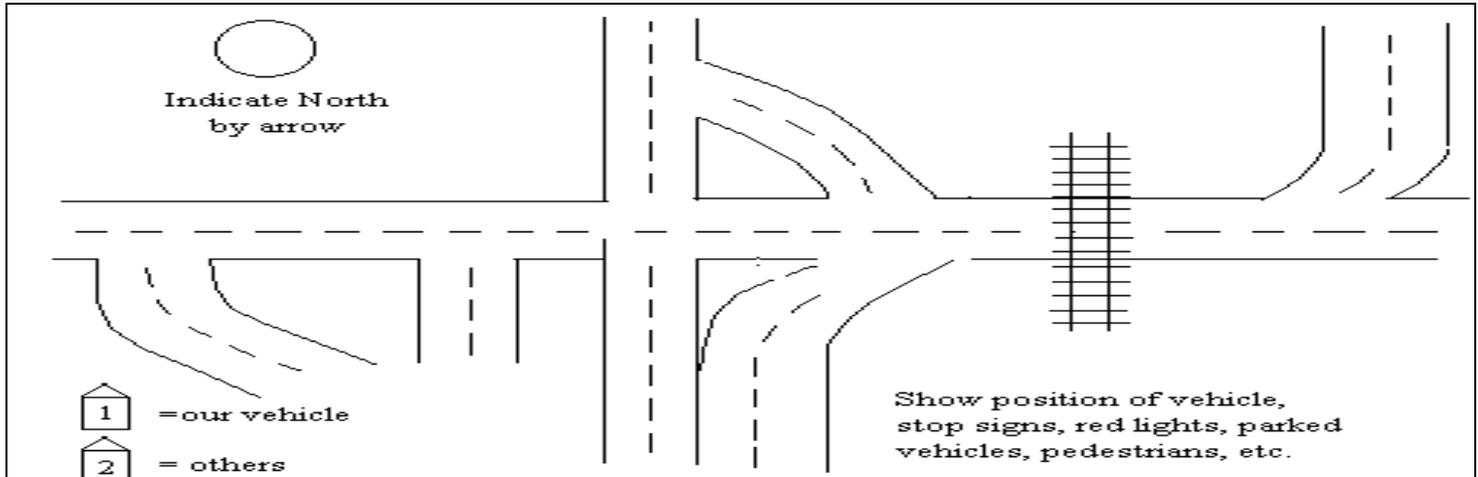


Diagram of Incident

<b>Supervisor &amp; Employee</b>	
Supervisor Name	
Investigator's Name (Person who prepared form)	Date
Insurance Claim Number	Total Incurred Cost (\$)



**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Employee Incident/Injury Form**

**SECTION II – COMPLETE THIS SECTION FOR ALL EMPLOYEE INJURIES**

**Type of Injury** (circle as many as necessary)

Abrasion	Amputation	Bee Sting	Break/ Fracture
Burns – Chemical	Burns – Heat/Scald	Cold Stress	Concussion
Contusion/ Bruise	Crushed	Cut	Dislocation
Dog Bite	Foreign Body/Eye	Fracture	Frostbite
Hearing Loss	Heart Attack	Heat Stress/ Cold Stress	Hernia
Inflam/Irrit Joints	InternalRespi ratory	Needle stick	Poisoning
Puncture		Sprains/ Strains	Rash
Rat Bite			
Other: _____			

**Cause of Injury** (circle only one)

Bites (Insect/Animal)	Cold Stress	Electrical	Fall – Height
Fall – Same Level	Falling Debris - Ash	Flying/ Falling/ Rolling Obj.	Fire
Heat Stress	Inhalation	Needle stick	Pushing/ Pulling
Slips/Trips	Struck Against	Struck By	Welding Flash
Other: _____			

**Activity at Time of Incident** (circle as many as necessary)

Bending	Carrying	Climbing	Dismounting
Driving	Firefighting	Jumping	Kneeling
Lifting	Lying	Pulling	Pushing
Riding	Running	Sitting	Standing
Stretching/ Reaching	Twisting	Welding	
Other: _____			



**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Employee Incident/Injury Form**

<b>Body Part Affected</b> (check as many as necessary)				
Left ____		Right ____		Body Part: ____
<b>Equipment/Material Involved</b>				
<b>Acts</b> (check as many as necessary)				
<input type="checkbox"/> None <input type="checkbox"/> Failure to follow directions  <input type="checkbox"/> Failure to secure or warn of observed hazards <input type="checkbox"/> Failure to wear safe personal attire <input type="checkbox"/> Improper use of equipment <input type="checkbox"/> Inattention to footing or surroundings  <input type="checkbox"/> Result of preventable vehicle accident Unsafe placing, mixing, combining <input type="checkbox"/> Other:		<input type="checkbox"/> Defeating/making safety devices inoperative <input type="checkbox"/> Failure to follow procedures <input type="checkbox"/> Failure to use PPE <input type="checkbox"/> Horseplay  <input type="checkbox"/> Improper use of hands or body parts <input type="checkbox"/> Operation or working at unsafe speed <input type="checkbox"/> Taking unsafe position or posture <input type="checkbox"/> Work on moving, energized, pressurized equipment		
<b>Medical Data</b>				
Name/Address of Physician/Clinic/Hospital				
Did employee receive full pay on day of injury?  <input type="checkbox"/> Yes <input type="checkbox"/> No	Did salary continue?  <input type="checkbox"/> Yes <input type="checkbox"/> No	No Treatment ____  Admitted ____	First Aid Only ____  Treated/Released ____	
Was PPE Available? <input type="checkbox"/> Yes <input type="checkbox"/> No		Was PPE Used? <input type="checkbox"/> Yes <input type="checkbox"/> No		Type of PPE
Last Day Worked:		Date Returned w/ restrictions:		Date Returned-Full Duty:
<b>OSHA Log 300 Data</b>				
OSHA Recordable <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> None  <input type="checkbox"/> Recordable Only, No Lost Time  <input type="checkbox"/> Days Away from Work (Lost Time)		<input type="checkbox"/> First Aid Only  <input type="checkbox"/> Restricted Days	
Number of Lost Days:	Number of Restricted Days:	Both:	Death: <input type="checkbox"/> Yes <input type="checkbox"/> No	Date of Death:
Type of Illness:				



**INJURY AND ILLNESS PREVENTION PROGRAM  
Employee Incident/Injury Form**

**SECTION III – COMPLETE THIS SECTION FOR VEHICULAR AND PROPERTY DAMAGE INCIDENTS**

**DOT Register Data**

Report to Insurance:    DOT Recordable:    Fatality:    Medical Treatment:    Tow Away:  
 \_\_\_ Yes \_\_\_ No    \_\_\_ Yes \_\_\_ No    \_\_\_ Yes \_\_\_ No    \_\_\_ Yes \_\_\_ No    \_\_\_ Yes \_\_\_ No

**Vehicle Data – Ours**

Unit Number:	Type of Vehicle:	Damage-WM Vehicle: ___ Yes ___ No	Towed ___ Yes ___ No
Year:	Make:	Model:	License Plate:

Weather Conditions:

**Claimant Data** (If there are more than 2 claimants, please provide them on a separate sheet of paper)

I	Claimant Name	Address	Phone	
	Driver? ___ Yes ___ No	License Number/State		
	Towed? ___ Yes ___ No	If Yes, Where?	Vehicle Year	Vehicle Model
	Owner's Name	Address	Phone	
	Insurance Carrier/Policy #			Phone

II	Claimant Name	Address	Phone	
	Driver? ___ Yes ___ No	License Number/State		
	Towed? ___ Yes ___ No	If Yes, Where?	Vehicle Year	Vehicle Model
	Owner's Name & Phone	Address	Phone	
	Insurance Carrier/Policy #			Phone

**Property Damage Data** (If there are more than 2 properties damaged, please provide details on a separate sheet of paper)

I	Contact/Business Name	Phone
	Location/Address	
II	Contact/Business Name	Phone
	Location/Address	



**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Employee Incident/Injury Form**

Police Report		
Was Ticket Issued? ___ Yes ___ No	If Yes, To Whom? ___ Us ___ Others ___ Both	For what?
Police Department	Report #	Name/Badge Number of Officer
Witnesses (Name, Address, Phone)		



**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Employee Incident/Injury Form**

**SECTION IV – COMPLETE THIS SECTION FOR ALL ENVIRONMENTAL SPILLS, EMISSIONS, RELEASES OR DISCHARGES**

**Type of Material**

<input type="checkbox"/> Hazardous Waste	Released To: <input type="checkbox"/> Air <input type="checkbox"/> Water <input type="checkbox"/> Ground
<input type="checkbox"/> Hazardous Substance – Exceeded to RQ <input type="checkbox"/> Yes <input type="checkbox"/> No	
<input type="checkbox"/> Non Hazardous	
<input type="checkbox"/> Unknown	

**Physical State**

<input type="checkbox"/> Solid – Estimated Volume in Pounds	How was Estimation Calculated?
<input type="checkbox"/> Liquid – Estimated Volume in Gallons	
<input type="checkbox"/> Air – Estimated Volume in Cubic Feet	

**External Agency Notified by WM Facility**

Law Enforcement:

City  County  State

Fire Department  FEMA (Federal Emergency Management)

State DEQ  National Emergency Response Center

Other:

Name(s)/ Telephone of Those Contacted

**Agency or Group Involved**

<input type="checkbox"/> Law Enforcement	<input type="checkbox"/> Fire Department	<input type="checkbox"/> FEMA
<input type="checkbox"/> City	<input type="checkbox"/> County	<input type="checkbox"/> State
<input type="checkbox"/> OSHA	<input type="checkbox"/> DOT	<input type="checkbox"/> EPA
<input type="checkbox"/> News Media	<input type="checkbox"/> TV	<input type="checkbox"/> Newspaper
<input type="checkbox"/> Radio	<input type="checkbox"/> Interest Groups	<input type="checkbox"/> Individual
<input type="checkbox"/> Community	<input type="checkbox"/> Organization	

Describe the Nature of Their Involvement Such as Information Requested, Interviews Requested, Inspections, Documents, Requests, Etc.



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**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Employee Incident/Injury Form**

Proposed Citations, Penalties				
<input type="checkbox"/>	Police	<input type="checkbox"/>	Fire	Report Attached: <input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	DOT	<input type="checkbox"/>	EPA	
<input type="checkbox"/>	OSHA			





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**INJURY AND ILLNESS PREVENTION PROGRAM**  
**Annual Program Review**

**ANNUAL PROGRAM REVIEW**





**ACKNOWLEDGEMENT FORM**

I, (print name) \_\_\_\_\_ have received training on **Kekaha Sanitary Landfill's** Injury and Illness Prevention Program.

I had the opportunity to have questions answered pertaining to the training material and instructions that was presented to me by the Company.

I understand the training I have received and agree to abide by the standards presented.

\_\_\_\_\_  
(Instructor's) Signature

\_\_\_\_\_  
(Instructor's) Print Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
(Employee's) Signature

\_\_\_\_\_  
Date



**Program: Confined Space**

**Facility: Kekaha Sanitary Landfill**

**Facility Location: 6900 D – Kaumualii Highway Kekaha 96752**

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## **CONFINED SPACE**

### **PURPOSE**

To describe the requirements to identify, evaluate and plan for the safe entry into confined spaces and permit-required confined spaces.

### **REQUIREMENTS**

1. Identify and prepare a written list of all confined spaces within your operations.
2. If employees have access to confined spaces, implement the attached confined space program. Complete the facility-specific information.
3. Any employee, who enters the permit space, or that employee's authorized representative, shall be provided any opportunity to observe all pre-entry and any subsequent testing or monitoring of permit spaces.
4. Using the attached evaluation form, determine which type of confined spaces and entry conditions constitute permit-required spaces.
5. Update the list of confined spaces on an annual basis and when a new confined space is introduced into the operations. Perform an evaluation for new confined spaces.
6. Provide awareness training to all employees about the hazards associated with confined spaces and to stay out of them unless trained as entrants.
7. Provide detailed training for employees and supervisors (entrants, attendants, and entry supervisors) who may be involved in permit-required confined space entries.
8. Evaluate a prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazard(s) identified.
9. Ensure that rescue personnel receive initial and annual training, including drills.

### **PERMIT-CONFINED SPACES**

1. Label all permit-required confined spaces. An alternative means of communicating the danger and identifying confined spaces may be used if labeling is impossible or impractical. Document the rationale for utilizing the alternative methodology.
2. Develop a system to restrict entry into permit- required confined spaces.
3. Utilize the permit for all permit-required confined space entries.



4. For locations where permit confined spaces must be entered, ensure atmospheric testing equipment is available, maintained, and used. Note: Under certain circumstances ventilation may allow reclassification of a permit space to a non-permit required confined space.
5. Make emergency rescue personnel (or local emergency responders) available during permit-required space entry.

### **GENERAL**

A *confined space* is any space that is large enough and configured so that an employee can *bodily enter* and perform assigned work, has limited means for entry or exit, and is not designed for continuous employee occupancy. Examples are pump-pits, sewer manholes, tanker trucks and storage tanks.

**There are two types of confined spaces – permit required and non-permit required.**

**All confined spaces** are considered to be *permit required confined spaces* until evaluations determine that the space is a *non-permit-required space*.

A *non-permit required confined space* means a confined space that does not contain or have the potential to contain any hazard capable of causing death or serious physical harm.

Under normal solid waste collection activities, we have determined that there is no potential for a hazardous atmosphere inside truck bodies. When the physical hazards have been locked out following proper procedures, the truck body may then be considered a non-permit required confined space and entered without a permit. In addition, by blocking open a truck body tailgate for entry and exit, the truck body may then be configured so that it no longer is considered a confined space.

A *permit-required confined space* is a confined space that has one or more of the following characteristics: (1) Contains or has the **potential to contain** a hazardous atmosphere; (2) Contains a material that has the potential for engulfing an entrant; (3) Has an internal configuration such that an entrant could be trapped by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section, or; (4) Contains any other recognized serious safety or health hazard, (5) has the potential to contain (1) through (4) and has not be evaluated.

A *permit-required (attendant-required) confined space* is a space that has been evaluated and engineering controls or lockout could not eliminate the hazard.

It is the policy of **Kekaha Sanitary Landfill employees** to avoid entry into confined spaces whenever possible. Employees follow this program if confined spaces must be entered.



**CORE PROGRAM**

When these hazards are not completely controlled or eliminated prior to entry, an attendant is required before entry. Two employees are needed for entry into a permit-required confined space (also called an attendant-required confined space), one to enter the space (Entrant), and one to stay outside and watch over the safety of the entrant (Attendant).

**RESPONSIBILITY**

Management is responsible for administering the confined space entry program. This person identifies confined spaces, coordinates all training, and ensures that the program is implemented.

The confined space entry program administrator appoints an individual to be an Entry Supervisor. The Entry Supervisor approves, issues, and signs all entry permits, authorizes entry into permit areas, identifies additional confined spaces, and maintains documentation of all entries. The Entry Supervisor may also act as an attendant for employees making entry into confined spaces.

Management is responsible for conducting work area surveys to identify potential confined spaces, ensuring permit-required confined spaces are labeled, and ensuring the program is implemented for all work in confined spaces.

Attendants are responsible for maintaining constant contact with persons in the confined space, and are also responsible for calling for help.

Emergency rescue team is responsible for being in a standby condition when notified by the entry supervisor that a confined space entry is underway. In the event the rescue team must respond to another call or cannot be on standby, the rescue team must inform the entry supervisor. The supervisor shall terminate the confined space entry until the emergency rescue team is available.

Employees who are trained and authorized may enter confined spaces when the requirements of this program have been satisfied. Employees who are trained as entry supervisors or attendants can also perform this role.

**IDENTIFY AND POST SIGNS ON CONFINED SPACES**

Management or management designees identify and evaluate confined spaces in work areas. See the Appendices for a list of confined spaces at the facility. Post signs or apply labels identifying confined spaces at the entry points for each space.

Identify the confined space and the work to be done. Determine whether it is safe to remove the cover to the confined space. If required, lockout and tagout sources of hazardous energy into the space using the facility lockout and tagout program. If possible, test the initial air before removing the cover. Where practical, the temperature and pressure inside the confined space should



## **CONFINED SPACE PROGRAM**

approximate the temperature and pressure outside the confined space. Excess pressure can blow the cover off and result in splash or injury.

Prior to the entry, put the following information on the permit:

- The confined space to be entered
- The purpose of the entry
- Hazardous materials to be taken into or hazardous work to be done in the space
- The length of time the permit is in effect.

**Note:** It is very important to review the hazardous materials taken into or hazardous work done in the confined space. Atmospheric and physical hazards can arise from the work inside the confined space. As an example, chemical solvent vapor concentration could increase and cause someone to pass out and welding could produce a hazardous atmosphere or fire hazard.

### **IDENTIFY POTENTIAL ATMOSPHERIC AND PHYSICAL HAZARDS**

Evaluate the confined space for internal and external hazards. Internal hazards include both atmospheric hazards (unsafe or lack of air) and physical hazards.

Atmospheric hazards may include:

- Hydrogen sulfide, methane, and oxygen deficiency from decaying waste, sewage, or stagnant water
- Air contaminants from chemicals used or stored in the space
- Excess oxygen (makes things burn easily)
- Flammable atmospheres containing methane, propane, or other explosive gases
- Combustion by-products like carbon monoxide
- Explosive dust atmospheres

Acceptable levels of atmospheric hazards are listed on the permit. Do not enter confined spaces where air quality is different from normal air (see permit) without first investigating the cause of the problem.

Physical hazards in confined spaces may include:

- Mechanical hazards from fans and other moving parts
- Engulfment, which is being trapped by a liquid or solid material
- Internal structures that could trap an entrant or impair his/her ability to exit the space quickly
- Electrical hazards from unguarded conductors or power sources
- Excessive heat or cold

## **ENTRY PROCEDURES**

The confined space entry procedures are designed to reduce or eliminate the hazards and if at all possible, reclassify the permit space to a non-permit space. If the space cannot be reclassified to a non-permit space, the permit identifies those items, conditions, and controls necessary to make the entry safe.

The basic process for entry into confined spaces is to:

- Identify the confined space and the work to be done. Evaluate the feasibility of performing the work from outside the confined space.
- If the confined space must be entered, determine if the space is a permit required or non-permit required confined space by identifying potential atmospheric and physical hazards.
- Test the space for atmospheric hazards to determine the classification of the space. Also test before entry and regularly during entry.
- Make the space safe for entry by eliminating atmospheric and physical hazards.
- Certify control measures taken, classify the space based on whether hazards have been eliminated, and post the permit if a permit required space.
- Ensure additional controls for attendant-required spaces.
- Authorize entry by Entry Supervisor.
- Do the work safely and,
- End the permit if applicable.

These steps are also on the permit. The rest of this program explains each of these steps.

## **PERMIT VS. NON-PERMIT CONFINED SPACES**

If any hazards remain that you cannot eliminate or control by ventilation alone, or if work releases additional hazards, the space is classified as a permit-required confined space and requires an Attendant. Provisions for rescue are also necessary.

If hazards remain, only authorized and trained Entrants can enter the Attendant-required confined space. The Entry Supervisor lists the Entrants on the Confined Space Entry Authorization Permit.

The Entry Supervisor must inform employees of the hazards present. The Entry Supervisors briefs the Entrant(s) and Attendant on planned emergency rescue methods and verifies that rescue equipment, procedures, and rescue personnel are available. Entrant(s) must read the permit and sign the permit before entry and entrants must evacuate the confined space when:

- Atmospheric monitoring alarms sound
- Respirators fail
- Forced-air ventilation stops
- The Attendant tells them to leave the space
- The Attendant informs them of problems



Entrants must promptly begin self-rescue when any of the above occurs.

### Test the Space for Atmospheric Hazards before Entry

Without entering the confined space, test in the following order the internal atmosphere for the presence of:

- Oxygen
- Flammable gas
- Toxic substances (what to test for depends on the hazard assessment)

For each atmospheric test, monitor the space at different levels and in any unusual configurations. The shape of a space may trap gases in unexpected areas. Record test results on the permit.

As part of the testing process, the Entry Supervisor must identify safe conditions for entry. Hazardous conditions that prohibit entry include:

- An oxygen-deficient (less than 19.5%) atmosphere, which can cause suffocation.
- An oxygen-enriched (more than 23.5%) atmosphere, which can cause an extreme fire hazard.
- A potentially explosive atmosphere caused by the presence of combustible gases, liquids, vapors, or dust at greater than 10% of their lower flammable limit (LFL).
- A concentration of any hazardous substance above its OSHA permissible exposure limit (PEL) or above the exposure limit given on the MSDS.
- The presence of a physical hazard that is not controlled and immediately dangerous to life or health (IDLH) such as a liquid or solid that may engulf, exposed conductors that may electrocute, or uncontrolled energy that may escape.

**Note:** Only qualified and authorized individuals can operate monitoring instruments. Regularly field-calibrate the instruments. Follow the manufacturer's written operating instructions and calibration procedures.

### **MAKE SPACE SAFE FOR ENTRY**

Do not enter the confined space if there is an uncontrolled hazardous atmosphere or physical hazard. If any readings are out of the normal range, identify the cause and perform corrective actions before entry. Perform tests again following the completion of control measure implementation.

Before entry, control or isolate all energy sources. Use the facility lockout and tagout program. Verify lockout by testing.

Drain, pump out, or otherwise empty the material in the space before entering. Use the best and most practical method to clean it.



## **CONFINED SPACE PROGRAM**

Do not use protective clothing and respiratory protection as substitutes for cleaning and ventilating the confined space.

Where practical, use forced-air ventilation whenever employees are inside of any confined space. Use only clean air supplies for continuous forced-air ventilation so you do not increase the hazards in the confined space. Do not contaminate the air supply with engine exhaust.

Never use oxygen to purge or ventilate any confined space. Injury or death may occur from the highly explosive atmosphere generated.

Other important control measures prior to entry include:

- Briefing entrants on hazards and control measures.
- Notifying contractors of the permit space and hazardous conditions.
- Testing and verifying lockout and tagout of known and potential hazardous energy sources.

### **CERTIFY CONTROL MEASURES, OBTAIN APPROVAL AND POST PERMIT**

After certification by the Entry Supervisor that conditions are now acceptable, it is safe to enter the hazard-controlled confined space. Post the permit as a certification to those entering the confined space that the hazards have been eliminated.

Normal work activities can proceed as long as there are no hazards present in the space. Do not take hazardous materials into the confined space or carry out welding activities or open flame work that could introduce new hazards or cause existing hazards to intensify. Conduct continuous air monitoring while an Entrant is in any confined space.

### **ALLOW ENTRY AFTER SUPERVISOR REVIEWS AND APPROVES PERMIT**

The Entry Supervisor authorizes entry into the confined space only after all safeguards have been executed. The Entry Supervisor must review the permit before allowing employees into the permit-required confined space. In the review, the Entry Supervisor must:

- Identify the confined space and work to be done.
- Anticipate and protect against hazards that the work might create (solvent use, hot work, and paint/coating removal or application).
- Identify the permit-required confined space hazards.
- Determine and identify on the permit the actual and potential hazards of the entry.
- Test the atmosphere in the space before initial entry and ensure continuous monitoring.
- Ensure that a safe atmosphere is maintained inside the space by testing and inspecting.
- Make the space safe before entry.
- Ensure control measures are taken to reduce and eliminate atmospheric and physical hazards.
- Certify the control measures taken and classify the space.

- Classify the space as hazard-controlled, forced-ventilation, or attendant-required.
- List the authorized Entrants.
- Tell the Entrants of the hazards involved and precautions to follow before entry.
- List the authorized Attendant(s).
- Ensure the Attendant knows the work, can summon help, and can communicate with the Entrants inside.
- Ensure the availability of an emergency rescue team.
- Verify that rescue services and an operating means for summoning them are available.
- Obtain the equipment required for entry and safe work practices.
- Ensure necessary equipment and work practices are used to maintain the safe conditions the permit requires.
- Issue and post a confined space entry permit at the entrance of the confined space before allowing Entrants to enter the space.
- Notify the emergency rescue team when the confined space entry is completed.

### **END THE ENTRY**

The Entry Supervisor ends the entry upon work completion, if unsafe conditions are detected, or an emergency rescue team is unavailable.

Upon work completion, the Entrant(s), retrieves tools or equipment and cleans up the space as necessary before ending the entry. Check to make sure no one is in the confined space and all measures required to bring the confined space back to normal service have been performed and notifies the Entry Supervisor.

Reversing lockout or other safety procedures may be necessary. This may include:

- Unblocking mechanical parts so they can move freely.
- Securing the hatch or manhole cover.
- Removing blinds from lines and pipes.
- Removing locks and tags from energy sources.
- Testing to be sure sources are working.

After ensuring the space has been returned to the proper conditions, the Entry Leader:

- Removes the permit.
- Signs and dates the permit.
- Documents problems encountered during the entry and provides suggestions to avoid these problems.
- Returns the completed permit to the Confined Space Program Administrator.
- Notifies the emergency rescue team that the confined space entry has been completed.



**PERFORM WORK SAFELY IN HAZARD-CONTROLLED AND FORCED VENTILATION SPACES**

The Entry Supervisor may limit the number of Entrants and restrict activities within the confined space in order to maintain the initial level of safety.

The Entrant(s) must immediately notify the Entry Supervisor and leave the confined space if the continuous air monitoring detects a hazard or if additional hazards are discovered or created, or if the ventilator stops operating. If any of these occur, treat the confined space as a permit-required confined space until safe conditions can be restored and are documented on the permit.

**WELDING IN CONFINED SPACES**

You must use continuous forced-air ventilation whenever you weld or burn inside a permit required confined space or use other oxygen-consuming equipment. You must also complete a hot work permit.

When you use continuous forced-air ventilation, begin ventilation before entering and direct it to the work area. Ventilating must continue until all employees leave the confined space.

**PROVIDE AN ATTENDANT DURING ENTRY**

An Attendant stays outside the entrance to the confined space and performs no other tasks whenever Entrant(s) is inside an attendant-required confined space. The Entry Supervisor lists the Attendant on the Confined Space Entry Authorization Permit. Attendants must read and sign the permit. Entrants and Attendants may rotate duties if trained in both designations. The Entry Supervisor may also be the Attendant.

The Attendant's duties include:

- Establishing and maintaining communication with the Entrant(s) at all times.
- Monitoring the Entrant(s) for signs of illness, overexposure, or other hazardous conditions.
- Informing Entrant(s) of changes in hazardous conditions so they can leave.
- Having a means to summon help in an emergency.
- Calling the rescue team when self-rescue by the Entrant(s) is not possible.
- Calling the appropriate Entry Supervisor to announce the location and the extent of the problem. The Attendant and/or Entry Supervisor directs the rescue team to the confined space location.
- Never entering the confined space for any reason.
- Informing the rescue team of the hazards present.

**PROVIDE PERSONAL PROTECTIVE EQUIPMENT, LIFELINE AND HARNESS**

A non-entry rescue is the safest and fastest method for Entrant rescue because the rescuer does not enter the confined space. To perform a non-entry rescue, attach a body harness and a retrieval line to the Entrant(s) before he or she enters the confined space. Use a mechanical winch to raise an Entrant out of the confined space.



## CONFINED SPACE PROGRAM

**Note:** Although the Attendant is not allowed to enter the confined space, he or she can perform a non-entry rescue.

### **NOTIFY CONTRACTORS**

Give contractors a copy of this program and hold them responsible for following an equivalent program of their own. Ensure that contractors will not enter confined spaces without proper precautions, or create confined space hazards for **Kekaha Sanitary Landfill** employees.

### **TRAIN ENTRANTS, ATTENDANTS, AND ENTRY SUPERVISORS**

**Kekaha Sanitary Landfill** ensures that all affected employees receive training. Employees who do not enter confined spaces are trained to identify confined spaces and stay out of them unless the hazards have been eliminated.

Employees receive training prior to assignment as Attendants, Entrants, and Entry Supervisors. Training provides the understanding, knowledge, and skills necessary for the safe performance of the duties assigned.

**Kekaha Sanitary Landfill** provides training at the following times:

- Before the employee is first assigned confined space duties.
- Whenever there is reason to believe there are inadequacies in the employee's knowledge.

**Kekaha Sanitary Landfill** documents the training using Safety Training Attendance Form. Documentation includes:

- The date of training.
- A brief description of the material covered.
- The names and signatures of the employees trained.
- The name of the individual conducting the training.

### **RESPONSIBILITY**

Identify the name and the title of the person responsible for the facility confined space entry program and reviewing and updating the confined space entry program annually:

**Name: John Ruiz      Title: Site Manager**

**List all confined spaces present at the facility including their locations:**

Leachate Collection Manholes 1 through 14  
Oil/Water Separator (4)  
Flowmeter Compartment  
Water Truck Tank  
Leachate Pump Stations (3)  
Stormwater Cleanout near community drop area (1)



**Briefly describe criteria used to determine if a confined space did not require permit for entry spaces at the facility:**

WM only uses contractors to perform confined space entry. Contractors will determine if confined spaces are permit required or non-permit required confined space.

**Briefly describe the procedures followed to assure that the non-permit spaces will remain non-permit spaces during entry procedure:**

WM only uses contractors to perform confined space entry.

**Identify the name(s) and title(s) of the person(s) who perform the above hazardous assessments:**

Various contractors with confined space entry experience.

The remainder of this plan must be completed for facilities with permit required confined space only. Activities may, however, change the status of the space (permit versus non-permit).

### **ACCEPTABLE ENTRY CONDITIONS**

**Briefly describe the tests performed (or data available) to ensure that conditions in confined spaces are acceptable for entry:**

WM only uses contractors to perform confined space entry. Contractors will determine if confined spaces are permit required or non-permit required confined space.

### **IDENTIFICATION AND LABELING OF CONFINED SPACES**

**Describe the signs, labels or markings used to identify permit required confined spaces at the facility:**

“Confined Space” signs are posted on confined spaces. All confined spaces are further evaluated by the contractor to determine if the space is permit required or non-permit required.

### **VENTILATION**

**Identify the ventilation equipment used at the facility:**

Contractor to provide.



**AIR MONITORING**

**Identify any facility-specific contaminants that are monitored in confined spaces:**

Contractor to determine based on actual confined space.

**List the monitor(s) that must be present in confined spaces when Authorized Entrants occupy them:**

Contractor to provide own certified and calibrated monitoring device.

**Monitor: N/A                      Model: N/A                      Calibration Date: N/A**

**PERSONNEL ROLES**

**Identify the titles used for confined space personnel if different from those used to in this program:**

Contractor to provide.

**CONFINED SPACE ENTRY PERMIT**

**Attach the confined space entry permit used at the facility if different from the one provided in the Appendix.**

**EMERGENCY PROCEDURES**

**Briefly describe emergency procedures followed at the facility for confined space accidents, injuries or illnesses:**

ALL ACCIDENTS OR ILLNESSES SHOULD BE REPORTED TO A SUPERVISOR. SUPERVISOR WILL DETERMINE WHAT IF ANY FIRST AID IS NECESSARY. IF MEDICAL ATTENTION IS NECESSARY, SUPERVISOR OR OTHERS WILL CALL AMBULANCE (911).

If the emergency rescue team is contacted by phone, include the phone number dialed to reach the team:

911

**TRAINING**

**Briefly describe the topics covered and materials used to train:**

To be determined by confined space entry contractor.

**Briefly describe simulated rescues performed as part of training for all team members:**

To be performed by confined space contractor.

## **CONTRACTOR PROVISIONS**

Describe any facility-specific procedures or policies regarding contractors and leased employees who perform work in confined spaces at the facility:

Contractor must have health and safety plan that includes confined space training.

**List all printed materials provided to contractors or leased employees who performed confined space entry at the facility:**

Copy of this program for contractor's review.

## **RECORDKEEPING**

**Location of the confined space permit file at facility:**

Contractors retain records of confined space entry.

**Location of training records for the confined space program at the facility:**

File cabinet in office. Contractors keep own confined space training records.

## **DEFINITIONS**

***Acceptable entry conditions:*** The conditions that must exist in a confined space to allow entry and to ensure that employees involved in a permit-required confined space entry can safely enter into and work within the space.

***Forced-Ventilation Confined Space:*** A confined space where the only hazard remaining is one that can be controlled by forced ventilation.

***Non-Permit Confined Space:*** A confined space where all the hazards are controlled prior to entry, and none are brought into the space.

***Combustible Dust:*** A dust capable of undergoing combustion or burning when subjected to a source of ignition.

***Engulfment:*** The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

***Entry:*** The action by which a person passes through an opening into a permit-required confined space. Entry includes work activities in the space and is considered to have occurred as soon as any part of the Entrant's body breaks the plane of an opening into the confined space.

***Entry Permit:*** The written or printed document that the employer provides which contains the necessary information to allow and control entry into a permit space.



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## CONFINED SPACE PROGRAM

**Hot Work:** Any work involving burning, welding, riveting, or similar fire-producing operations, as well as work which produces a source of ignition, such as drilling, abrasive blasting, and space heating.

**Hazardous Atmosphere:** An atmosphere that may expose employees to the risk of death, incapacitation, impairment or ability to self-rescue injury, or acute illness from one or more of the following causes:

- A flammable atmosphere in excess of 10% of the LFL (lower flammable limit) for the material.
- Airborne combustible dust at a concentration that meets or exceeds its LFL.
- Atmospheric oxygen concentration below 19.5% or above 23.5%.
- Exposure to an atmospheric concentration of any substance that a dose or PEL is published by the Occupational Safety and Health Administration (OSHA) that may result in employee exposure to the substance in excess of that dose or PEL.
- Any other atmospheric condition that is immediately dangerous to life or health.

**Isolation:** A process whereby the confined space is removed from service and completely protected against the inadvertent release of material and hazardous energy by the following: blanking off (skillet type metal blank between flanges), misaligning sections of all lines and pipes, locking out all sources of power, and blocking or disconnecting all mechanical linkages.

**Lower Flammable Limit (LFL):** The lower limit of flammability of a gas or vapor at ordinary ambient temperature expressed in a percentage of the gas or vapor in air by volume.

**Oxygen Deficiency:** Refers to an atmosphere containing less than 19.5% oxygen.

**Oxygen Enriched:** An atmosphere containing an oxygen concentration greater than 23.5%.

**Threshold Limit Value (TLV):** The airborne concentration of a substance established by the American Conference of Governmental Hygienists (ACGIH) representing a condition under which it is believed that nearly all workers may be repeatedly exposed without adverse effect.





## PERMIT-REQUIRED CONFINED SPACE DETERMINATION WORKSHEET

Space Being Evaluated: \_\_\_\_\_

Work To Be Performed: \_\_\_\_\_

**Step 1. Is the space...**

	Yes	No
1) Large enough for a body to enter		
2) Limited or restricted means of entry or exit		
3) Not designated for continuous occupancy		

If the answer to **ALL** three questions above is "Yes," it is a "**Confined Space**" - Go to Step 2.  
 If the answer to any of the questions is "No," it is not a confined space – Proceed to Step 3,  
 Sign, Date and Keep On File.

**Step 2. Does the confined space have one or more of the following:**

	Yes	No
1) Contains or has a potential to contain hazardous atmosphere (OR)		
a) 10% LEL (Lower Explosion Limit) – Flammable/Combustible gasses b) Dust Concentrations > LEL Dust c) O2 level is > 19.5% or < 23.5% d) OSHA PEL (Permissible Exposure Limit) Exceeded e) IDLH (Immediately-Dangerous-to-life-or-Health) Atmosphere (See <i>Definitions</i> for further detail)		
2) Engulfment (completely surrounded by) examples – cave-in, drowning, buried		
3) Trapped or asphyxiated by inwardly converging walls		
4) Is there a serious safety of health hazard that cannot be completely eliminated through lockout/tagout? Attach Lockout/Tagout Procedure to this document.		

If the answer to **ANY** of the above questions in Step 2 is "Yes," the space is considered to be a "Permit Required Confined Space." Contact your Regional or Corporate Safety Manager to discuss requirements for entry into the space. If the answer to ALL of the questions is "no," the space is considered to be a "Confined Space" only. In either case, proceed to Step 3 of the Worksheet, Sign, Date, Keep On File.

**Step 3. Check the appropriate box**

	Not A Confined Space
	Confined Space
	Permit-Required Space

\_\_\_\_\_  
 Signature  
 Date

\_\_\_\_\_  
 Print Name

Comments:

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CONFINED SPACE ENTRY PERMIT				PERMIT NO.			
<b>1. Identify Space And Work To Be Done</b>							
Space to Be Entered							
Location/Building							
Hazardous Materials to be Taken Into or Hazardous Work to Be Done in Space							
Purpose of Entry							
Authorization Duration of Permit		Date:	From	To	Time:	From	To
<b>2. Identify Permit Space Hazards</b> (Indicate Specific Hazards Which May be Present)				<b>4. Make Space Before Entry</b> (Check After Steps Have Been Taken)			
<input type="checkbox"/> Unsafe to Remove Cover, Excess Pressure <input type="checkbox"/> Excess Heat <input type="checkbox"/> Oxygen Deficiency (Less than 19.5%) <input type="checkbox"/> Oxygen Enrichment (Greater than 23.5%) <input type="checkbox"/> Flammable Gasses or Vapors (Greater than 10% of LEL) <input type="checkbox"/> Airborne Combustible Dust (Greater than 10% of LEL) <input type="checkbox"/> Toxic Gases or Vapors (Greater than PEL) <input type="checkbox"/> Mechanical Hazards <input type="checkbox"/> Electrical Shock <input type="checkbox"/> Materials Harmful to Skin <input type="checkbox"/> Engulfment, Falling Slag <input type="checkbox"/> Other: _____ _____ _____				<input type="checkbox"/> Notify Affected Department of Service Interruption			
				Isolation Methods			
				<input type="checkbox"/> Blank/Blind <input type="checkbox"/> Inert <input type="checkbox"/> Lockout/Tagout <input type="checkbox"/> Other: _____ Continuous Ventilation		<input type="checkbox"/> Clearance Procedure <input type="checkbox"/> Purge/Clean  <input type="checkbox"/> Atmospheric Test <input type="checkbox"/> Barriers	
				Personal Awareness			
				<input type="checkbox"/> Pre-entry Briefing on Specific Hazards, Control Methods and Emergency Action Plan <input type="checkbox"/> Notify Contractors of Permit and Hazard Conditions <input type="checkbox"/> Test/Verify Hazard Energy Control <input type="checkbox"/> Other _____  <input type="checkbox"/> Additional Permits Required and/or Attached <input type="checkbox"/> Hot work <input type="checkbox"/> Other			
<b>3. TEST SPACE BEFORE INITIAL ENTRY &amp; REGULARLY THEREAFTER (And Before Open Flame Work)</b>							
<u>Material</u>	<u>Normal Air</u>	<u>Acceptable Entry Conditions</u>	<u>Initial Test : AM/PM</u>	<u>Result : AM/PM</u>	<u>Result : AM/PM</u>		
Oxygen-min/max flammability	20.9	> 19.5% < 23.5%	_____	_____	_____		
Hydrogen Sulfide	0	< 10% LEL/LFL	_____	_____	_____		
Carbon monoxide	0	< 10 ppm	_____	_____	_____		
Chlorine	0	< 50 ppm	_____	_____	_____		
Sulfur dioxide	0	< 0.5 ppm	_____	_____	_____		
Other (Specify)	_____	< 2 ppm	_____	_____	_____		
<b>Tester Initials</b>	_____	_____	_____	_____	_____		
Always investigate before entry if conditions do not match normal air.							
<b>5. Certify Control Measures Taken, Classify Space, And Post Permit</b>							
<b>Low Hazard</b> – All hazards are eliminated; none to be released by work. Follow basic safety precautions for the work.							
<b>Ventilation Controlled</b> – Only environmental hazards remain or will be released by work, which are controllable by ventilation. Ventilate before and during entry, with regular tests to ensure safety of air in the space.							
<b>Attendant Required</b> – Atmospheric and/or physical hazard remains. <b>SKIP SECTIONS 6 &amp; 7 BELOW; GO TO PAGE 2 AND COMPLETE</b>							

Entry Leader Printed Name	Date
Entry Leader Signature	
<b>6. Authorization By Entry Supervisor To Enter Reclassified Nonpermit-Required Space</b>	
I certify that all required precautions have been taken and necessary equipment is provided for safe entry and work in this confined space, and that the space is not attendant-required.	
Printed Name	Date
Signature	
<b>7. End Entry (For All Spaces)</b>	
I have checked the space to make sure no one is in it, and all measures required to return it back to normal service have been performed. I authorize the return of this space to normal service.	
Problems That Occurred	
Suggestions	
Entry Supervisor Printed Name	Date
Entry Supervisor Signature	
<b>THIS PERMIT MUST BE POSTED AT SPACE ENTRANCE • PERMIT GOOD ONLY FOR THE DURATION  OF THE JOB  NO LIMIT ON HAZARD-CONTROLLED OR FORCED-VENTILATION SPACE UNLESS HAZARDS  CHANGE  CHECK BEFORE ENTRY</b>	
<b>8. List/Signature Of Authorized Entrants (List by Name or Attach Roster)</b>	
<b>9. List/Signature of Authorized Attendants (List by Name)</b>	
<b>10. Ensure Emergency Rescue Available</b>	
Control Room Notified Prior to Entry (Plants)	
Rescue Phone Number	
Method of Contact	

<b>11. Authorization by Entry Supervisor to Enter Attendant-Required Space</b>	
I certify that all required precautions have been taken and necessary equipment is provided for safe entry and work in this confined space, and that the space is not attendant-required.	
Printed Name	Date
Signature	
<b>12. Obtain Equipment Required for Entry and Work</b>	
Establish Communication Procedures to be Used by Attendants and Entrants	
<b>Specify as Required:</b>	
Personal Protective Equipment	
Continuous or Period Atmospheric Testing/Monitoring	
Respiratory Protection Equipment	
Rescue Equipment	
Other	
<b>13. End Entry (For All Spaces)</b>	
I have checked the space to make sure no one is in it, and all measures required to return it back to normal service have been performed. I authorize the return of this space to normal service.	
Problems that Occurred	
Suggestions	
Entry Supervisor Printed Name	Date
Signature	
<b>THIS PERMIT MUST BE POSTED AT SPACE ENTRANCE • PERMIT GOOD ONLY FOR THE DURATION  OF THE JOB  NO LIMIT ON HAZARD-CONTROLLED OR VENTILATION-VENTILATION SPACE UNLESS HAZARDS  CHANGE  CHECK BEFORE ENTRY</b>	



**Program: Emergency Action Plan**

**Facility: Kekaha Sanitary Landfill**

**Facility Location: 6900 D – Kaumualii Highway Kekaha 96752**

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**EMERGENCY ACTION PLAN**

**Refer to Section I Part E.**



**Program: Fire Prevention Plan**

**Facility: Kekaha Sanitary Landfill**

**Facility Location: 6900 D – Kaumualii Highway Kekaha 96752**

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**FIRE PREVENTION PLAN**

**Refer to Section I Part E.**



**Program: Hazard Communication**

**Facility: Kekaha Sanitary Landfill**

**Facility Location: 6900 D Kaumualii Hwy, Kekaha HI 96752**

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## **HAZARD COMMUNICATION**

### **PURPOSE**

Employees at our facilities use certain materials requiring specific precautions. It is the policy of KLF to communicate any known hazards associated with these materials and to train our employees in safe handling techniques.

### **DEFINITIONS**

***Chemical*** – any element, chemical compound or mixture of elements and/or compounds.

***Chemical manufacture*** – an employer with a workplace where chemical(s) are produced for distribution or use.

***Combustible liquid*** – any liquid having a flashpoint at or above 100 degree F (37.8 degree C), but below 200 degree F (93.3 degree C), except any mixture having components with flashpoints of 200 degree F (93.3 degree C), or higher, the total volume of which make up 99 percent or more the total volume of the mixture.

***Common name***- any designation or identification such as code name, code number, trade name, brand name, or generic name used to identify a chemical other than by its chemical name.

***Container*** – any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical.

***Explosive*** – a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

***Exposure or exposed*** – an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (e.g., accidental or possible) exposure.

***Flashpoint*** – the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite when tested.



## HAZARD COMMUNICATION PROGRAM

**Health hazard** – includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes.

**Labels** – any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals.

**Physical hazard** – a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

**Trade secret** – any confidential formula, pattern, process, device, information or compilation of information that is used in an employer's business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it.

**Unstable** – a chemical which in pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure or transfer.

**Water-reactive** – a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

**Work area** – a room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.

**Workplace** – an establishment, job site, or project, at one geographical location containing one or more work areas.

### RESPONSIBILITIES

Management and supervisors must ensure that proper information is obtained and communicated to appropriate employees. Employees must follow the safe work practices outlined in training sessions, Material Safety Data Sheets, warning labels, and/or operating procedures.

The effectiveness and success of this program depend on the active support and involvement of all personnel.

### MATERIAL SAFETY DATA SHEETS (MSDS)

Material Safety Data Sheets (MSDS's) contain information necessary to safely handle specific materials. It is important for KLF to obtain the MSDS's from suppliers concerning hazardous materials purchased. Workers are advised of the following information:

- Name, address, and telephone number of manufacturer, distributor or importer.

- Chemical name and/or common name of material.
- Chemical analysis or formula.
- Ingredients and hazards associated with chemicals used.
- Physical data.
- Fire and explosion hazard data.
- Reactive data.
- Health hazard data.
- Spill leak, and disposal data.
- Special protection information.
- Special precautions and comments.
- MSDS identification number.

Vendors are required to provide MSDS's for all hazardous materials including solvents, soaps, oils, maintenance supplies, lubricants, cleaners, compressed gases, welding and brazing wires and rods, fluxes, etc. These sheets should be sent to the District Manager. Records should be maintained of all verbal and written requests for MSDS's from suppliers of hazardous materials.

Records of verbal requests must include date of request, supplier's name, product for which the sheet is being requested, name of person from whom sheet is being requested, and name of the person making the request. Written requests can be kept in a separate file.



**Master copies of the MSDS binder will be maintained in the shop and in the landfill office.**

### STATE SPECIFIC ITEMS

Each MSDS will be maintained for at least 30 years.

These MSDS's are available for review by any employee upon request. In addition, the Operations Manager will screen all MSDS's received to insure that the information listed above is included. If sheets are incomplete, the supplier will be notified and an updated and/or complete MSDS will be requested. Records of these requests will be maintained also.

Generally, the Company does not become aware of new and significant health hazards associated with materials used in our facilities unless notified by the supplier or manufacturer. Upon receipt of updated MSDS's Operations Manager replaces outdated MSDS's with the new ones, and informs employees of the changes.

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### WORKPLACE CHEMICAL LIST

The Operations Managers will be responsible for maintaining a Workplace Chemical List of all hazardous materials used at KLF. A separate form will be used for each facility. The Workplace Chemical List will be available for review by employees of a facility upon request.

The Workplace Chemical List constitutes the official list of all hazardous materials approved for use at KLF.

The Operations Manager must approve materials not on the list before being received.

**Once a year, each department will conduct a physical inventory of chemicals and materials in use in its area and report the results to John Ruiz program manager. The results will be compared with the Workplace Chemical List to insure that it is complete and accurate.**

### LABELS AND OTHER FORMS OF WARNING

Labels and similar forms of warning list any hazards associated with containerized materials. Therefore, all hazardous materials will be placed in labeled containers. Labels must not be defaced or removed. Labeled containers must always be positioned with the labels clearly visible. If a container is without a label, it must be labeled immediately. Until the container is properly labeled, the materials will not be use Labels are to include:

- A list of hazardous materials within the container.
- Appropriate hazard warnings.
- Name, address and phone number of the manufacturer, distributor, or importer.



## HAZARD COMMUNICATION PROGRAM

Labels are to be in English, with other languages optional. Labels will contain the material's name. If the chemical name is used, the common name can be found by referring to the Workplace Chemical List.

Employees are trained not to rely solely on the information inscribed on a label, but also to read the MSDS for additional information.

### TRAINING AND LOCATION OF HAZARD DATA

A program has been established to ensure that all employees are trained prior to beginning work with hazardous materials. Procedures have also been established to train new hires and transferred employees. This training is to inform employees of any hazardous materials known to be present in the workplace.

- This written program and copies of MSDS's covering hazardous materials in a specific work area are maintained by the Operations Manager and supervisors in appropriate places to permit ready access to employees, physicians, and employee representatives at all times. (A location within a locked office or filing cabinet and not readily accessible is unacceptable.)
- The Site Manager maintains the facilities Workplace Chemical List and a master copy of all MSDS's. MSDS's from this file are not to be removed from the facility. Employees may review this information at any time.
- Employee training includes, as a minimum:
  - A briefing on the OSHA Hazard Communication Standard concerning employee and company rights and responsibilities.
  - Identification of hazardous materials in the employee's work area, and potential dangers associated with them.  
Location of the written program and MSDS's appropriate to the employee's work area.
  - How to use MSDS's (e.g., what information they contain, where to find the information, how to use it).
  - How to use labels and other forms of warning—what information they communicate, and how to use that information for protection.
  - Specific training appropriate to the employee.
  - Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.)
  - The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and PPE to be used.
  - Employee's protection against discharge or other discrimination due to the employee's exercise of the rights afforded pursuant to the provisions of the Hazardous Substances Information and Training Act.



## HAZARD COMMUNICATION PROGRAM

- Whenever KLF receives a new or revised MSDS, such information will be provided on a timely basis not to exceed 30 days after receipt, if the new information indicates significantly increased risk to, or measures necessary to protect, employee health as compared to those stated on a MSDS previously provided.
- Schedule
  - All new employees will be trained prior to working with hazardous materials.
  - All transferred employees will be trained prior to assignment in an area where hazardous materials are used.
  - All employees will be trained on the hazards of materials at the time they are introduced into their work area.
  - All employees, prior to being assigned to a non-routine task involving hazardous materials, will receive special training.
  - All employees will be retrained annually.
  - The District Manager will schedule such annual training as a safety-meeting topic. Ongoing responsibility for training employees in the situations described above rests with the supervisor of the applicable work area.
- Documentation

All training is to be documented and the information kept at the facility site. Documentation will show the following:

  - Date of training session.
  - Type of training given (brief description or outline)
  - Name and signature of employees receiving the training.
  - Name(s) of instructor(s).

## HAZARD DETERMINATION AND EVALUATION

**KLF** will accept the hazard determination and evaluation conducted by the supplier.

## EMPLOYEE HAZARD COMMUNICATION REGARDING NON-ROUTINE TASKS

**KLF** RECOGNIZES THAT EMPLOYEES WILL BE REQUIRED TO PERFORM NON-ROUTINE TASKS (EMERGENCY REPAIRS AND/OR CLEAN-UP OF CHEMICAL SPILLS, ETC.), WHICH COULD EXPOSE THEM TO UNUSUAL RISKS FROM HAZARDOUS MATERIALS. THEREFORE, SPECIAL ATTENTION WILL BE GIVEN BY THE DISTRICT

Manager and supervisors instruct employees on how to protect themselves in the performance of these tasks.

- Instructions by the supervisor take place immediately before the employee(s) perform(s) the non-routine task.
- Written records are kept by the supervisor showing:
  - Date
  - Non-routine task involved
  - Name(s) of employee(s) involved
  - Name of person doing the communication and training



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## HAZARD COMMUNICATION PROGRAM

- Employees are issued special protective equipment and instructions for its use in the performance of non-routine tasks.

### INFORMING CONTRACTORS

- The following information will be communicated to all contractors:
  - Hazardous chemicals to which they may be exposed while on the job site.
  - Precautions the contractor's employees may take to lessen the possibility of exposure by usage of appropriate protective measures.
- It is the responsibility of the contractor to communicate this information to their employees and to sign and return the attached acknowledgment form.
- Contractors must provide a copy of each MSDS for chemicals they bring to our site.



**ACKNOWLEDGMENT OF CONTRACTOR RESPONSIBILITY  
FOR HAZARD COMMUNICATION**

I, \_\_\_\_\_, representing the company named \_\_\_\_\_, do acknowledge receipt of the contractor portion of the KLF and Resource Recovery Facility Hazard Communication Program. I understand the responsibility of my Company under this program. I will insure that the personnel of my company comply with all applicable provisions while at the KLF.

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Date*







**Program: Hearing Conservation Program**

**Facility: Kekaha Sanitary Landfill**

**Facility Location: 6900 D Kaumualii Highway, Kekaha, HI 96752**

**Site Manager: John Ruiz**

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## **HEARING CONSERVATION**

### **PURPOSE**

To describe the Hearing Conservation Program requirements when employees are exposed to noise in excess of levels specified by OSHA 1910.95 Occupation Noise Exposure.

### **SCOPE**

This procedure applies to all employees who may be exposed to noise levels above what OSHA regulatory requirements specify.

### **EXCLUSIONS**

Employees whose noise exposure is less than 85-dBA time weighted over an 8-hour day or 50% equivalent dose.

DOT regulated drivers are excluded from requirements for wearing hearing protectors and participating in OSHA Hearing Conservation Programs. DOT requires interior cab noise levels to be 90 dBA or less. This does not preclude the facility from implementing appropriate practices.

### **RESPONSIBILITIES**

The District Manager is responsible for administering the Hearing Conservation Program. This person:

- Oversees the program.
- Ensures that hearing protection is available.
- Arranges for noise monitoring and audiometric tests as needed.
- Reviews the program on an annual basis.
- Provides employee training.
- Posts notification in areas requiring hearing protection.
- Checks that employees wear their hearing protection properly.



## **HEARING CONSERVATION PROGRAM**

Waste Management supervisors are responsible for ensuring employees properly wears hearing protection in required areas, ensuring noisy areas are posted and personnel are following the requirements of this program.

Waste Management employees must wear hearing protection properly where required and keep it clean and well maintained. Employees should tell their supervisors about work areas they believe are too noisy that may need monitoring or posting.

### **NOISE MONITORING**

Waste Management conducts personal and/or area noise monitoring as needed to determine which areas have noise levels above eighty-five dBA or above a fifty percent dose for an eight-hour shift. A noise survey to determine areas of potential over-exposure should be conducted prior to personal noise dosimetry. OSHA requires use of the A-weighted decibel scale to determine compliance.

Area monitoring may be used to identify work areas, such as areas around pumps, motors, heavy equipment, or compressors, where workers must wear hearing protection. Personal noise monitoring determines which employees to include in the Hearing Conservation Program. Noise monitoring is important in determining which type of hearing protection will best protect hearing.

Until or unless site specific monitoring finds differently, all monitoring for site specific tasks performed by Waste Management that indicate exposures above or equal to 85dBA TWA or equivalent will take precedence.

Each employee exposed at or above an 8-hour time-weighted average of 85 decibels will be notified of the results of the monitoring.

### **CONTROL MEASURES**

The permissible noise level for OSHA compliance is ninety decibels on the A-weighted scale for an eight-hour, time-weighted average (TWA). If the noise levels exceed ninety dBA, Waste Management must implement appropriate administrative or engineering controls.

The OSHA action level for noise exposure is eighty-five dBA for an eight-hour TWA. If any Waste Management employee has a noise exposure that equals or exceeds the action level, a Hearing Conservation Program is mandatory. The facility will maintain a list of employees entered into the Hearing Conservation Program. The list is located with the Hearing Conservation Program binder.

Employees in areas of the facility where the eight-hour TWA noise level equals or exceeds eighty-five dBA, but is below ninety dBA, receive hearing protection. Use of hearing protection is recommended. However, if annual audiometric examination reveals a decline in the employee's hearing ability, the use of hearing protection becomes mandatory.

Any employee who is exposed to an eight-hour TWA of eighty-five dBA or greater who has not yet had a baseline audiogram, must wear hearing protection.



## HEARING CONSERVATION PROGRAM

Employees working in areas of the plant where the eight-hour TWA is ninety dBA or higher must wear appropriate hearing protection at all times.

### AUDIOMETRIC TESTING

#### *TESTING*

Employees exposed above the action level will be included in Waste Management Hearing Conservation Program and given a baseline audiogram within 180 days of beginning work. An audiogram is a chart, graph, or table that displays the results of an audiometric test. Audiograms show an individual's hearing threshold levels as a function of frequency.

The initial audiogram becomes a baseline against which future audiograms are compared to determine if hearing loss has occurred. An employee's annual audiogram is compared to the baseline audiogram to determine if loss constitutes a standard threshold shift (STS). An STS is a change in hearing threshold relative to the baseline audiogram of more than ten dB or more at 2000, 3000, and 4000-hertz (Hz) in either ear. OSHA requires reporting of all work-related STS's with an average of ten dB or more at 2000, 3000, and 4000 Hz in either ear on the OSHA 300 log as an occupational illness. In determining whether a standard threshold shift has occurred, allowance may be made for the contribution of aging (presbycusis) to the change in hearing level by correcting the annual audiogram.

A licensed or certified audiologist, or a physician or technician who is certified by the Council of Accreditation in Occupational Hearing Conservation, must perform the audiogram.

#### *MAINTAINING RECORDS*

Waste Management is responsible for maintaining records of noise measurements and audiometric testing for prescribed lengths of time:

- Area noise measurements—two years.
- Audiometric test records—the duration of the worker's employment. The audiometric test provider should maintain these records for Waste Management.

Audiometric test records must include:

- The name and job classification of the employee
- The date of the test
- The audiometric examiner's name
- The date of acoustic calibration
- Measurements of background sound pressure levels in audiometric test rooms. (The testing company usually retains this information).
- If an employee incurred hearing loss prior to employment, proper medical documentation must be on file.

### EMPLOYEE NOTIFICATION



## HEARING CONSERVATION PROGRAM

Waste Management must notify all affected employees of personal and area monitoring results. The contract physician provides interpretation of the audiometric test results to the employee. Retain copies of this form in the employee's personnel file.

If the comparison of the annual audiogram to the baseline audiogram indicates an STS has occurred, Waste Management must inform the employee in writing within twenty-one days. The audiometric tester should explain the results of the audiogram to each employee.

Any employee whose audiogram indicates an STS may be re-tested within thirty days. Waste Management can use the results from the retest as the annual audiogram.

If a physician determines the STS is work related, the supervisor must take the following steps:

- Fit and train an employee who has not been wearing hearing protectors in the use and care of hearing protection.
- Refit an employee already wearing protection with protectors with a higher level of protection (attenuation) and retrain him or her in the proper use of hearing protection.
- Refer the employee for a clinical audiological evaluation if wearing hearing protection causes or aggravates the problem.
- If subsequent audiometric testing of an employee indicates that an STS is not persistent, Waste Management must inform the employee of this.

### HEARING PROTECTORS

Waste Management employees in work areas where the noise level is over the action level (eighty-five dBA, eight-hour TWA) receive hearing protection. Workers can select hearing protection from a variety of types with the proper attenuation. The hearing protectors are available at each work location.

All hearing protection devices will have a noise reduction rating (NRR) of twenty or greater.

Hearing protection must reduce employee exposure to less than eight-five dBA.

Hearing protectors are supplied at no cost to employees in the Hearing Conservation Program. Replaced as necessary.

### EMPLOYEE INFORMATION

As part of the Hearing Conservation Program, Waste Management will post signs at the entrance to all rooms or work areas where the noise level exceeds eighty-five dBA. The signs say:

**Hearing Protection Required Beyond This Point**, or equivalent. Waste Management will provide access to a copy of the OSHA Noise Standard by posting it in a prominent location. Supervisors should instruct employees who operate mobile equipment (such as drilling or trenching equipment) to wear hearing protection.



## HEARING CONSERVATION PROGRAM

Affected employees or their representatives have access to copies of this standard and a copy of the standard is also posted at the work location.

### **TRAINING (Refer to Appendix A)**

Employees exposed to noise above eighty-five dBA will be trained annually. Training is to cover all of the requirements of the OSHA noise standard, including:

- The effects of noise on hearing
- The purpose, advantages, and disadvantages of various types of hearing protectors
- The selection, fitting, and care of protectors
- The purpose and procedures of audiometric testing
- The attenuation of different types of protection and what this means in terms of noise reduction.

### **RECORDKEEPING**

#### ***RETENTION***

Waste Management shall retain records required in this program for at least the following periods:

- Noise exposure measurement records shall be retained for two (2) years.
- Audiometric tests records shall be retained for the duration of the affected employee's employment.

#### ***ACCESS***

All records required by this section shall be provided upon request to employees, former employees, and representatives designated by the individual employee.

### **ENFORCE THE PROGRAM**

Consistent enforcement of the Hearing Conservation Program is important. The message needs to be conveyed that the use of hearing protection is strictly required in some areas. All persons in hearing protection areas, including visitors, managers, and office employees, must wear required hearing protection devices.

### **REVIEW THE PROGRAM ANNUALLY**

The program administrator conducts an annual review of the Hearing Conservation Program. The review addresses the following:

#### ***Monitoring***

Review previous monitoring results.



## HEARING CONSERVATION PROGRAM

Identify areas with altered or changed equipment or processes and arrange for monitoring in these areas.

Arrange for monitoring in these areas and areas where monitoring has not been performed within a year.

### ***Audiometric Testing***

Review audiometric results for all employees.

Check to determine if repeat testing for employees who show an STS has been performed. If not, arrange for repeat testing.

Arrange for all employees working in areas where the noise level is above the action level to have audiometric testing annually.

### ***Review Hearing Loss Patterns***

Recognize jobs that seem to cause hearing loss.

List employees who show a loss of hearing above twenty-five dB (Standard Threshold Shift) on the OSHA 300 log as an occupational illness.

### ***Identify Potential Hearing Loss Causes***

Do employees wear their hearing protection?

Do they wear hearing protection properly?

Is the protection sufficient?

Has noise increased in the work area?

Was this increase caused by the addition of new equipment?

Was this increase caused by old equipment becoming noisier?

### ***Implement Additional Controls***

Reduce noise sources with an engineering control. Document any noise abatement activity.

Get different hearing protectors.

Conduct additional training in the correct use of hearing protection.

Enforce the use of hearing protection.

Retrain and issue hearing protection with a higher protection level to any employee showing hearing loss. If these employees continue to show an occupationally related hearing loss over two consecutive years, place them in a new job without a noise hazard.

Make a list of the names of the persons included in the Hearing Conservation Program.



## HISTORICAL NOISE LEVEL AND EXPOSURE DATA

	Average Exposure (dBA)	Exposure Range (dBA)	Avg. Dose %	Dose Range %
<b>Hauling</b>				
Driver – Commercial	86	76 – 90	79	19 - 151
Driver – Dump Truck	78	69 – 88	27	5 – 34
Driver – Recycle	85	81 – 91	70	9 – 138
Driver – REL	85	83 – 87	57	42 – 81
Driver – Residential	87	82 – 99	92	2 – 481
Driver – Roll-Off	87	76 – 92	103	18 – 191
Driver – Semi-Truck	86	83 – 88	68	28 – 101
Driver – Sweeper	86	83 – 90	80	39 – 119
Drivers – Overall	86	71 – 99	78	2 – 481
<b>Landfill/Transfer</b>				
Driver – Site Truck	84	78 – 89	43	18 – 85
Driver – Water Truck	84	70 – 91	103	18 – 192
Gas Plant/Gas Recovery	90	82 – 98	102	22 – 316
Laboratory Personnel	78	56 – 90	36	0.4 – 299
Loaders – Transfer/Tipping	86	70 – 95	71	4 – 299
Operator – Compactor	91	91	115	96 – 134
Operator – Landfill Equip.	85	64 – 99	79	3 – 319
Spotter – Transfer / Tipping	85	71 – 93	57	6 – 131
<b>Maintenance</b>				
Mechanic – Hauling/Landfill	81	69 – 96	35.8	3 – 236
Mechanic – MRF	83	69 – 89	52	4 – 94
Tire Men	83	71 – 88	57	8 – 91
<b>Material Recovery Facility</b>				
Baler Operator	87	76 – 104	77	13 – 200
Forklift/Bobcat Operator	87	81 – 93	73	54 – 187
Sorters	88	72 – 103	101	1.9 – 1243
Ticket Collector MRF	87	86 – 87	69	56 – 88

**NOTE:**

8-Hour Average Exposures of 85 dBA or Greater (or 50% of the Allowable Dose) Require Hearing Conservation Training, Audiograms and the Availability of Hearing Protection.

8-Hour Average Exposures of 90 dBA or Greater (or 100% of the Allowable Dose) Require Mandatory Use of Hearing Protection in Addition to Other Hearing Conservation Program Requirements.

If the Data Above Indicates Excessive Exposures, Implement Hearing Conservation OR Conduct Monitoring to Determine the Specific Exposures at Your Location. Send a Copy of the Results to Corporate Safety.

DOT Drivers are Covered by 49 CFR 394 Inside of Their Cabs, and Not 29 CFR 1910.95. They **Must Not** Wear Hearing Protection While Driving on Public Roadways.





## HEARING CONSERVATION PROGRAM

### §29 CFR 1910.95

#### Occupational noise exposure.

- (a) Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in Table G-16 when measured on the A scale of a standard sound level meter at slow response. When noise levels are determined by octave band analysis, the equivalent A-weighted sound level may be determined as follows:

Equivalent sound level contours. Octave band sound pressure levels may be converted to the equivalent A-weighted sound level by plotting them on the graph and noting the A-weighted sound level corresponding to the point of highest penetration into the sound level contours. This equivalent A-weighted sound level, which may differ from the actual A-weighted sound level of the noise, is used to determine exposure limits from Table 1.G-16.

- (b)(1) When employees are subjected to sound exceeding those listed in Table G-16, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table G-16, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.
- (2) If the variations in noise level involve maximums at intervals of 1 second or less, it is to be considered continuous. Table G-16. -- Permissible Noise Exposures{ 1}.

Duration per day, hours	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

{1} When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions:  $C(1) / T(1) + C(2) / T(2) + \dots + C(n) / T(n)$  exceeds unity, then the mixed exposure should be considered to exceed the limit value. C(n) indicates the total time of exposure at a specified noise level, and T(n) indicates the total time of exposure permitted at the level.

Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

- (b) Hearing Conservation Program.

- (1) The employer shall administer a continuing, effective Hearing Conservation Program, as described in paragraphs (c) through (o) of this section, whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level (TWA) of 85 decibels
  - (2) measures on the A scale (slow response) or, equivalently, a dose of fifty percent. For purposes of the Hearing Conservation Program, employee noise exposures shall be computed in accordance with Appendix A and Table G-16a, and without regard to any attenuation provided by the use of personal protective equipment.
  - (3) For purposes of paragraphs (c) through (n) of this section, an 8-hour time-weighted average of 85 decibels or a dose of fifty percent shall also be referred to as the action level.
- (d) Monitoring.
- (1) When information indicates that any employee's exposure may equal or exceed an 8-hour time-weighted average of 85 decibels, the employer shall develop and implement a monitoring program.
    - (i) The sampling strategy shall be designed to identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors.
    - (ii) Where circumstances such as high worker mobility, significant component of impulse noise make area monitoring generally inappropriate, the employer shall use representative personal sampling to comply with the monitoring requirements of this paragraph unless the employer can show that area sampling produces equivalent results.
  - (2)(i) All continuous, intermittent and impulsive sound levels from 80 decibels to 130 decibels shall be integrated into the noise measurements.
    - (ii) Instruments used to measure employee noise exposure shall be calibrated to ensure measurement accuracy.
  - (3) Monitoring shall be repeated whenever a change in production, process, equipment or controls increases noise exposures to the extent that:
    - (i) Additional employees may be exposed at or above the action level; or
    - (ii) The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of paragraph (j) of this section.
- (e) Employee notification. The employer shall notify each employee exposed at or above an 8-hour time-weighted average of 85 decibels of the results of the monitoring.
- (f) Observation of monitoring. The employer shall provide affected employees or their representatives with an opportunity to observe any noise measurements conducted pursuant to this section.
- (g) Audiometric testing program.
- (1) The employer shall establish and maintain an Audiometric testing program as provided in this paragraph by making Audiometric testing available to all employees whose exposures equal or exceed an 8-hour time-weighted average of 85 decibels.
  - (2) The program shall be provided at no cost to employees.

Audiometric tests shall be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the Council of Accreditation in Occupational Hearing Conservation, or who has satisfactorily demonstrated competence in administering Audiometric examinations, obtaining valid Audiograms, and properly using, maintaining and checking calibration and proper functioning of the audiometers being used.

- (3) A technician who operates microprocessor audiometers does not need to be certified. A technician who performs Audiometric tests must be responsible to an audiologist, otolaryngologist or physician.
- (4) All Audiograms obtained pursuant to this section shall meet the requirements of Appendix C: Audiometric Measuring Instruments.
- (5) Baseline Audiogram.
  - (i) Within 6 months of an employee's first exposure at or above the action level, the employer shall establish a valid baseline Audiogram against which subsequent Audiograms can be compared.
  - (ii) Mobile test van exception. Where mobile test vans are used to meet the Audiometric testing obligation, the employer shall obtain a valid baseline Audiogram within 1 year of an employee's first exposure at or above the action level. Where baseline Audiograms are obtained more than 6 months after the employee's first exposure at or above the action level, employees shall wearing hearing protectors for any period exceeding six months after first exposure until the baseline Audiogram is obtained.
  - (iii) Testing to establish a baseline Audiogram shall be preceded by at least 14 hours without exposure to workplace noise. Hearing protectors may be used as a substitute for the requirement that baseline Audiograms be preceded by 14 hours without exposure to workplace noise.
  - (iv) The employer shall notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the Audiometric examination.
- (6) Annual Audiogram. At least annually after obtaining the baseline Audiogram, the employer shall obtain a new Audiogram for each employee exposed at or above an 8-hour time-weighted average of 85 decibels.
- (7) Evaluation of Audiogram.
  - (i) Each employee's annual Audiogram shall be compared to that employee's baseline Audiogram to determine if the Audiogram is valid and if a standard threshold shift as defined in paragraph (g)(10) of this section has occurred. This comparison may be done by a technician.
  - (ii) If the annual Audiogram shows that an employee has suffered a standard threshold shift, the employer may obtain a retest within 30 days and consider the retest the results of the retest as the annual Audiogram.
  - (iii) The audiologist, otolaryngologist, or physician shall review problem Audiograms and shall determine whether there is a need for further evaluation. The employer shall provide to the person performing this evaluation the following information:
    - (A) A copy of the requirements for hearing conservation as set forth in paragraphs (c) through (n) of this section;
    - (B) The baseline Audiogram and most recent Audiogram of the employee to be evaluated;
    - (C) Measurements of background sound pressure levels in the Audiometric test room as required in Appendix D; Audiometric Test Rooms.
    - (D) Records of audiometer calibrations required by paragraph (h)(5) of this section.
- (8) Follow-up procedures.

## Hearing Conservation Program

- (i) if a comparison of the annual Audiogram to the baseline Audiogram indicates a standard threshold shift as defined in paragraph (g)(10) of this section has occurred, the employee shall be informed of this fact in writing, within 21 days of the determination.
- (ii) Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, the employer shall ensure that the following steps are taken when a standard threshold shift occurs:
  - (A) Employees not using hearing protectors shall be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.
  - (B) Employees already using hearing protectors shall be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.
  - (C) The employee shall be referred for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary or if the employer suspects that a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors.
  - (D) The employee is informed of the need for an otological examination if a medical pathology of the ear that is unrelated to the use of hearing protectors is suspected.
- (iii) If subsequent Audiometric testing of an employee whose exposure to noise is less than an 8-hour TWA of 90 decibels indicates that a standard threshold shift is not persistent, the employer:
  - (A) Shall inform the employee of the new Audiometric interpretation; and
  - (B) May discontinue the required use of hearing protectors for that employee.
- (9) Revised baseline. An annual Audiogram may be substituted for the baseline Audiogram when, in the judgment of the audiologist, otolaryngologist or physician who is evaluating the Audiogram:
  - (i) The standard threshold shift revealed by the Audiogram is persistent; or
  - (ii) The hearing threshold shown in the annual Audiogram indicates significant improvement over the baseline Audiogram.
- (10) Standard threshold shift.
  - (i) As used in this section, a standard threshold shift is a change in hearing threshold relative to the baseline Audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear.
  - (ii) In determining whether a standard threshold shift has occurred, allowance may be made for the contribution of aging (presbycusis) to the change in hearing level by correcting the annual Audiogram according to the procedure described in Appendix F: Calculation and Application of Age Correction to Audiograms.
- (h) Audiometric test requirements.
  - (1) Audiometric tests shall be pure tone, air conduction, hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency shall be taken separately for each ear.
  - (2) Audiometric tests shall be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers, S3.6-1969, which is incorporated by reference as specified in § 1910.6.
  - (3) Pulsed-tone and self-recording audiometers, if used, shall meet the requirements specified in Appendix C: Audiometric Measuring Instruments.

- (4) Audiometric examinations shall be administered in a room meeting the requirements listed in Appendix D: Audiometric Test Rooms.
- (5) Audiometer calibration.
  - (i) The functional operation of the audiometer shall be checked before each day's use by testing a person with known, stable hearing threshold's output to make sure that the output is free from distorted or unwanted sounds. Deviations of 10 decibels or greater require an acoustic calibration.
  - (ii) Audiometer calibration shall be checked acoustically at least annually in accordance with Appendix E: Acoustic Calibration of Audiometers. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check. Deviations of 15 decibels or greater require an exhaustive calibration.
  - (iii) An exhaustive calibration shall be performed at least every two years in accordance with sections 4.1.2; 4.1.3; 4.1.4.3; 4.2; 4.4.1; 4.4.2; 4.4.3; and 4.5 of the American National Standard Specification for Audiometers, S3.6-1969. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this calibration.
- (i) Hearing protectors.
  - (1) Employers shall make hearing protectors available to all employees exposed to an 8-hour time-weighted average of 85 decibels or greater at no cost to the employees. Hearing protectors shall be replaced as necessary.
  - (2) Employers shall ensure that hearing protectors are worn:
    - (i) By an employee who is required by paragraph (b)(1) of this section to wear personal protective equipment; and
    - (ii) By any employee who is exposed to an 8-hour time-weighted average of 85 decibels or greater, and who:
      - (A) Has not yet had a baseline Audiogram established pursuant to paragraph (g)(5)(ii); or
      - (B) Has experienced a standard threshold shift.
  - (3) Employees shall be given the opportunity to select their hearing protectors from a variety of suitable hearing protectors provided by the employer.
  - (4) The employer shall provide training in the use and care of all hearing protectors provided to employees.
  - (5) The employer shall ensure proper initial fitting and supervise the correct use of all hearing protectors.
- (j) Hearing protector attenuation.
  - (1) The employer shall evaluate hearing protector attenuation for the specific noise environments in which the protector will be used. The employer shall use one of the evaluation methods described in Appendix B: Methods for Estimating the Adequacy of Hearing Protection Attenuation.
  - (2) Hearing protectors must attenuate employee exposure at least to an 8-hour time-weighted average of 90 decibels are required by paragraph (b) of this section.
  - (3) For employees who have experienced a standard threshold shift, hearing protectors must attenuate employee exposure to an 8-hour time-weighted average of 85 decibels or below.
  - (4) The adequacy of hearing protector attenuation shall be re-evaluated whenever employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation. The employer shall provide more effective hearing protectors where necessary.
- (k) Training program.

## Hearing Conservation Program

- (1) The employer shall institute a training program for all employees who are exposed to noise at or above an 8-hour time-weighted average of 85 decibels, and shall ensure employee participation in such program.
  - (2) The training program shall be repeated annually for each employee included in the Hearing Conservation Program. Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.
  - (3) The employer shall ensure that each employee is informed of the following:
    - (i) The effects of noise on hearing;
    - (ii) The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care; and
    - (iii) The purposes of Audiometric testing, and an explanation of the test procedures.
- (l) Access to information and training materials.
- (1) The employer shall make available to affected employees or their representatives copies of this standard and shall also post a copy in the workplace.
  - (2) The employer shall provide to affected employees any informational materials pertaining to the standard that are supplied to the employer by the Assistant Secretary.
  - (3) The employer shall provide, upon request, all materials related to the employer's training and education program pertaining to the standard to the Assistant Secretary and the Director.
- (m) Recordkeeping
- (1) Exposure measurements. The employer shall maintain an accurate record of all employee exposure measurements required by paragraph (d) of this section.
  - (2) Audiometric tests.
    - (i) The employer shall retain all employee Audiometric test records obtained pursuant to paragraph (g) of this section:
    - (ii) This record shall include:
      - (A) Name and job classification of the employee;
      - (B) Date of the Audiogram;
      - (C) The examiner's name;
      - (D) Date of the last acoustic or exhaustive calibration of the audiometer; and
      - (E) Employee's most recent noise exposure assessment.
      - (F) The employer shall maintain accurate records of the measurements of the background sound pressure levels in Audiometric test rooms.
  - (3) Record retention. The employer shall retain records required in this paragraph (m) for at least the following periods.
    - (i) Noise exposure measurement records shall be retained for two years.
    - (ii) Audiometric test records shall be retained for the duration of the affected employee's employment.
  - (4) Access to records. All records required by this section shall be provided upon request to employees, former employees, representatives designated by the individual employee, and the Assistant Secretary. The provisions of 29 CFR 1910.20(a) - (e) and (g) - (i) apply to access to records under this section.
  - (5) Transfer of records. If the employer ceases to do business, the employer shall transfer to the successor employer all records required to be maintained by this section, and the successor employer shall retain them for the remainder of the period prescribed in paragraph (m)(3) of this section.
- (n) Appendices.

## Hearing Conservation Program

- (1) Appendices A, B, C, D, and E to this section are incorporated as part of this section and the contents of these Appendices are mandatory.
- (2) Appendices F and G to this section are informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligation.
- (o) Exemptions. Paragraphs (c) through (n) of this section shall not apply to employers engaged in oil and gas well drilling and servicing operations.
- (p) Startup date. Baseline Audiograms required by paragraph (g) of this section shall be completed within six months of hire date.

### **Purpose**

The purpose of this training is to give you the basic knowledge needed to understand why hearing conservation is an important part of the safety and health equation.

### **Objectives:**

By the end of this training, participants should be able to understand:

1. The Effects of noise on hearing;
2. The purpose of hearing protectors.
3. The advantages, disadvantages, of various types of hearing protection.
4. Selection, use and care of hearing protection.
5. The purpose of audiometric testing.

### **HOW WE HEAR..... It's as simple as 1, 2, 3...**

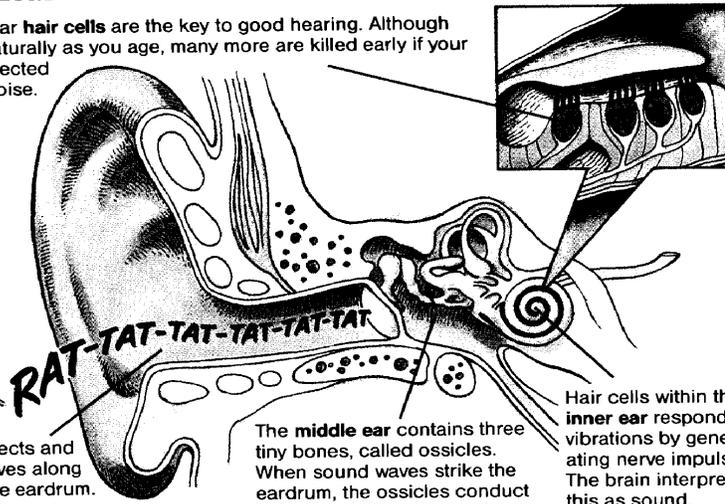
- 1) Your outer ear, called the pinna, collects sound waves and channels them down the ear canal to a thin, tight piece of skin called the tympanic membrane (eardrum).
- 2) The eardrum vibrates in response to these pressure waves and pushes on the small bones of your middle ear. These bones act like a set of levers, transferring their mechanical motion to a fluid-filled structure in the inner ear, called the cochlea.
- 3) In the cochlea, cells with tiny sensing hairs transform the fluid movement into electrical signals. These signals travel along the auditory nerve to your brain. Once in the brain, the nerve signals are decoded and processed into what we recognize as sound.

### How We Hear

Healthy inner-ear **hair cells** are the key to good hearing. Although some die off naturally as you age, many more are killed early if your ears aren't protected from harmful noise.



The **outer ear** collects and funnels sound waves along the ear canal to the eardrum.



The **middle ear** contains three tiny bones, called ossicles. When sound waves strike the eardrum, the ossicles conduct the vibrations to the cochlea in the inner ear.

Hair cells within the **inner ear** respond to vibrations by generating nerve impulses. The brain interprets this as sound.





### **EFFECTS OF NOISE ON HEARING**

Prolonged exposure to excessive noise levels can cause a noise-induced hearing loss.

When you are exposed to excessive noise levels, the first effect usually is a temporary hearing loss. You may have difficulty in conversation or the ears may feel “plugged and “ring.” Over a period of time, an individual who experiences repeated temporary hearing loss will have gradual, permanent, irreversible hearing loss.

Noise-induced hearing loss (called “acoustic trauma”) involves damage to the receptor cells in the inner ear and is classified as sensori-neural impairment. A noise-induced hearing loss typically begins with a drop in hearing level at the higher frequencies of sound. As the hearing loss increases, it includes the lower sound frequencies that include speech. Early noise-induced hearing loss normally is not detected by an individual, since it occurs above the speech range. By the time an individual is aware of a hearing loss, the amount of loss may be significant.

Noise exposure is cumulative. So the noise at home or at play must be counted in the total exposure during any one day. If the maximum allowable noise level is reached while on the job, any following exposure during non-working hours, such as a noisy lawnmower or loud music will may cause you to exceed the safe daily limit.

#### **PICTURE THIS: (similarity to hairs cells in your ears)**

You take a shortcut across a luxuriant green lawn with tall, healthy blades of grass reaching proudly toward the sky. Where you have walked, the blades are trampled, bent over, bruised and damaged. You can see the outline of each of your steps in the thick carpet of grass.

Tomorrow, you decide to take the same shortcut. As you look, there is no sign you passed this way yesterday. This time, however, some of your co-workers see you and decide to do the same thing. Soon, many people begin taking this route, not just once a day but throughout the day as well. Before long, bicyclists are using the path. Eventually, the blades of grass have no time to repair themselves between uses. Gradually, some of the blades break off, and then more as time progresses. Eventually, where once there was a beautiful lawn, there now is a dirt trail with only a blade or two of grass here and there.

### **PURPOSE OF HEARING PROTECTORS**

Hearing protectors either are plugs of various shapes and sizes that are inserted into the ear canals or muffs that are placed over the ears. In either case, their job is to reduce the intensity of sound that reaches the ear so as to protect the ear from potentially damaging noise.

#### **Advantage and Disadvantage of Hearing Protectors:**

##### **Foam Hearing Protectors:**

A cylinder of sound-attenuating foam. The foam is compressed and inserted in the ear canal, where the foam expands to fill the canal.

- Advantages: Readily available, inexpensive, disposable, adequately comfortable, lightweight.
- Disadvantages: Requires regular replacement, can become



## Hearing Conservation Program

uncomfortable with prolonged wear.

### **Ribbed Hearing Protectors:**

Made of rubber in a "one size fits all" shape. They are inserted in the ear canal as deeply as possible.

- Advantages: Generally available, durable, lightweight, washable.
- Disadvantages: Slip easily, uncomfortable, may not provide tight fit.

### **Muff Hearing Protectors:**

Resemble stereo head sets that completely cover the ears.

- Advantages: Good noise reduction, hard to lose, more durable with infrequent replacement.
- Disadvantages: Heavy and cumbersome, more expensive, hot, uncomfortable.

### **Custom Molded Protectors:**

Made of silicone and are molded to exactly fit the individual's ear.

- Advantages: Good noise rating, durable, very comfortable for long periods of time.
- Disadvantages: Requires initial impression of ear, more expensive, possible replacement.

### **Attenuation of Hearing Protectors (Noise Reduction by Hearing Protectors)**

Manufacturers of hearing protection assign a Noise Reduction Rating (NRR) to each type of hearing protector. The NRR is an indication of the relative level of protection provided by the plug or muff. The higher the NRR, the more protection the equipment provides. The NRR is determined under ideal laboratory conditions and should not be used as a direct measurement of the protection that each wearer will receive.

### **Field Attenuation of Hearing Protection**

To estimate the attenuation afforded to a noise-exposed employee in an actual work environment by muffs, plugs, or a combination of both, proceed as follows.

a. For muffs or plugs: Determine the laboratory-based noise attenuation afforded by the given hearing protector. This is based on laboratory testing using human subjects and is provided by the manufacturer. It is referred to as the Noise Reduction Rating or NRR and should be on the packaging.

Subtract 7dB from the NRR to correct for using A-weighted measurements.



## Hearing Conservation Program

To adjust for workplace conditions, applying a safety factor of 50% is recommended. This is because the field use of ear protectors does not afford the same degree of protection achieved in the laboratory using well-trained subjects under ideal test conditions.

b. For dual protection (i.e. muffs and plugs): Determine the laboratory-based noise attenuation (NRR) for the higher rated hearing protector, subtract 7dB, and (it is recommended that you) apply a safety factor of 50%.

Then add 5 dB to the field-adjusted NRR to account for the use of the second hearing protector.

Example 1: TWA = 100 dBA and Muff NRR = 19 dB  
Approximate Field Attenuation is:  $(19-7) \times 50\% = 6$  dB  
 $100$  dBA TWA - 6 dB = 94 dBA

Conclusion: The protected TWA can be assumed to be 94 dBA. Feasible engineering controls must be implemented. Since the HCA does not require applying a 50% correction factor, the protected TWA is 88 dBA. Therefore, better hearing protection (with greater attenuation) is not required by the standard. If an employee exhibits an STS, better hearing protection may be required.

Example 2: Given TWA = 98 dBA and Plug NRR = 29 dB  
Approximate Field Attenuation is:  $(29-7) \times 50\% = 11$  dB  
 $98$  dBA TWA - 11 dB = 87 dBA

Conclusion: The protected TWA can be assumed to be 87 dBA. Unless the employee exhibits an STS, the employer meets one of the necessary conditions for being excused from the requirement to implement engineering controls. Better hearing protection (with greater attenuation) is not required since the protected TWA, without the safety factor, is 76 dBA. If an employee exhibits an STS, better hearing protection should be recommended.

Example 3: Given  $TWA_8 = 110$  dBA, Plug NRR = 29 and Muff NRR = 25 dB  
Employer requires dual protection.  
Calculate field-adjusted NRR for the higher-rated protector:  
 $(29-7) \times 50\% = 11$  dB  
Add 5 dB to this field-adjusted NRR:  $11+5 = 16$  dB  
Calculate the protected  $TWA_8$ :  $110$  dBA  $TWA_8 - 16$  dB = 94 dBA

Conclusion: The protected  $TWA_8$  can be assumed to be 94 dBA. If feasible, engineering controls must be implemented. The protected  $TWA_8$ , without using the 50% safety factor, is 83 dBA. Therefore, better hearing protection is not required by the HCA. Hearing protectors with greater attenuation should be recommended.

## SELECTION OF EAR PROTECTORS

Ear protector selection should be based on employee convenience, comfort, and proper degree of attenuation. Under attenuation would lead to excessive noise exposure. Over attenuation in



## Hearing Conservation Program

moderate noise levels can lead to a feeling of isolation and, consequently, poor acceptance of the protectors.

### FITTING

Earplugs must fit tightly to provide a good seal. Grasping the ear with the opposite hand, pulling it up and out to open the ear canal and then inserting the plug with the other hand insert the earplug.

Muffs will normally fit all people without any difficulty. Eyeglasses may interfere with the proper fitting of the muff. Muffs that attach directly to hard hats are also available.

Ear stoppers are usually easy to position. The headband can be worn on top of or behind the head, or under the chin.

When hearing protectors are initially worn, it may take a short time for the employee to adjust to the new level of sound. The same sounds are heard, but at a lower intensity.

### CARE AND USE OF PROTECTORS

Ear protectors must be maintained in sanitary condition. It is important that earplugs be clean when inserted into the ears. If plugs are dirty when inserted, they may cause irritation, which could lead to infection of the ear canal. The same applies to stoppers.

Earplugs, when not in use, should be stored in some type of container that can be closed to seal out dust or dirt. Earplugs should be replaced when they no longer can be cleaned or lose their pliability.

Earmuffs have a replaceable seal, which should be kept clean. The seal should be replaced whenever it becomes stiff or cracked.

### AUDIOMETRIC TESTING

Audiometric testing is a means of determining your hearing ability. "Normal" hearing includes the median hearing level of a large group of American adults between 18 and 25 years of age, having no known history of ear disease and no appreciable high-level noise exposure. The accepted normal range of hearing is between 0 and 25 decibels.

The audiometric test consists of exposing each ear separately to sound at six different frequencies. The audiometric test will indicate the amount of hearing loss, if any, of an individual. The higher the decibel reading, the greater the hearing loss. As an individual ages there is a natural hearing loss, which takes place. This is called presbycusis. A cold, an ear infection, or recent high noise exposure can cause a temporary hearing loss, which would produce poor test results. Tests should not be administered to anybody with a cold or an ear infection. Test will need to be administered once cold or ear infection has passed. Audiogram should be preceded by at least 14 hours of quiet. If audiogram is to be administered during work shift the supervisor should require it mandatory for employees to wear hearing protectors prior to taking audiogram test.

## **RIGHT TO ACCESS RECORDS**

All records required by this section shall be provided upon request to employees, former employees, representatives designated by the individual employee, and the director.

## **Conclusion**

The more intense or louder the noise, the more likely it will contribute to hearing loss. The longer an employee is exposed to a particular noise at work or at home, the greater the chance an injury will occur to the auditory system. To minimize the risk of hearing loss occurring it is up to each employee to take responsibility and wear hearing protectors at work or at home.

## **Glossary**

- (1) Audiogram - A chart, graph, or table resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.
- (2) Audiologist - A professional, specializing in the study and rehabilitation of hearing, who is certified by the American Speech, Hearing, and Language Association or licensed by a state board of examiners.
- (3) Baseline audiogram - The audiogram against which future audiograms are compared.
- (4) Criterion sound level - A sound level of 90 decibels.
- (5) Decibel (dB) - Unit of measurement of sound level.
- (6) Hertz (Hz) - Unit of measurement of frequency, numerically equal to cycles per second.
- (7) Impulsive or impact noise - Noise levels which involve maxima at intervals greater than one second. Where the intervals are less than one second, the noise levels shall be considered continuous.
- (8) Medical pathology - A disorder or disease. For purposes of this regulation, a condition or disease affecting the ear, which should be treated by a physician specialist.
- (9) Noise dose - The ratio, expressed as a percentage, of (a) the time integral, over a stated time or event, of the 0.6 power of the measured SLOW exponential time-averaged, squared A-weighted sound pressure and (b) the product of the criterion duration (8 hours) and the 0.6 power of the squared sound pressure corresponding to the criterion sound level (90 dB).
- (10) Noise dosimeter - An instrument that integrates a function of sound pressure over a period of time in such a manner that it directly indicates a noise dose.
- (11) Otolaryngologist - A physician specializing in diagnosis and treatment of disorders of the ear, nose and throat.
- (12) Representative exposure - Measurements of an employee's noise dose or 8-hour time-weighted average sound level that the employer deems to be representative of the exposure of other employees in the workplace.
- (13) Standard threshold shift - A hearing level change, relative to the baseline audiogram, of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear.
- (14) Sound level - Ten times the common logarithm of the ratio of the square of the measured A-weighted sound pressure to the square of the standard reference pressure of 20 micropascals. Unit: Decibels (dB). For use with this regulation, SLOW time response, in accordance with ANSI S1.4.1971 (R1976), is required unless specifically specified otherwise.
- (15) Sound level meter - An instrument for the measurement of sound level.

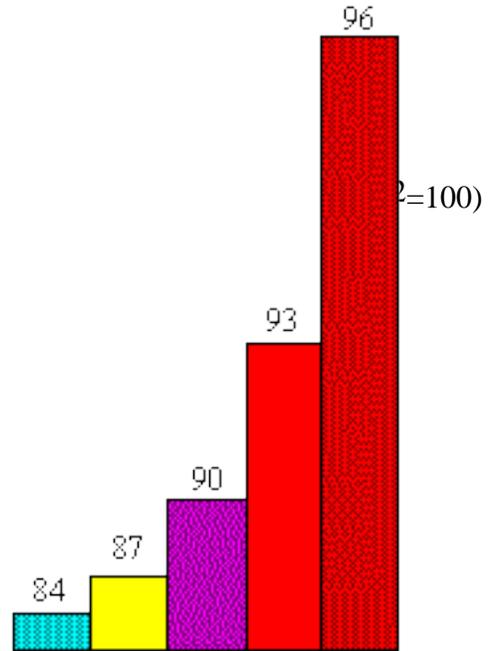
**Hearing Conservation Program**

(16) Time-weighted average sound level - That sound level, which if constant over an 8-hour period, would result in the same noise dose as if measured in the time varying noise level environment.

A sound's volume level, which your brain perceives as loudness, is measured in decibels.

**RELATIONSHIP OF THE DECIBEL TO SOUND INTENSITY IN NON-LOGARITHMIC UNITS**

<u>Decibels</u>	<u>Units</u>
0	1
10	10
20	100
30	1,000
40	10,000
50	100,000
100	10,000,000,000
150	1,000,000,000,000,00



*The Decibel Scale*



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## Lockout/Tagout Program

**Program: Lockout/Tagout Program**

**Facility: Kekaha Sanitary Landfill**

**Facility Location: 6900 D Kaumualii Highway, Kekaha, HI 96752**

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### **LOCKOUT/TAGOUT**

**Refer to Section I Part D.**





**Program: Personal Protective Equipment**

**Facility: Kekaha Sanitary Landfill**

**Facility Location:** 6900 D Kaunualii Highway, Kekaha, HI 96752

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## **PERSONAL PROTECTIVE EQUIPMENT**

### **INTRODUCTION**

Personal protective equipment (PPE) is used in the workplace to protect employees from hazards to the eyes, face, hands, skin, head, and feet when engineering and administrative controls are not feasible. PPE can also provide protection against heat or cold and hazardous chemicals. It can act as a shield or barrier between the worker and the hazardous chemical.

PPE does not remove the hazard from the workplace, so it is the last line of defense before the hazard reaches the employee. Do not rely on PPE alone to provide protection against hazards. PPE should be used in conjunction with guards, engineering controls, and sound operational practices.

PPE is only as good as the consistency with which employees wear it. PPE effectiveness relies on the fit, use and maintenance by the employees. PPE is effective only if it is properly selected based on the hazards present and it is worn in the way it has been designed to be used.

Performed by a person who can assess the hazards carefully, it is important for everyone to know the hazards in their area, and to use and take care of the PPE that is selected to protect them.

OSHA regulations 29 CFR 1910.132-133 and 135-138 cover personal protective equipment.

### **CORE PROGRAM**

#### **RESPONSIBILITY**

John Ruiz, Ian Imamura or designee, is responsible for administering the personal protective equipment program. These duties include:

- Implementing the program.
- Ensuring that a hazard assessment is conducted.
- Ensuring that personal protective equipment is available.
- Reviewing the program on an annual basis.
- Ensuring that employee training is conducted.



Supervisors are responsible for ensuring employees wear personal protective equipment in required areas and that they wear their personal protective equipment properly.

Employees must wear personal protective equipment where required. They must learn how to wear it properly, and keep it clean and well maintained.

### **JOB HAZARD ASSESSMENT (JHA)**

The general requirements for personal protective equipment are in 29 CFR 1910.132. This standard requires the completion of a Job Hazard Assessment, sometimes referred to as a Job Safety Analysis (JSA). The Job Hazard Assessment identifies hazards present or likely to be present that require the use of personal protective equipment (PPE).

The written Job Hazard Assessment, must include the following:

- The specific tasks evaluated
- The name of the person verifying that the hazard assessment was performed
- The date of the hazard assessment
- Indication that the purpose of the hazard assessment is determining PPE requirements
- Perform a hazard assessment using the PPE assessment form in the appendix or an equivalent form. Use this form to select PPE based on the identified hazards.

(See Attachment A: Job Hazard Analysis 2004)

Once the facility performs the Job Hazard Assessment and selects and makes available PPE, training must be conducted to:

- Inform the affected employees of the PPE required for each hazard and its limitations.
- Select PPE that properly fits each employee.
- Inform of the proper use, care, cleaning and maintenance of the PPE.

It is important to remember that anyone who enters the area where employees are required to wear PPE must wear the same type of PPE. For example, office personnel should be required to wear traffic safety vests and appropriate footwear whenever they enter the tipping floor, as they are exposed to similar vehicle traffic and material hazards as the workers who are spotting trucks.

Similarly, supervisors and contractors should be required to wear, at a minimum, the same PPE as the other workers in their immediate work area.

A good practice is to have boxes with at least eye and hearing protection located at the entrance to shop areas, tipping floor, landfill office. Office personnel or visitors can don the PPE and return it when finished.

### **EYE AND FACE PROTECTION**

OSHA requires the use of eye and face protection (29 CFR 1910.133). Employees exposed to flying materials must use eye protection, such as safety glasses with side protection Permanently



attached side shields are preferred, however, slide on side shields are acceptable if they meet the ANSI standards.

Employees must use safety glasses with side shields for the following hazards:

- Flying particles
- Compressed air
- Impact

Safety glasses and a face shield are required when exposed to:

- Liquid chemicals
- Acids or other chemicals that can burn, corrode, or dissolve
- Debris as in construction and/or demolition

Goggles to protect against:

- Chemical gases or vapors
- Light radiation (with the proper filter shade)

All eye and face protection must:

- Provide adequate protection for the hazards in the work area.
- Fit properly and comfortably.
- Be kept in a clean condition.
- Be kept in good repair.
- Meet the American National Standard practice for occupational and educational eye protection.

If exposed to light radiation, use the appropriate eye PPE, as indicated in the table under 29 CFR 1910.133 (a) 5. A copy of the table can be found in the Appendices.

If employees must wear corrective lenses and eye/face protection, provide them with:

- Eye protection that has corrective lenses built in, or
- Eye protection that can be worn over corrective lenses without interfering with the position of the lenses or the protection.

All eye and face protection purchased after July 5, 1994, must comply with ANSI Z87.1-1989, the American National Standard practice for occupational and educational eye and face protection. Any eye protection purchased before July 5, 1994 must comply with ANSI Z87.1-1968, the USA Standard for Occupational and Educational Eye and Face Protection.

### **HEAD PROTECTION**

Head protection is required to be worn to prevent injury to the head from falling objects or from striking the head against hard surfaces. Refuse can fall from elevated truck bodies, conveyors



and work platforms, creating an impact hazard. Low-hanging surfaces, such as walkways under conveyors and roof supports on elevated sorting platforms, can present bump hazards.

Hard hats must be worn where impact and penetration hazards can occur from falling objects. They are generally worn at landfills in the active disposal and borrow areas. Hard hats are also worn at material recovery facilities (MRFs) on the tipping floor and in locations where employees are assigned to work below sorting platforms and conveyors.

Bump caps provide protection from head bumps, but do not provide impact or penetration protection. Application of bump caps should be limited in the refuse industry. Most exposures in the industry that involve head protection require the use of hard hats. Bump protection may be appropriate for work performed under vehicles and in work, or passage to work areas, involving low overhead clearances.

When selecting head protection, know if there are potential electrical hazards in the work area. Special non-conductive head protection must be worn if electrical hazards are present. All head protection must meet the requirements of ANSI Z89.1-1986, the American National Standard for Personnel Assurance Protection-Protective Headwear for Industrial Workers requirements.

### **FOOT PROTECTION**

Protective footwear should be worn when working in areas where there is a danger of foot injuries due to falling or rolling objects or objects piercing the sole, and where there may be electrical hazards. Safety footwear is labeled to show that it meets the requirements and specifications in the "American National Standard for Personal Protection - Protective Footwear" ANSI Z41-1991 and OSHA 29 CFR 1910.136.

Work boots with puncture and oil resistant, slip resistant soles and a minimum six-inch high lace-up ankle support are acceptable for drivers and residential helpers. Where employees are assigned or allowed to walk on refuse, such as when tarping a load or working in the active area of a landfill or on a transfer station tipping floor, they should be required to wear work boots with steel mid-sole. Steel shank protection in work boots provides limited protection of the soles and may not be used in place of steel mid-soles.

In some cases, metatarsal protection or chemical impermeability may be prescribed for drum handling. Steel toe safety shoes are required when it is necessary to protect an employee's feet from injury from heavy material rolling over or dropping on toes. Mechanics, and other employees, who are involved in work with moving heavy objects, such as commercial containers on casters, should be required to wear steel-toed safety shoes. Minimum acceptable footwear for hauling, landfill, transfer and MRF workers is a substantial shoe. A substantial shoe is one that is constructed of leather or leather like materials and covers the foot and ankle above the anklebone. Tennis shoes are not considered to be substantial shoes.

### **HAND PROTECTION**

Employees whose hands are exposed to hazards must be provided hand protection as required by 29 CFR 1910.138. Employees must use hand protection when conditions may cause:



- Exposure to hazardous substances, which can damage or be absorbed through the skin
- Cuts/scrapes/abrasions
- Punctures (such as needle sticks).
- Injury from extreme temperatures (hot or cold)

No single type of glove will provide protection against all hand hazards. Most glove materials provide only limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused. It may be more cost effective to regularly change cheaper gloves than to clean and reuse more expensive types.

It is also important to know how the gloves perform against the specific hazard; e.g., chemical hazards, cuts, heat, etc. Glove manufacturers have standard test procedures to assess these performance characteristics. Before selecting gloves, request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated. For chemicals, consult the material safety data sheet or other health and safety references to identify the compatible material.

Many refuse collection; recycling, transfer and disposal employees will be provided with or will choose to wear leather gloves. Leather gloves generally offer durable protection for material handling tasks. However, leather gloves do not grip well when neither wet, nor do they withstand repeated decontamination or cleaning. Palm-dipped (canvas backed) nitrile gloves and other similar gloves coated with synthetic and natural rubbers can provide acceptable alternatives to leather.

Arm protection is used in recycle sorting and other operations where employees may be exposed to cuts and abrasions to the forearms. Exposure can occur when employees are reaching across conveyors, into mixed refuse/recyclables and into refuse containers. Sleeves made of Kevlar and/or PVC can be used as protection.

Where there is a potential for exposure to the forearms from chemicals (e.g., reaching into chemical detergent containers), cold, or heat (e.g., from welding or cutting) appropriate protective sleeves may also be worn.

Select hand protection based on the hazards identified.

### **PROTECTIVE CLOTHING**

Protective clothing can include the following:

- Uniforms
- Enhanced visibility clothing/accessories
- Chemical protective clothing
- Welders / painters cottons



## Personal Protective Equipment Program

Residential drivers and helpers, landfill spotters, and employees working in or near motor vehicle traffic should wear enhanced visibility uniforms obtained through the company yellow sheet program.

Enhanced visibility elements must appear on the outer most layer of clothing to be effective. Periodic monitoring of employee use of enhanced visibility clothing by supervisors is an important component in ensuring that employees wear enhanced visibility clothing when it is required.

Employees potentially exposed to hazardous chemicals, extreme heat, or cold should use protective clothing appropriate to the hazard. Selection of protective clothing requires a clear understanding of the potential hazards and the limitations of the protective clothing. For chemicals, consult the Material Safety Data Sheet (MSDS) or other toxicology references to identify compatible materials.

Wear rain gear as needed. Incorporate enhanced visibility into the rain gear as required.

### **RESPIRATORY PROTECTION**

Refer Respiratory Protection Program.

### **HEARING PROTECTION**

Refer Hearing Conservation Program.

### **CONTROL THE HAZARD**

Control the hazards at the source, if possible. Rely on PPE as the last line of defense in controlling hazards. PPE should be used as a supplement to guards, engineering controls, and sound operational practices.

### **CARE OF PPE**

Some of the PPE, such as earplugs, coveralls, and gloves, may be disposable. Ensure that non-disposable PPE is carefully maintained so that it continues to give full protection.

### **RECOGNIZE LIMITATIONS OF PPE**

PPE provides important protection, but it has limitations. PPE can be hot, bulky, and heavy. It can make it harder to move freely while doing a job. It can increase fatigue and cut down on the ability to see, hear, and feel. All of these limitations can create stress. The best PPE selection minimizes stress and maximizes protection.

### **DEFECTIVE PPE**

Damaged, defective, or worn out PPE cannot provide the necessary protection. PPE must be inspected before each use to see if it has been degraded or weakened by contact with a chemical, excessive wear or abuse. Look for holes, defects, rips, or seam openings in the PPE that could let a chemical penetrate.

### **TRAINING**

Employee training must include the following information:



- Where and when to wear PPE
- What PPE to wear
- How to properly don, doff, adjust, and wear PPE
- How to properly care for and maintain PPE
- What the limitations of PPE are
- How to identify when PPE is no longer usable

All employees required to wear PPE must demonstrate that they understand how to properly wear, use, clean, and maintain their PPE.

Employees require retraining when:

- They improperly wear, use, clean, or maintain PPE, or otherwise show that they lack these skills.
- Whenever there are new work practices or equipment, or requirements for PPE have changed.
- Whenever a worker is assigned to a task that requires different PPE or places additional limitations on the PPE that the worker is already trained to use.

### **RECORD KEEPING**

Document training in the employee training record. The record should include the following information:

- A statement that each employee has received and understands the PPE training
- The content of the training
- The names and signatures of the employee
- The date(s) of training
- The name of the person who provided the training

### **DEFINITIONS**

**Administrative Controls:** Controls such as job rotation, different work assignments, or time away from the hazard.

**Engineering Controls:** Methods of controlling employee exposures by modifying the source or reducing the quantity of contaminants released into the work environment.

**Job Hazard Assessment:** A process used to identify hazards present or likely to be present, to determine the proper PPE usage when performing job related tasks.

**Personal Protective Equipment (PPE):** Equipment worn by the worker to protect against hazards. Examples include gloves, respirators, and hearing protection.

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**Reviewed by:**

**Date:**







**CERTIFICATION OF HAZARD ASSESSMENT**

<b>Job Title: Maintenance Technician</b>		
<b>Hazard</b>	<b>Source</b>	<b>Minimum Required Protection</b>
Impact/Heat/Light/Electrical	Welding, cutting, hot liquids, hot objects	Welding gloves, welding apron, welding helmet, boots, coveralls
Chemical	Chemical use part of tasks	Safety glasses, goggles or face shields, chemical resistant gloves, coveralls and respirators. Protection based upon task and MSDS.
Penetration/Compression	Working with tools on equipment	Gloves, work boots
Heat (i.e. lack of heat)	LNG/CNG fueling	Cryogenic gloves, goggles, face shield, long sleeve shirt or overalls,
Impact	Airborne debris	Safety glasses, goggles or face shield
Noise	Operating tools, working with metal	Ear plugs, canal caps, ear muffs where required
Impact	Falling debris, overhead hazard in shop or yard.	Hard hat
Compression	Wet, uneven surfaces, obstacles	Work boots
Impact	Outside of service truck on route, high traffic areas, at post collection facility and in yard	ANSI Class II high visibility clothing
Chemical/Penetration	Welding fumes	When air testing indicates the need, a full or half face respirator with appropriate cartridges. Additional ventilation evaluations may be required.
<b>Additional Hazards</b>		
<b>Tasks or hazards not listed must be added to this form.</b>		
<b>This is to certify that I have performed a hazard assessment at this workplace as required by 29CFR1910.132(d), through an observation of persons performing the above job descriptions.</b>		
<b>Certified by</b>	<b>Title</b>	<b>Date of Assessment</b>
John Ruiz	District Manager	April 4, 2013
<b>Site Name</b>	<b>Site Address</b>	
Kekaha Sanitary Landfill	6900D Kaunualii Highway, Kekaha 96752	



**CERTIFICATION OF HAZARD ASSESSMENT**

<b>Job Title:</b> <b>Equipment Operator</b>	
<b>Job Description</b>	Drives/operates mobile equipment (e.g. forklifts, loaders, dozers, compactors, scrapers) to consolidate/move waste/recyclable materials as well as landfill cover/construction materials (dirt, rock, etc.)
<b>Check All That Apply</b>	<b>Tasks</b>
✓	Ascends/descends cab of vehicle throughout day for various reasons
✓	Cleans out radiator as needed
✓	Communicates via two-way radio with co-workers
✓	Conducts pre-trip/in-route/post trip inspections daily on vehicles driven
✓	When possible, performs visual inspection of waste to help ensure prohibited materials are not received
✓	Fuels equipment
✓	Operates controls, pedals and/or levers from inside of cab
✓	Completes daily paper work
✓	Replaces equipment fluids as needed
✓	Walks to and from equipment
<b>Additional Tasks</b>	
✓	Clean tracks
✓	Clean compactor wheels



**CERTIFICATION OF HAZARD ASSESSMENT**

<b>Job Title: <u>Equipment Operator</u></b>		
<b>Hazard</b>	<b>Source</b>	<b>Minimum Required Protection</b>
Heat	Hot objects/fluids while inspecting equipment	Gloves, work boots
Penetration	Mounting and dismounting equipment	Gloves, work boots
Harmful Dusts	Airborne debris	Safety glasses
Penetration/Compression	Walking at post collection facilities	Puncture resistant boots
Impact	Falling debris	Hard hat when outside of cab or operating open cab equipment
Compression	Wet, uneven surfaces, obstacles	Work boots
Impact	Vehicular traffic at post collection facilities	ANSI Class II high visibility clothing
<b>Additional Hazards</b>		
Noise	Noise from equipment exceeding threshold levels outlined in Hearing Conservation Program	Ear plugs/ear muffs in required equipment
<b>Tasks or hazards not listed must be added to this form.</b>		
<b>This is to certify that I have performed a hazard assessment at this workplace as required by 29CFR1910.132(d), through an observation of persons performing the above job descriptions.</b>		
<b>Certified by</b>	<b>Title</b>	<b>Date of Assessment</b>
John Ruiz	District Manager	April 4, 2013
<b>Site Name</b>	<b>Site Address</b>	
Kekaha Sanitary Landfill	6900D Kaumualii Highway, Kekaha 96752	





**Personal Protective Equipment**

**CERTIFICATION OF HAZARD ASSESSMENT**

**Job Title:** Laborer

Hazard	Source	Minimum Required Protection
Penetration/Compression	Material handling	Gloves, work boots
Impact	Airborne debris	Safety glasses, or goggles, or face shield
Penetration	Walking at post collection facilities	Puncture resistant boots
Impact	Falling debris at post collection facility	Hard hat
Compression	Wet, uneven surfaces, obstacles	Work boots
Impact	Vehicular traffic at post collection facilities	ANSI Class II high visibility clothing

**Additional Hazards**


**Tasks or hazards not listed must be added to this form.**

**This is to certify that I have performed a hazard assessment at this workplace as required by 29CFR1910.132(d), through an observation of persons performing the above job descriptions.**

<b>Certified by</b>	<b>Title</b>	<b>Date of Assessment</b>
John Ruiz	District Manager	April 4, 2013
<b>Site Name</b>	<b>Site Address</b>	
Kekaha Sanitary Landfill	6900D Kaumualii Highway, Kekaha 96752	





**CERTIFICATION OF HAZARD ASSESSMENT**

<b>Job Title: Traffic Director</b>		
<b>Hazard</b>	<b>Source</b>	<b>Minimum Required Protection</b>
Harmful Dusts	Airborne debris	Safety glasses
Penetration	Walking at post collection facilities	Puncture resistant boots
Impact	Falling debris at post collection facilities	Hard hat
Compression	Wet, uneven surfaces, obstacles	Work boots
Impact	Vehicular traffic at post collection facilities	ANSI Class II high visibility clothing
<b>Additional Hazards</b>		
<b>Tasks or hazards not listed must be added to this form.</b>		
<b>This is to certify that I have performed a hazard assessment at this workplace as required by 29CFR1910.132(d), through an observation of persons performing the above job descriptions.</b>		
<b>Certified by</b>	<b>Title</b>	<b>Date of Assessment</b>
John Ruiz	District Manager	April 4, 2013
<b>Site Name</b>	<b>Site Address</b>	
Kekaha Sanitary Landfill	6900D Kaumualii Highway, Kekaha 96752	



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## RESPIRATORY PROTECTION PROGRAM

**Program: Respiratory Protection Program**

**Facility: Kekaha Sanitary Landfill**

**Facility Location: 6900 D Kaunualii Highway, Kekaha, HI 96752**

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## RESPIRATORY PROTECTION



Definitions. The following definitions are important terms used in the respiratory protection program.

***Air-purifying respirator*** means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

***Atmosphere-supplying respirator*** means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

***Canister or cartridge*** means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

***Demand respirator*** means an atmosphere-supplying respirator that admits breathing air to the face piece only when a negative pressure is created inside the face piece by inhalation.

***Emergency situation*** means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

***Employee exposure*** means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

***End-of-service-life indicator (ESLI)*** means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

***Escape-only respirator*** means a respirator intended to be used only for emergency exit.

***Filter or air purifying element*** means a component used in respirators to remove solid or liquid aerosols from the inspired air.

***Filtering face piece (dust mask)*** means a negative pressure particulate respirator with a filter as an integral part of the face piece or with the entire face piece composed of the filtering medium.

***Fit factor*** means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

***Fit test*** means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

***High efficiency particulate air (HEPA) filter*** means a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

***Immediately dangerous to life or health (IDLH)*** means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

***Loose-fitting face piece*** means a respiratory inlet covering that is designed to form a partial seal with the face.

***Negative pressure respirator (tight fitting)*** means a respirator in which the air pressure inside the face piece is negative during inhalation with respect to the ambient air pressure outside the respirator.

***Oxygen deficient atmosphere*** means an atmosphere with an oxygen content below 19.5% by volume.

***Physician or other licensed health care professional (PLHCP)*** means an individual whose legally permitted scope or practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by subsection (e).

***Positive pressure respirator*** means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

***Powered air-purifying respirator (PAPR)*** means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

***Pressure demand respirator*** means a positive pressure atmosphere-supplying respirator that admits breathing air to the face piece when the positive pressure is reduced inside the face piece by inhalation.

***Qualitative fit test (QLFT)*** means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

***Quantitative fit test (QNFT)*** means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

***Respiratory inlet covering*** means that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a face piece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

***Self-contained breathing apparatus (SCBA)*** means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

***Service life*** means the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

***Supplied-air respirator (SAR) or airline respirator*** means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

***Tight-fitting face piece*** means a respiratory inlet covering that forms a complete seal with the face.

***User seal check*** means an action conducted by the respirator user to determine if the respirator is properly seated to the face.





## RESPIRATORY PROTECTION PROGRAM

### Maintenance and Other Non-Routine Tasks

Work Area Operation	Chemical/Substance	PEL/STEL	Exposure Estimates	Respirator and Cartridge

### Variable Situations

The Respirator Program Administrator will prepare a reasonable exposure estimate and select an appropriate respirator based on the maximum, following protection factors: up to 10 X PEL/STEL half-face air purifying; up to 50 X PEL/STEL full-face air purifying; and 50 X PEL/STEL SCBA with pressure demand air supply.

### Emergency Respirator Use

In the event of an emergency, the following respiratory protection will be used:

Work Area/Operation	Chemical/Emergency	Respirator Required



### Medical Evaluation

All employees who are assigned to wear respirators (except for employees who voluntarily use filtering dust masks) will be provided and receive medical evaluation initially upon assignment of the respiratory protection device and periodically thereafter as directed by a physician or other licensed health care professional (PLHCP). Medical evaluations will be conducted using the following procedures:

- 1) Employees will complete [Respirator Medical Evaluation Questionnaire--Appendix A] Assistance will be available, however KLF will not review any of the information recorded on the form. We will provide the completed questionnaires to the PLHCP in a sealed envelope.
- 2) We will schedule employees for PLHCP examinations. The PLHCP will provide a completed *Respirator User Medical Evaluation Report* or its equivalent directly to the employer.
- 3) Employees will be assigned to respirator use positions based on the results of the medical evaluation.
- 4) Periodic medical evaluations will be based on physician recommendation or whenever an employee answers questions 1 through 8 in Section 2 Part A of the *Respirator Medical Evaluation Questionnaire* positively.
- 5) The following items will be provided to the physician:
  - a. The type and weight of the respirator to be used by the employee;
  - b. The duration and frequency of respirator use;
  - c. The expected physical work effort;
  - d. Additional protective clothing and equipment to be worn;
  - e. Temperature and humidity extremes that may be encountered; and
  - f. A copy of this written program.

### Fit-Testing

Respirators must fit properly to provide protection. If a tight seal is not maintained between the face piece and the employee's face, contaminated air will be drawn into the face piece and be inhaled by the employee. Fit testing seeks to protect the employee against inhaled contaminated ambient air and is one of the core provisions of our respirator program.

In general, fit testing may be either qualitative or quantitative. Qualitative fit testing (QLFT) involves the introduction of a gas, vapor, or aerosol test agent into an area around the head of the respirator user. If that user can detect the presence of the test agent through subjective means, such as odor, taste, or irritation, the respirator fit is inadequate.

In a quantitative respirator fit test (QNFT), the adequacy of respirator fit is assessed by measuring the amount of leakage into the respirator, either by generating a test aerosol as a test atmosphere, using ambient aerosol as a test agent, or using controlled negative pressure to measure the volumetric leak rate. Appropriate instrumentation is required to quantify respirator fit in QNFT.



## RESPIRATORY PROTECTION PROGRAM

Employees are fit tested at the following times with the same make, model, style, and size of respirator that will be used:

- Before any of our employees are required to use any respirator with a negative or positive pressure tight-fitting face piece;
- Whenever a different respirator face piece (size, style, model, or make) is used;
- At least annually;  
Whenever the employee reports, or our company, PLHCP, supervisor, or Program Administrator makes visual observations of changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight; and
- When the employee, subsequently after passing a QLFT or QNFT, notifies the company, Program Administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable. That employee will be retested with a different respirator face piece.

Employees must pass one of the following fit test types that follow the protocols and procedures:

- QLFT (Only used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less. May be used to test tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators if tested in the negative pressure mode); or
- QNFT (May be used to fit test a tight-fitting half face piece respirator that must achieve a fit factor of 100 or greater OR a tight-fitting full face piece respirator that must achieve a fit factor of 500 or greater OR tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators if tested in the negative pressure mode).

Our workplace-specific fit testing procedures include the following:

### Qualitative fit testing (QLFT)

Fit testing will be documented using [Employee Annual Respirator Fit-Test and Training Record--Appendix B] on an annual basis.

## TRAINING

Employees who are assigned to wear respirators will be provided annual training at or about the time of fit testing. This training will include the following elements:

- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;
- The limitations and capabilities of each respirator used;
- How to use the respirator effectively in emergency situations, including situations where the respirator malfunctions;
- How to inspect, don and remove, use, and check the seals of the respirator;
- The procedures for maintenance and storage of the respirator;
- Recognition of medical signs and symptoms that may limit or prevent the effective use of respirators;
- The general requirements of our company's program and the standard.



This training will be repeated at least annually and will be documented using an *Employee Annual Respirator Fit-Test and Training Record*.

Supplement training will be provided as necessary based on the following factors:

- Changes in the workplace or a new type of respirator;
- Demonstrated inadequacies in an employee's knowledge or use of the respirator; or
- Any other situation in which retraining appears necessary to ensure safe respirator use.

Individuals using a tight-fitting respirator will be trained on [User Seal Check Procedures--Appendix C].

### **CLEANING, STORAGE AND MAINTENANCE OF RESPIRATORS**

#### Routine-Use Respirators (individually assigned respirators)

We will provide supplies and parts necessary to assure proper sanitation and maintenance of any respirator assigned to an individual employee.

Employees will keep their respirators clean and disinfected at all times. [Respirator Cleaning Procedures--Appendix D].

Each respirator must be inspected before each use and during cleaning for proper functioning of all parts and components:

1. A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the face piece, head straps, valves, connecting tube, and cartridges, canisters or filters; and
2. A check of elastic parts for pliability and signs of deterioration.

#### Non-Routine Use Respirator (emergency and non-individually assigned respirators)

KLF will provide each respirator user with a respirator that is clean, sanitary, and in good working order. Respirators will be cleaned and disinfected before being worn by different individuals. Respirators maintained for emergency use will be cleaned and disinfected after each use and respirators used in fit testing training will be cleaned and disinfected after each use.

#### Storage of Routine-Use Respirators

All respirators will be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they will be packed or stored to prevent deformation of the face piece and exhalation valve.



### Storage of Emergency Respirators

Emergency respirators will be:

- Kept accessible to the work area;
- Stored in compartments or in covers that are clearly marked as containing emergency respirators;
- Stored in accordance with any applicable manufacture instructions;
- All respirators maintained for use in emergency situations will be inspected at least monthly and in accordance with the manufacture's recommendations, and will be checked for proper function before and after each use;
- Emergency escape-only respirators will be inspected before being carried into the workplace for use; and
- Inspections are documented by a tag or written/electronic inspection record.

### Inspection and Maintenance of Self-Contained Breathing Apparatus (SCBA)

SCBA devices (emergency and non-emergency) will be inspected monthly. Air and oxygen cylinders will be maintained in a fully charged state and will be recharged when the pressure falls to 90% of the manufacture's recommended pressure level. **KLF** will determine that the regulator and warning devices function properly.

### Air Quality for Self-Contained and Air Line Devices

- Compressed and liquid oxygen (if used) must meet the United State Pharmacopoeia requirements for medical or breathing oxygen.
- Compressed breathing air will meet at least the requirements for Grade D breathing air described in the ANSI/Compressed Gas Association Commodity Specification for
- Air, G-7.1-1989, including: oxygen content (v/v) of 19.5-23.5%; hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less; carbon monoxide (CO) content of 10 ppm or less; carbon dioxide content of 1,000 ppm or less; and lack of noticeable odor.
- Compressed oxygen will not be used in atmosphere-supply respirators that have previously been used for compressed air.
- Oxygen concentrations greater than 23.5% are used only in equipment designed for oxygen service or distribution.
- Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178).
- Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements of Grade D breathing air.
- The moisture content in the cylinder does not exceed a dew point of -50 deg. F (-45.6 deg. C) at a 1-atmosphere pressure.

### Compressor Systems

Compressors used to supply breathing air to respirators are constructed and situated so as to:



## RESPIRATORY PROTECTION PROGRAM

- Prevent entry of contaminated air into the air-supply systems.
- Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 deg. F (-5.56 deg. C) below the ambient temperature.
- Have suitable in-line air-purifying sorbent beds and filters to further ensure that the quality of breathing air is maintained by following the manufacturer's instructions.
- Have a tag maintained at the compressor that contains the most recent change date and the signature of the person authorized by the company to perform the change.
- For compressors that are not oil-lubricated, a means to assure that carbon monoxide levels in the breathing air do not exceed 10 ppm.
- For oil-lubricated compressors, a high-temperature or carbon monoxide alarm, or both, is used to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply will be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.
- Breathing air couplings are incompatible with outlets for non-respirable worksite air or other gas systems. No asphyxiating substance will be introduced into breathing air lines.
- Only breathing gas containers marked in accordance with the NIOSH respirator certification standard [42 CFR §84] are used.

### **VOLUNTARY RESPIRATOR USE**

#### Filtering Masks

Employees who use filtering masks in situations that do not otherwise require the use of a respirator are not covered by this program.

#### Tight-fitting Respirators

Employees who use tight-fitting respirators when respirators are not otherwise required are subject only to the following provisions of this program:

- Medical evaluation;
- Cleaning and sanitation;
- Storage; and
- [Information for Employees Using Respirators When Not Required Under the Standard-- Appendix E]

### **CHANGE SCHEDULE**

For vapor or gas air purifying respirators the two systems in place to warn respirator wearers of contaminant breakthrough include using respirator cartridges equipped with an end-of-service life indicator (ESLI) or using a cartridge replacement schedule based on manufacturer breakthrough test data.



## RESPIRATORY PROTECTION PROGRAM

Employees using cartridges not equipped with ESLIs must replace cartridges in accordance with the instruction. When air purifying respirators with cartridges are used the cartridges must be changed out a minimum of every 30 days; or

Whenever an employee feels that they have become saturated and / or experiences breakthrough.

- At the beginning of each shift.
- At more frequent intervals.
- Air purifying cartridges absorb moisture and / or contaminants once they are exposed to the atmosphere. Respirators should not be stored with air purifying cartridges attached. Once opened, a package of cartridges should be considered reliable for one work shift (8 hours).

Protection for Particulates, Mists, and Fumes:

- Either atmosphere-supplying respirators or air purifying respirators with appropriate filters may be used for protection from particulates, mists, and fumes.
- When air purifying respirators with filters are used the filters must be changed out whenever an employee feels the filters have become clogged and / or experiences difficulty breathing.

For respirators worn exclusively for protection against particles, filters will be changed per the manufacturer's specification and whenever the wearer detects a change in breathing resistance.

Air supply unit will have filter replaced at manufacturer specified times and documented

### **POLICY OF PROVIDING RESPIRATORS AND MEDICAL EVALUATIONS AT NO COST TO THE EMPLOYEE**

Employees will be provided respirators, medical evaluations and other requirements of the respirator standard at no cost to them.

#### Annual Program Evaluation

An annual evaluation of the respirator program will be conducted by the KLF. The evaluation will be conducted by the Respirator Program Administrator and will consist of:

- A review of the written respiratory protection program to assure that it is up-to-date, effective and is being properly implemented;
- Observation to ensure that employees are using the respirators properly;
- Consultation with an employee representative to assess the employees' views on program effectiveness and to identify any problems;
- Checking respirator fit (including the ability to use the respirator without interfering with effective workplace performance);
- Checking appropriate respirator selection for the hazards to which employees are exposed;
- Requiring proper respirator use under the workplace conditions the employee encounters; and
- Proper respirator maintenance.



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## RESPIRATORY PROTECTION PROGRAM

Any problems that are identified during this assessment will be corrected.

Periodic Evaluations will be documented using the [Periodic Respirator Program Evaluation Form--Attachment F].

### **RECORDKEEPING**

Compliance with the elements of the standard including medical evaluations, fit testing, training, and periodic evaluation of the respirator program will be maintained for a minimum of three (3) years.

The program will be located KLF Office.

Approved by:

Title:

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Print Name

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Signature

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Date



## RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE

### OSHA RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE (MANDATORY)

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Can you read (circle one): Yes/No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's Date: \_\_\_\_\_
2. Your name: \_\_\_\_\_
3. Your age (to nearest year): \_\_\_\_\_
4. Sex (circle one): Male/Female
5. Your height: \_\_\_\_\_ ft. \_\_\_\_\_ in.
6. Your weight: \_\_\_\_\_ lbs.
7. Your job title: \_\_\_\_\_
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): \_\_\_\_\_
9. The best time to phone you at this number: \_\_\_\_\_
10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No
11. Check the type of respirator you will use (you can check more than one category):
  - a. \_\_\_\_\_ N, R, or P disposable respirator (filter-mask, non- cartridge type only).
  - b. \_\_\_\_\_ Other type (for example, half- or full-face piece type, powered-air purifying, supplied-air, self-contained breathing apparatus).
12. Have you worn a respirator (circle one): Yes/No



## RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE

If "yes," what type(s):

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Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month: Yes/No
2. Have you ever had any of the following conditions?
  - a. Seizures (fits): Yes/No
  - b. Diabetes (sugar disease): Yes/No
  - c. Allergic reactions that interfere with your breathing: Yes/No
  - d. Claustrophobia (fear of closed-in places): Yes/No
  - e. Trouble smelling odors: Yes/No
3. Have you ever had any of the following pulmonary or lung problems?
  - a. Asbestosis: Yes/No
  - b. Asthma: Yes/No
  - c. Chronic bronchitis: Yes/No
  - d. Emphysema: Yes/No
  - e. Pneumonia: Yes/No
  - f. Tuberculosis: Yes/No
  - g. Silicosis: Yes/No
  - h. Pneumothorax (collapsed lung): Yes/No
  - i. Lung cancer: Yes/No
  - j. Broken ribs: Yes/No
  - k. Any chest injuries or surgeries: Yes/No
  - l. Any other lung problem that you've been told about: Yes/No
4. Do you currently have any of the following symptoms of pulmonary or lung illness?
  - a. Shortness of breath: Yes/No
  - b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No
  - c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No
  - d. Have to stop for breath when walking at your own pace on level ground: Yes/No
  - e. Shortness of breath when washing or dressing yourself: Yes/No
  - f. Shortness of breath that interferes with your job: Yes/No
  - g. Coughing that produces phlegm (thick sputum): Yes/No
  - h. Coughing that wakes you early in the morning: Yes/No
  - i. Coughing that occurs mostly when you are lying down: Yes/No
  - j. Coughing up blood in the last month: Yes/No
  - k. Wheezing: Yes/No
  - l. Wheezing that interferes with your job: Yes/No



## RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE

- m. Chest pain when you breathe deeply: Yes/No
  - n. Any other symptoms that you think may be related to lung problems: Yes/No
5. Have you ever had any of the following cardiovascular or heart problems?
- a. Heart attack: Yes/No
  - b. Stroke: Yes/No
  - c. Angina: Yes/No
  - d. Heart failure: Yes/No
  - e. Swelling in your legs or feet (not caused by walking): Yes/No
  - f. Heart arrhythmia (heart beating irregularly): Yes/No
  - g. High blood pressure: Yes/No
  - h. Any other heart problem that you've been told about: Yes/No
6. Have you ever had any of the following cardiovascular or heart symptoms?
- a. Frequent pain or tightness in your chest: Yes/No
  - b. Pain or tightness in your chest during physical activity: Yes/No
  - c. Pain or tightness in your chest that interferes with your job: Yes/No
  - d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No
  - e. Heartburn or indigestion that is not related to eating: Yes/ No
  - f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No
7. Do you currently take medication for any of the following problems?
- a. Breathing or lung problems: Yes/No
  - b. Heart trouble: Yes/No
  - c. Blood pressure: Yes/No
  - d. Seizures (fits): Yes/No
8. If you've used a respirator, have you ever had any of the following problems? (If you've never used a respirator, check the following space and go to question 9:)
- a. Eye irritation: Yes/No
  - b. Skin allergies or rashes: Yes/No
  - c. Anxiety: Yes/No
  - d. General weakness or fatigue: Yes/No
  - e. Any other problem that interferes with your use of a respirator: Yes/No
9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes/No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-face piece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you ever-lost vision in either eye (temporarily or permanently): Yes/No



**RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE**

- 11. Do you currently have any of the following vision problems?
  - a. Wear contact lenses: Yes/No
  - b. Wear glasses: Yes/No
  - c. Color blind: Yes/No
  - d. Any other eye or vision problem: Yes/No
  
- 12. Have you ever had an injury to your ears, including a broken ear drum: Yes/No
  
- 13. Do you currently have any of the following hearing problems?
  - a. Difficulty hearing: Yes/No
  - b. Wear a hearing aid: Yes/No
  - c. Any other hearing or ear problem: Yes/No
  
- 14. Have you ever had a back injury: Yes/No
  
- 15. Do you currently have any of the following musculoskeletal problems?
  - a. Weakness in any of your arms, hands, legs, or feet: Yes/No
  - b. Back pain: Yes/No
  - c. Difficulty fully moving your arms and legs: Yes/No
  - d. Pain or stiffness when you lean forward or backward at the waist: Yes/No
  - e. Difficulty fully moving your head up or down: Yes/No
  - f. Difficulty fully moving your head side to side: Yes/No
  - g. Difficulty bending at your knees: Yes/No
  - h. Difficulty squatting to the ground: Yes/No
  - i. Climbing a flight of stairs or a ladder carrying more than 25 lbs.: Yes/No
  - j. Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

Part B Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

- 1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes/No

If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes/No

- 2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes/No

If "yes," name the chemicals if you know them:

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**RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE**

- 3. Have you ever worked with any of the materials, or under any of the conditions, listed below:
  - a. Asbestos: Yes/No
  - b. Silica (e.g., in sandblasting): Yes/No
  - c. Tungsten/cobalt (e.g., grinding or welding this material): Yes/No
  - d. Beryllium: Yes/No
  - e. Aluminum: Yes/No
  - f. Coal (for example, mining): Yes/No
  - g. Iron: Yes/No
  - h. Tin: Yes/No
  - i. Dusty environments: Yes/No
  - j. Any other hazardous exposures: Yes/No

If "yes," describe these exposures:

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- 4. List any second jobs or side businesses you have:

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- 5. List your previous occupations:

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- 6. List your current and previous hobbies:

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- 7. Have you been in the military services? Yes/No

If "yes," were you exposed to biological or chemical agents (either in training or combat):  
Yes/No

- 8. Have you ever worked on a HAZMAT team? Yes/No

- 9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes/No

If "yes," name the medications if you know them:

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## RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE

10. Will you be using any of the following items with your respirator(s)?
- HEPA Filters: Yes/No
  - Canisters (for example, gas masks): Yes/No
  - Cartridges: Yes/No
11. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?:
- Escape only (no rescue): Yes/No
  - Emergency rescue only: Yes/No
  - Less than 5 hours per week: Yes/No
  - Less than 2 hours per day: Yes/No
  - 2 to 4 hours per day: Yes/No
  - Over 4 hours per day: Yes/No

12. During the period you are using the respirator(s), is your work effort:

- a. Light (less than 200 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: \_\_\_\_\_ hrs. \_\_\_\_\_ mins.

Examples of a light work effort are sitting while writing, typing, drafting, or performing light assembly work; or standing while operating a drill press (1-3 lbs.) or controlling machines.

- b. Moderate (200 to 350 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: \_\_\_\_\_ hrs. \_\_\_\_\_ mn.

Examples of moderate work effort are sitting while nailing or filing; driving a truck or bus in urban traffic; standing while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; walking on a level surface about 2 mph or down a 5-degree grade about 3 mph; or pushing a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.

- c. Heavy (above 350 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: \_\_\_\_\_ hrs. \_\_\_\_\_ mn.

Examples of heavy work are lifting a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; shoveling; standing while bricklaying or chipping castings; walking up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes/No

If "yes," describe this protective clothing and/or equipment:



## RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE

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14. Will you be working under hot conditions (temperature exceeding 77 deg. F): Yes/No

15. Will you be working under humid conditions: Yes/No

16. Describe the work you'll be doing while you're using your respirator(s):

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17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

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Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance: \_\_\_\_\_

Estimated maximum exposure level per shift:

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Duration of exposure per shift:

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Name of the second toxic substance: \_\_\_\_\_

Estimated maximum exposure level per shift:

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Duration of exposure per shift:

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Name of the third toxic substance:

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Estimated maximum exposure level per shift:

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Duration of exposure per shift:

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## RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE

The name of any other toxic substances that you'll be exposed to while using your respirator: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**EMPLOYEE ANNUAL RESPIRATOR FIT-TEST AND TRAINING RECORD**

District Name: \_\_\_\_\_

Employee Name: \_\_\_\_\_

Occupation/Job: \_\_\_\_\_

**Respirator Use Information**

Work Area(s)

\_\_\_\_\_  
\_\_\_\_\_

Exposure Conditions

<b>Chemicals</b>	<b>Exposure Estimate and PEL/STEL</b>

Emergency Use of Respirators (Member of HAZMAT Team)

Yes       No

Type(s) of Respirator Used

- Voluntary air purifying ( half-face or  full-face)
- Half-face air purifying
- Full-face air purifying
- Self-contained breathing apparatus (pressure demand)
- Airline breathing apparatus (pressure demand)
- Other; specify what type: \_\_\_\_\_

Air Purifying Cartridges Used

<b>Contaminant</b>	<b>Cartridge Name and Color Code</b>



**EMPLOYEE ANNUAL RESPIRATOR FIT-TEST AND TRAINING RECORD**

**Fit-Testing Record**

Fit-test Protocol Used (indicate each used if more than one)

Qualitative; Test Substance:

\_\_\_\_\_

Other:

\_\_\_\_\_

Quantitative; Test Method:

\_\_\_\_\_

Other:

\_\_\_\_\_

**Respirator(s) Successfully Fitted**

<input type="checkbox"/>	<b>Type of Respirator</b>	<b>Brand</b>	<b>Model</b>	<b>Size</b>
<input type="checkbox"/>	Half-face air purifying			
<input type="checkbox"/>	Full-face air purifying			
<input type="checkbox"/>	Self-contained breathing apparatus			
<input type="checkbox"/>	Supplied-air breathing apparatus			
<input type="checkbox"/>	Other, specify:			

**Fit Test Certification**

Respirator fit testing for the devices indicated in was successfully completed.

Employee: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Tester: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



**Training Record**

Training Subjects Covered

- Purpose and conditions of respirator use (nature and concentrations of air contaminants known or anticipated).
- Requirements for use--when respirator(s) are required.
- How the device operates--its components and their maintenance.
- Respirator inspection and cleaning procedures and employee obligation for cleaning and maintenance as applicable.
- Chemical cartridge selection criteria, change out frequency and warning signs for breakthrough and other failures. Instruction to terminate exposure if a problem is detected. [If air-supplied or self-contained, the air supply (pressure gauge) and low pressure alarm should be described and demonstrated.]
- How to properly don each respirator to be used.
- How to conduct self-seal check and that this is mandatory upon each use.
- An explanation of fit-testing procedures.
- An explanation of medical surveillance and procedures.
- Other warnings and precautions as set forth in the manufacturer's instruction, including emphasis that air-purifying respirators do not supply breathing air and must not be used in an oxygen-deficient atmosphere.

Training Certification

Training in all of the above topics was successfully completed.

Employee: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Trainer: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Appendix B-1. to Section 5144: User Seal Check Procedures (Mandatory)**[Guide to Respiratory Protection at Work](#)

The individual who uses a tight-fitting respirator is to perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the positive and negative pressure checks listed in this appendix, or the respirator manufacturer's recommended user seal check method will be used. User seal checks are not substitutes for qualitative or quantitative fit tests.

Face piece Positive and/or Negative Pressure Checks.

1. Positive pressure check. Close off the exhalation valve and exhale gently into the face piece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.
2. Negative pressure check. Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the face piece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the face piece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.
3. Manufacturer's Recommended User Seal Check Procedures. The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates that the manufacturer's procedures are equally effective.

***Appendix B-2. to Section 5144: Respirator Cleaning Procedures (Mandatory)***[Guide to Respiratory Protection at Work](#)

These procedures are provided for employer use when cleaning respirators. They are general in nature, and the employer as an alternative may use the cleaning recommendations provided by the manufacturer of the respirators used by their employees, provided such procedures are as effective as those listed here in Appendix B-2. Equivalent effectiveness simply means that the procedures used must accomplish the objectives set forth in Appendix B-2, i.e., must ensure that the respirator is properly cleaned and disinfected in a manner that prevents damage to the respirator and does not cause harm to the user.

**Procedures for Cleaning Respirators.**

1. Remove filters, cartridges, or canisters. Disassemble face pieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
2. Wash components in warm (43 deg. C [110 deg. F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.
3. Rinse components thoroughly in clean, warm (43 deg. C [110 deg. F] maximum), preferably running water. Drain.
4. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:
  5. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43 deg. C (110 deg. F); or,
  6. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43 deg. C (110 deg. F); or,
  7. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.
8. Rinse components thoroughly in clean, warm (43 deg. C [110 deg. F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on face pieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.
9. Components should be hand-dried with a clean lint-free cloth or air-dried.
10. Reassemble face piece, replacing filters, cartridges, and canisters where necessary.
11. Test the respirator to ensure that all components work properly.



***Appendix D to Section 5144: (Mandatory) Information for Employees Using  
Respirators When Not Required Under the Standard***

**[Guide to Respiratory Protection at Work](#)**

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designated to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.



## PERIODIC RESPIRATOR PROGRAM EVALUATION

Person Performing Evaluation: \_\_\_\_\_

Program Administrator: \_\_\_\_\_

Date of Last Evaluation: \_\_\_\_/\_\_\_\_/\_\_\_\_

Date of This Evaluation: \_\_\_\_/\_\_\_\_/\_\_\_\_

### Review of Written Program

Is written program up-to-date?

Yes  No If no, what changes are needed?

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Have there been any changes in respirator use or exposure conditions since the last review?

Yes  No If yes, summarize the changes:

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Are all personnel responsible for the respirator program properly listed?

Yes  No If no, what changes should be made?

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### Observation of Respirator-using Employees

When asked, are employees satisfied and comfortable with respirator use and the employer's program?

Yes  No If no, what problems need to be corrected?

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Are respirators in use, properly fitted (check for obvious poor fits, facial hair, other interferences)?

Yes  No If no, fit-testing should be required:

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Are respirators in use, appropriate for exposure conditions and required work?

Yes  No If no, what problems should be corrected?

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Are respirators in use, fitted with the proper cartridges?

Yes  No If no:

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## PERIODIC RESPIRATOR PROGRAM EVALUATION

Are respirators in use, properly maintained in terms of sanitation, parts in place, etc.?

Yes  No If no:

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### Respirators In Storage

Are all respirators in storage in sealed plastic bags and properly stored?

Yes  No If no:

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If an emergency device, is the unit being inspected monthly, and is this inspection specifically documented with a tag or otherwise?

Yes  No If no:

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Are all SCBA air tanks on devices not in use and tanks in storage filled to 90% of capacity?

Yes  No If no:

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### Documentation Review

Are records available indicating initial and/or respirator fit-testing and training for all users within the past 12 months?

Yes  No If no:

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Are there initial medical evaluation documents for all employees who use respirators?

Yes  No If no:

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Is there a need for more frequent periodic evaluations for any employee or group of employees?

Yes  No If yes:

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Signed: \_\_\_\_\_ Date: \_\_\_\_\_



## Respiratory Protection Based on Historical Air Monitoring

**Note:** Evaluate All Operations Not Listed Below And Those Utilizing Technology Applied Developed After June 1998

<u>OPERATION</u>	<u>HAZARD ASSESSED</u>	<u>RESPIRATORY PROTECTION REQUIRED</u>	<u>RESPIRATORY PROTECTION NOT REQUIRED</u>
<b>Hauling</b>			
Driver - Special Wastes	new materials		X
Driver - Asbestos	as needed		X
Dusts			X
<b>Landfill / Transfer</b>			
Driver site truck	dust/silica		X
Driver water truck	dust/silica		X
Gas plant / gas recovery			X
Laboratory personnel	methylene chloride	NA	NA
Loaders - transfer / tipping	dust/silica		X
Operator compactor		NA	NA
Operator landfill equipment	dust/silica		X
Spotter - transfer / tipping	dust/silica		X
Operator track loader/transfer	new methods (non-friable asbestos)	NA	NA
<b>Maintenance</b>			
Mechanic - hauling Container Repair	lead in old container paint		X
Mechanic - hauling Truck Body Repair (inside truck bodies)	fume, copper electrodes inside bodies	X	
Painter - Water Reducible Paint			X
Painter - Solvent based Paint	solvents	X	
Mechanic -landfill			X
Mechanic - MRF			X
<b>Material Recovery Facility</b>			
Baler operator	dusts	NA	NA
Forklift/bobcat operator	dusts		X
Sorters - Recycle Line	dusts	NA	NA
Sorters - Commingle MRF	dusts		X
Ticket collector MRF	dusts/silica		X

**Note:**

- Data collected in over ten years of monitoring routine, non-routine and “worst case” workplace exposures show results of airborne concentrations of dusts, mists, fumes, vapors and gases are routinely below 10% of their respective PELs.
- Exposures may exceed action levels or PELs from solvent based paint, carbon arc welding inside truck bodies, and in dusty areas where high levels of airborne road dust contain 10% silica sand (on some landfill haul roads and on some tipping floors).
- Continue to assess non-routine operations and new methods to ensure sampling results are representative, adequate engineering controls are in place and proper PPE is selected.
- NA=SUFFICIENT DATA TO EVALUATE NOT AVAILABLE



**Program: Welding, Cutting, Brazing & Hot Work Guidelines**

**Facility: Kekaha Sanitary Landfill**

**Facility Location: 6900 D Kaunualii Highway, Kekaha, HI 96752**

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## **WELDING, CUTTING, BRAZING, AND HOT WORKS**

### **PURPOSE**

Describe the requirements when welding, burning, brazing, cutting or performing other "hot" work.

### **REQUIREMENTS**

Only trained authorized personnel may weld at KLF or use Waste Management equipment.

Designate areas for welding, brazing, and cutting.

Use general or local exhaust ventilation to keep the concentration of toxic fumes, gases, or dusts below the OSHA Permissible Exposure Limits. Refer to the Industrial Hygiene database for information about exposures to welders.

Provide, and require the use of, flameproof screens or shields around designated welding or burning areas or move all combustible materials at least 35 feet from the welding/burning area or cover the materials with welding blankets.

Provide, and require the use of, personal protective equipment (PPE) as specified in the PPE hazard assessment.

Protect welding cables and cylinders from damage.

Use only approved cutting and welding equipment.

Use a check valve for each of the acetylene and oxygen cylinders and use a flashback arrestor at the acetylene or gas regulator.

### **COMPRESSED GASES**

6. Oxygen, fuel gas and acetylene cylinders must be shut off when not in use.

7. Pressure should not remain in the hoses when not in use.

8. Store cylinders upright and away from flame and heat sources.

9. Maintain labels on cylinders.

10. Separate oxygen from acetylene or fuel gases in storage by 20 feet or a 1/2-hour fire-rated non-combustible barrier 5 feet in height.

11. Segregate empty and full containers in storage.

### **HOT WORK PERMITS**

1. Hot Work means working with materials or equipment or in conditions which could result in fire or explosion.

2. Hot work permits must be used when welding, brazing, or cutting outside of designated areas.

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3. Train and authorize an individual to issue hot work permits.
4. Use a fire watch when welding, burning or brazing outside of the designated welding area. The fire watch should man the fire extinguisher when hot work is in progress.
5. Use the hot work permit and require forced air ventilation for any welding, cutting, or brazing works inside confined spaces.
6. Hot work permits should be kept on file for one year.

### **INTRODUCTION**

The Waste Management written Welding Brazing/ Cutting/Compressed Gas and "Hot Work" guidelines include the following:

Safety Procedures for arc welding  
Safety Procedures for gas welding and cutting  
Using compressed gas cylinders  
Fire prevention and protection  
Hot work control program  
Maintenance of welding equipment  
Welding in confined spaces  
Ventilation during welding  
Personal protective equipment (PPE)  
Respiratory and hearing protection  
Training

The following sections describe how KLF addresses each of these topics.

#### Health Effects Associated With Welding

Welding produces different fumes and dusts depending on the metal being welded, the kind of welding, and the electrode coatings on the metal.

Welding also produces gases. Gases such as nitrogen oxide, nitrogen dioxide, and ozone may irritate the respiratory tract and mucous membranes. Chronic exposure can lead to respiratory disease. Carbon monoxide may cause headaches and dizziness and at high level leads to oxygen deprivation. Argon, carbon dioxide, helium, and nitrogen deplete the atmosphere of oxygen. Arc welding can generate these gases as well.

Welding produces intense light and heat. Electric welding can cause electric shock and burns. The intensely bright light produced by welding can burn the eyes and skin very quickly.

Fumes from welding steel products can irritate the lungs. The excessive breathing in of fumes can cause the flu-like symptoms of metal fume fever. Nickel fumes also irritate the lungs, and skin contact can produce an allergic reaction. Airborne nickel dusts can be cancer causing when breathed in. Airborne chromium dust can be toxic. However, nickel and chromium fumes are not considered cancer causing.

#### General Safety Guidelines

Follow these guidelines when welding:

Avoid prolonged breathing of gases, fumes, and dust.

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Never weld in damp or wet areas without protective equipment.

Wear safety glasses, leather welding gloves, a welding helmet, and protective clothing.

Keep the area clear of combustibles (at least 35 feet from the hot work area).

Regularly inspect all equipment to ensure that it is in good working condition.

Use an NIOSH-approved respirator for fumes when other controls do not bring fumes, dusts, or other contaminants down to safe levels.

Use fire-resistant welding curtains or shields constructed of noncombustible materials positioned so that others do not see the welding arc.

### **ARC WELDING**

Cover welding cables located on the floor or ground so they don't cause a tripping hazard.

Don't overload cables.

Don't use worn or poorly connected cables. Inspect the cables and connections frequently.

Don't operate or move the polarity switch under the load of a welding current.

Do not leave the electrode in the lead when it is not in use. Shut off the welder when not in use.

Never weld on trucks that have the motor running. Disconnect the vehicle battery cables before welding.

Don't operate the range switch under load.

Follow lockout/tagout procedures when performing servicing or maintenance on machines. (Note: Repairs are to be made only by qualified persons.)

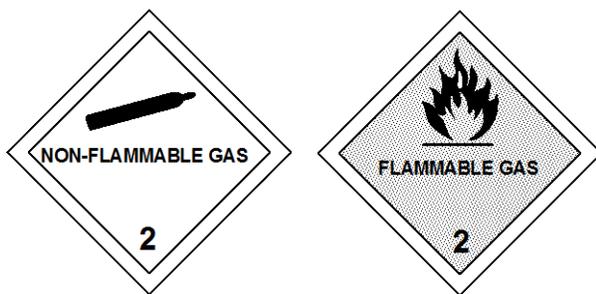
Never leave an uninsulated electrode holder or a "live" electrode on the tabletop in contact with a grounded metallic surface.

Ensure that welding leads are free of cracks or cuts in the insulation.

### **GAS WELDING**

Use welding and cutting torches equipped with antirflashback valves.

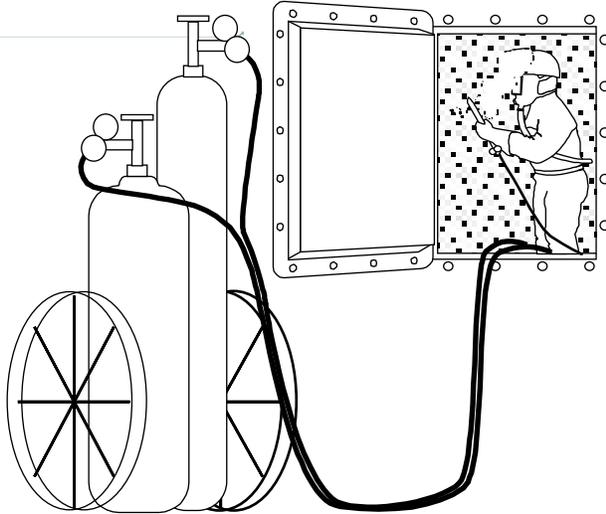
Follow the safe handling and use procedures for compressed gas cylinders detailed in these guidelines.



### **COMPRESSED GAS CYLINDERS**

The gas in cylinders like the ones used for welding is highly pressurized and can create a potentially hazardous situation. Cylinders exposed to heat, fire, or rough handling can explode with great force. For this reason, store cylinders in a cool, dry place. Chain and cap them when they are not in use. Before you use a cylinder, read the label to verify the contents. Report illegible labels to your supervisor.

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### **SAFE HANDLING REQUIREMENTS**

Wear safety glasses and insulated neoprene gloves when transporting or exchanging cylinders, or when connecting or disconnecting regulators.

Use a hand truck to transport cylinders.

Check hoses for leaks. Shut off the cylinders when hoses are connected but not in use.

Check regulators when changing cylinders to be sure they are free of dust and oil.

Inspect cylinders for defects, corrosion, and dents. Isolate and mark any defective cylinders, and contact the vendor immediately for pick-up.

Store filled cylinders inside in a well-protected, well-ventilated, dry location. They must be at least 20 feet from highly combustible materials, sparks, open flames, excessive heat, and away from elevators, stairs, or gangways. Keep cylinders secured to prevent them from falling over.

Separate stored oxygen cylinders from stored fuel gas cylinders or combustible material (especially oil or grease) by at least 20 feet or by a noncombustible barrier. This barrier must be at least 5 feet high and have a fire resistance rating of one-half hour.

Mark all cylinders legibly to identify their contents. If the cylinder is unmarked, do not use it.

If a cylinder is leaking, close the valve, cap, and move to a well-ventilated area. Contact the supplier immediately.

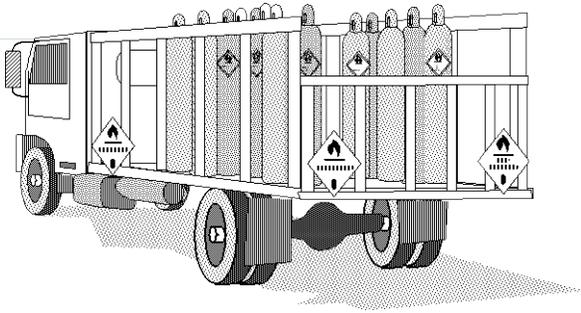
For cylinders that are flammable, use a non-sparking wrench when changing.

Be careful that cylinders are not placed so as to become part of an electrical circuit.

Never try to mix any gases in a cylinder.

Never try to refill a cylinder.

Mark empty tanks "MT," close the valves, and replace valve caps securely. Separate "MT" and full tanks.



### **ATTACHING REGULATORS**

Handle the regulator carefully at all times. Do not use pipe wrenches or pliers for attaching regulators to cylinders. Use an open-end wrench of the proper size instead. Use a close-fitting wrench to avoid stripping the threads. Hammers or wrenches must not be used to open or close cylinder valves that are fitted with hand wheels.

- When opening the valves, never stand in front of the regulators. The tanks are under pressure and the regulators may explode when opened.

### **REQUIREMENTS FOR HOSES, TORCH VALVES, AND CONNECTIONS**

Replace or repair hoses showing leaks, burns or worn places.

Color-code hoses to avoid accidental mixing.

Connect hoses to regulator properly. Check hose connections for proper threading. Standard hose connections are threaded right-hand for oxygen and left-hand for acetylene or other fuel gas. This helps prevent an accidental switch of oxygen and fuel-gas hoses.

Use only approved bronze or brass fittings. Copper fittings must never be used on acetylene cylinders. Under certain conditions, the acetylene might react with the copper to produce an explosive compound.

Do not use oil, grease, or similar substances on any torch or regulator. Oil and grease in the presence of oxygen may burn with explosive force, if ignited.

#### Testing For Leaks

To test for leaks, open the fuel and oxygen cylinder valves with the needle on the torch closed. Adjust the regulator to normal working pressures, and apply soapy water to connections and hose with a brush. If bubbles form, a leak is present. Correct condition as necessary. Do not try to repair hoses with tape. Do not use any other testing method.

### **GAS WELDING AND CUTTING**

#### Lighting and Shutting Off the Torch

Ensure the proper welding or cutting tip is selected and installed.

Purge the hoses by opening the valve on the acetylene cylinder. This should never be opened more than one and one-half turns. Three-fourths of a turn is preferable.

Open the acetylene torch valve one-fourth turn.

Adjust the acetylene to working pressure with the gas regulator screw.

Close the acetylene torch valve.

Slowly open the oxygen cylinder valve all the way.

- Open the oxygen torch valve one-half turn.

Adjust the oxygen to working pressure with the gas regulator screw.

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Turn off the oxygen torch valve. The final steps are the actual lighting of the torch.

Reopen the acetylene torch valve one-fourth to three-quarters turn and light the gas with a spark lighter. (NEVER USE MATCHES.)

- Increase the fuel supply until the flame has a slight tendency to jump away from the tip. Gradually open the oxygen needle.

Follow the procedures below for shutting off the torch:

Close the torch valves acetylene first, then oxygen.

- Close the cylinder valves acetylene first, then oxygen.

Open both torch valves to release the pressure.

Shut off the regulator-adjusting handle until you no longer feel any spring tension.

Close the torch valves. This procedure reduces the possibility of regulator fires when the oxygen cylinder valve is open again. It will also prevent leaks of acetylene or oxygen while the equipment is not in use. A leak could cause a serious fire.

## **FIRE PREVENTION AND PROTECTION**

The site program administrator designates safe areas for welding, brazing, and cutting free of combustible and flammable materials. Welding and cutting in these areas should not pose a hazard to welders or workers in nearby areas. Work site preparation to avoid fires and/or explosions includes ensuring all combustibles are at least 35 feet from the work area. If this is not possible, protect combustibles using flameproof covers, and complete a Hot Work Permit [HOT WORK PERMIT FORM].

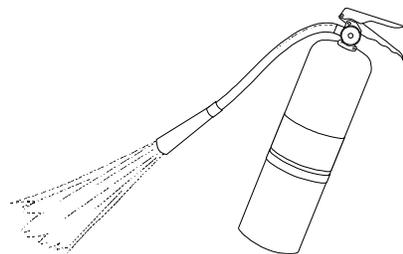
Follow these safe work practices when welding to prevent fires and/or explosions:

Know the location of nearby fire extinguishers and know how to use them.

Do not weld in locations close to chlorinated hydrocarbon vapors coming from degreasing, cleaning, or spraying operations. Heat or rays from the arc can react with solvent vapors to form a highly toxic gas and other irritating products.

- Do not weld on containers or barrels which have held combustible or flammable materials or materials which, when heated, give off toxic vapors. Perform cleaning, purging, or inerting first.

Do not weld on a closed container unless the contents have been identified and found to be non-flammable.



When you know the container held a gas or liquid which will readily dissolve in water, use the following method:

Flush out the container with water several times, and then fill the container with water.

Before welding, be sure there is a vent or opening on the container to provide for release of air pressure.

When you know the container held a gas or liquid that will not readily dissolve in water, perform the following procedure:

Clean out the container thoroughly with steam or a compatible-cleansing agent. Purge all air or inert materials with a gas such as carbon dioxide or nitrogen before repairing. Carbon dioxide is heavier than air and will tend to remain in the container if the opening is at the top.

Use steam to clean out light material.

Use a strong caustic soda solution to clean out heavy oils or grease.

Don't clean where there is poor ventilation. Ventilation is necessary to carry away harmful or explosive vapors.

Don't clean near any open flames. When scraping or hammering to remove heavy sludge or scale use a spark resistant tool and keep the tool wet to avoid sparks.

Keep your head and arms as far away from your work as possible.

## **HOT WORK CONTROL PROGRAM**

To minimize the potential for employee injury from fires/explosions arising from unsafe cutting and welding practices, and in certain conditions such as confined spaces, a hot work control program must be implemented. At a minimum, the program must include the following elements:

Where cutting, welding or other hot work is performed on a regular basis, one or more permanent designated areas must be established for this work.

A permit system for authorizing the temporary use of portable cutting and welding equipment outside of designated areas must be used.

Document precautions on [HOT WORK PERMIT FORM].

A permit must not be issued if the work can be moved to a designated hot work area.

A supervisor must inspect the area to verify that all necessary precautions have been taken before filling out and signing the permit.

The welder must post a signed permit in the area where the hot work will be done before commencing work.

The welder must return the permit to the supervisor when the work has been completed, signing off on the permit to indicate that a final check-up was conducted.

## **HOT WORK SAFETY RULES**

Obtain a permit before performing hot work outside of designated areas.

Check the condition of hot work equipment prior to each use. (Note: A visual inspection should be made with special attention to electrical cables and gas hoses. A soap solution should be used to check for leaks at valves and connections of oxygen-acetylene sets, especially after changing cylinders.)

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## WELDING, CUTTING, BRAZING & HOT WORK GUIDELINES

Protect floor and wall openings within 35 feet.

Ensure automatic sprinklers (when installed) are functional.

Ensure that portable fire extinguishers of the proper type are in the immediate vicinity. (Note: "A" rating for ordinary combustibles; "B" rating for flammable and combustible liquid and gases; "C" rating for energized electrical equipment.)

Protect welding hoses against physical damage. (Note: Use UL approved welding hose reels, when appropriate.)

Ensure a fire watch is present during hot work activities.

Check the area 30 minutes after the work is completed for hazardous conditions or fire.

### WHEN WELDING IS PROHIBITED

You must never weld or cut in the following situations:

If you have not been trained and authorized by management.

If the building you are working in has sprinkler systems that are not working.

In the presence of explosive atmospheres.

- Near large quantities of highly ignitable materials

### VENTILATION

Four main factors in arc and gas welding affect the potential for air contamination. These factors are:

The size of the space

The gross volume of work

The number of welders working at one time

The size of the welding rod

Provide adequate ventilation for protection against potentially excessive concentrations of airborne contaminants (for example, welding, fumes, and carbon monoxide gas) and oxygen deficient atmospheres.

Local exhaust may be needed when welding, cutting or brazing is done on materials which contain or are coated (treated) with fluorides, zinc, lead, copper, beryllium, cadmium, mercury, or residual chlorinated solvents (such as perchlorethylene).

Engine-driven welding equipment used indoors is to have exhaust gases piped to suitable exhaust ducts or directly outdoors. Never locate engine exhaust on or near an air conditioning intake.

### WELDING MACHINE USE

Welding machines must meet safety and design requirements. Observe the following guidelines when using arc-welding equipment:

Be properly trained.

Do not exceed voltage limits.

Ground the frame or case of the welding machine.

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## WELDING, CUTTING, BRAZING & HOT WORK GUIDELINES

Ground the ground cable of every power circuit to prevent accidental shock by stray current. Do not ground to pipelines carrying gases or flammable liquids, or conduits carrying electrical conductors.

Do not use chains, wire ropes, crane hoists, and elevators carry a welding current.

Check ground connections.

Provide disconnecting switches or controllers as part of the welding machines or have them near the machines.

Do not use a welding machine to thaw out frozen water or pipes. Fire, explosion, or damage to the welding machine may result.

Follow safe maintenance practices. These practices include:

Reporting all equipment defects or hazards to your supervisor.

Remove defective equipment immediately from service.

Have all repairs made by qualified personnel.

Thoroughly dry and test machines that have become wet before using again.

- Replace cables with damaged insulation or exposed bare conductors.

### PERSONAL PROTECTION

Welders must wear the appropriate personal protective equipment. Specific requirements are detailed below.

### EYE AND FACE PROTECTION

Select the proper eye protection based on the welding operation. During arc welding or cutting operations, use a welding helmet. Helmets must have filter and cover plates designed for easy removal, and be fitted with a double lens color arc ray lens inside and clear plastic outside. Flash goggles should be used under the welding helmet, particularly while welding using a gas-shielded arc welder.

The shaded lens used in the welder's helmet must meet the test for transmission of radiant energy prescribed in ANSI Z87-1-1989. Select the correct shade of filter lens using the following chart:

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**LENS FILTER SHADE GUIDELINES**

Type of Operation	Shade Number
<b><i>Gas Torch</i></b>	
Light Cutting - up to one inch	3 or 4
Medium Cutting- one to six inches	4 or 5
Heavy cutting -More than six inches	5 or 6
Gas Welding - Up to 1/8" thickness	4 or 5
Gas Welding -1/8" to 1/2" thickness	5 or 6
Gas Welding- More than 1/2" thickness	6 or 8
<b><i>Arc Welding</i></b>	
Up to 30 amps	12 or 14
Shielded metal arc welding (Greater than 5/16" Electrodes)	
30 to 74 amps	10
Shielded Metal Arc Welding (Less than 5/32" Electrodes)	
75 to 200 amps	11
Gas Shielded Arc Welding (Non Ferrous)	
200 to 400 amps	12
Gas Shielded Arc Welding (Ferrous)	

Helpers or others who normally work near welding operations should also wear shaded eye protection (such as goggles). Selection of the darkness of the lens shade depends on the degree of the helper's exposure to the welding "flash." Often the helper must wear shaded goggles that are the same shade that the welder wears.

For welding, the best protection is provided by welding hoods. Welding hoods can be worn with safety hats by adding special fittings to the safety hats. For grinding, chipping, or cleaning, use protective goggles.

Inspect eye and face protection for welding before each use. Inspect helmets for cracks or defects. Replace cracked or poorly fitting filter plates. Keep a cover glass in front of the filter plate.

**PROTECTIVE CLOTHING**

Supervisors must ensure that protective clothing is inspected, maintained, and worn properly to preserve its effectiveness. Additionally, employees should:

- Wear long-sleeved shirts and pants.
  - Keep clothing reasonably free of oil or grease.
-



Not roll-up sleeves or cuffs when welding.  
Button sleeves and collars.

### TRAINING

Welders and their Supervisors must be:

Trained in the safe operation of their equipment and emergency procedures in the event of a fire.  
Properly trained before entering to weld in a confined space.

- Trained in health hazards associated with welding.

### DEFINITIONS

*Arc cutting:* cutting processes that melt the metals with the heat of an arc between an electrode and the base metal.

*Gas metal arc welding (MIG):* an arc welding process that produces coalescence of metals by heating them with an arc between a continuous filler metal (consumable) electrode and the work. Shielding is obtained entirely from an externally supplied gas or gas mixture.

*Gas tungsten arc welding (TIG):* an arc welding process that produces coalescence of metals by heating them with an arc between a tungsten (non-consumable) electrode and the work. Shielding is obtained from a gas or gas mixture. Pressure and filler metal may or may not be used.

*Welder and welder operator:* any operator of electric or gas welding and cutting equipment.

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**HOT WORK PERMIT**

Date			
Time Started		Estimated Completion Time	
Department		Floor	Building
Work to Be Done			
Permit Expires:	Date	Time	
<b>All items following have been completed. Therefore, permission is granted for this work.</b>			
Signed		Title	
<b>PRECAUTIONS</b> Do not cut, weld, or use other open flame or spark-producing equipment until the following precautions have been taken:			
<p><b>Check Each Item</b></p> <p><input type="checkbox"/> Work Location has Been Personally Examined.</p> <p><input type="checkbox"/> Sprinklers, Where Provided, are in Working Order.</p> <p><input type="checkbox"/> Cutting and Welding Equipment is in Good Condition.</p> <p><input type="checkbox"/> Floors Swept Clean of Combustibles.</p> <p><input type="checkbox"/> Combustible Floors Have Been Wet Down, Covered with Damp Sand, Metal or Flame Resistant Sheets.</p> <p><input type="checkbox"/> All combustibles Have Been Located Outside a Radius of 35' from the Operation.</p> <p><input type="checkbox"/> Flame Resistant Tarp Suspended from Work to Collect Sparks.</p> <p><input type="checkbox"/> PPE and Flash Screens Erected as Required.</p>		<p><b>Work on Enclosed Equipment (Tanks, Containers, Ducts, Dust Collectors, Etc.)</b></p> <p><input type="checkbox"/> Equipment Cleaned of All Combustibles.</p> <p><input type="checkbox"/> Containers Purged of All Flammable Liquids.</p> <p><input type="checkbox"/> Explosion Meter Used to Monitor Presence of Flammable Vapors.</p>	
		<p><b>Work on Walls or Ceiling</b></p> <p><input type="checkbox"/> The Construction is Non-Combustible and Without Combustible Covering or Insulation.</p> <p><input type="checkbox"/> Combustibles Have Been Moved Away from Opposite Side of the Wall</p>	
		<p><b>Fire Watch</b></p> <p><input type="checkbox"/> Provided for a Least 30 Minutes After Operation is Completed or Stopped</p> <p><input type="checkbox"/> Proper Fire Extinguishers or Small Hose at Site.</p> <p><input type="checkbox"/> Trained in the Use of Extinguishing Equipment.</p>	



## HOT WORK PERMIT

### FINAL CHECK UP

Work areas and all adjacent areas to which sparks and heat might have spread (such as floors above and below and on opposite side of walls) were inspected for at least 30 minutes after the work was completed, and were found fire safe.

Signed

Title

**After Signing, Return Permit to Person Who Issued It**



**Program: Bloodborne Pathogens**

**Facility: Kekaha Sanitary Landfill**

**Facility Location: 6900 D – Kaunualii Highway Kekaha 96752**

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**BLOODBORNE PATHOGENS**

The Waste Management safety team has determined that landfill employees working at the Kekaha Sanitary Landfill do not have the exposure to warrant a blood borne pathogen program. We will conduct awareness training on an annual basis to ensure our employees have the knowledge to keep themselves safe in case they do run across items contaminated with blood borne pathogens. If, in the unlikely event, we do have an employee that is exposed to blood borne pathogens then we will follow the applicable sections of this plan.



# BLOODBORNE PATHOGEN GUIDANCE PLAN

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## INTRODUCTION

Waste Management (WM) is committed to providing a safe and healthy work environment for all its employees. To achieve this, WM complies with the Occupational Safety and Health Administration's (OSHA) Bloodborne Pathogen Standard (the Standard), Part 1910.1030, Title 29 of the Code of Federal Regulations. You can find the Standard at [www.osha.gov/SLTC/bloodborne pathogens/index.html](http://www.osha.gov/SLTC/bloodborne pathogens/index.html).

The purpose of this **Best Practice Guidance (Guidance)** is to provide Company employees with information they need to comply with the Standard. The goal of the Standard is to eliminate or minimize occupationally transmitted bloodborne infections. This **Guidance** contains

- instructions for compliance with the Standard,
- education and training materials, and
- guidelines for the medical evaluation and treatment of employees who may be exposed to blood, body fluids, or other potentially infectious material (OPIM) contaminated with blood or body fluids.

Bloodborne pathogens (BBPs) are germs in blood or in other potentially infectious material (OPIM) that can infect and cause disease in people who are exposed to blood containing the germs. Bloodborne pathogens can cause serious diseases, including HIV and hepatitis B and C. OSHA defines blood as all parts of human blood including fluid from wounds.

## INSTRUCTIONS

This **Guidance** presents the Standard in a readily understandable format. It provides checklists and self-prompting forms that are easy to use and help your facility to achieve full compliance. Take a few moments to familiarize yourself with the various parts of this **Guidance**. Each part contains text followed by Exposure Control Plan (ECP) pages. Once the ECP pages are complete, they become your facility's ECP for compliance with the Standard.

## YOUR ECP

Pages that contain **ECP, Page #** in the upper right-hand corner and are colored green as shown here are the pages that make up your ECP. You must complete these pages as indicated on the page. Then remove the pages from the **Guidance** and place them in a binder or staple them together. At least once a year and whenever there are changes, you must review your ECP and make revisions as needed.

The forms included in your ECP are masters from which you will make copies for use as directed by this **Guidance**.

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## EXPOSURE CONTROL PLAN: OVERVIEW

Each WM site must evaluate the site's need to have a written ECP. The purpose of the ECP is to eliminate or minimize "occupational exposures". See *Appendix A: Definitions*. The mandatory elements of the ECP that will be addressed in the following parts of this **Guidance** are listed below.

1. Exposure Determination (identify covered employees)
2. Schedule and Methods of Implementation
  - Methods of compliance
  - Hepatitis B vaccination and post-exposure evaluation
  - Communication of hazards to employees
  - Record keeping
  - Procedure for Evaluation of Circumstances Surrounding Exposure Incidents

**Note: WM sites are responsible for ensuring that the ECP is readily available for review by covered employees and that a copy is made available to them without charge, within fifteen working days after request. The ECP must be reviewed annually and whenever necessary to reflect new or modified tasks and procedures that affect occupational exposure, new employee positions with occupational exposure, and employee positions that have changed to include occupational exposure.**

**EXPOSURE CONTROL PLAN: GENERAL INFORMATION**

WM Site Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Bloodborne Pathogens **Guidance** completed by: \_\_\_\_\_

Date: \_\_\_\_\_

Date(s) of Update Review \_\_\_\_\_

Update Reviewer(s) \_\_\_\_\_

Reviewing and updating of the ECP pages of this **Guidance** must be performed annually and whenever there is a need for a change in the Exposure Determination List (e.g., change in employees who are occupationally exposed; change in tasks/procedures/jobs which may affect occupational exposure).

(✓)

Responsible Person \_\_\_\_\_

A copy of this Bloodborne Pathogens **Guidance** will be made readily accessible to all employees who are occupationally exposed at \_\_\_\_\_ (location). Provisions have been made to provide a copy of the Exposure Control Plan within fifteen working days of an occupationally exposed employee's request.

(✓)

Responsible Person \_\_\_\_\_

\*Implementation of this Exposure Control Plan ("ECP") as written does not in any way acknowledge the existence of occupational exposure for any of the workers at the site.

**EXPOSURE CONTROL PLAN: SCHEDULE OF IMPLEMENTATION**

ECP Element	Date Completed
Written ECP	_____
Employee Training	_____
Medical and Training Records Available	_____
Engineering Controls	_____
Personal Protective Equipment	_____
Housekeeping Procedures	_____
Hepatitis B Vaccine Available (Waivers Signed)	_____

---

## EXPOSURE DETERMINATION

Each Waste Management site having employees with Exposure must be identified and included in the Exposure Control Program. This identifying process is known as Exposure Determination. It requires the creation of two lists.

1. The first is a listing of job classifications in which **all** employees in that job classification have potential exposure. In general, WM sites do not have any job classifications in which all employees will be at risk for exposure.
2. The second requires a listing of the job classifications in which only **some** of the employees have potential exposure, along with the associated tasks/procedures in that job classification in which Potential exposure may occur. In general, most WM sites will designate 1-2 supervisors per shift to be responsible for the clean up of sharps or any OPIM contaminated with bloodborne pathogens.

## EXPOSURE DETERMINATION FORM

**Instruction:** On the first line under A.1., please write "none" if there are no job classifications at your facility in which all the employees doing that job have occupational exposure to bloodborne pathogens.

**A.1.** List job classifications in which **all** employees may have occupational exposure to bloodborne pathogens.

_____	_____
_____	_____
_____	_____

List tasks/procedures associated with occupational exposures.

_____	_____
_____	_____
_____	_____

**A.2.** Complete for employees in A.1.

Name	Job Classification/Position	Date Listed
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**Note: All employees listed must be offered full protection under the Standard.**

**Use Additional Pages As Needed**

**Instruction:** On the lines under B.1., please list job classifications in which employees at your site have occupational exposure to bloodborne pathogens. In most cases, this will be "Supervisor who is responsible for bloodborne pathogen and/or sharps cleanup." Under "List tasks/procedures associated with occupational exposure," you would list them "Picking up sharps or MSW potentially contaminated with blood or OPIM from recycling line or municipal solid waste".

**B.1.** List job classifications in which **some** (but not all) employees have occupational exposures to bloodborne pathogens.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

List tasks/procedures associated with occupational exposures.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Instruction:** On the lines under B.2., please list the employee(s) at your site, that employee(s) job classification/position, and the date that employee(s) is first listed on this form.

**B.2.** Complete for employees in B.1.

Name	Job Classification/Position	Date Listed
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**All employees listed must be offered full protection under the OSHA standard.**

Use Additional Pages As Needed

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## ENGINEERING AND WORK PRACTICE CONTROLS

A number of preventive and protective actions must be taken to eliminate or minimize occupational exposures to bloodborne pathogens. This section addresses compliance methods known as Universal Precautions, Engineering Controls, and Work Practice Controls.

### UNIVERSAL PRECAUTIONS

Universal Precautions is an OSHA-mandated system of infection-control methods. Under this system, the only sensible way to protect employees from bloodborne pathogens is by treating all body fluids (OSHA-defined) as potentially infectious. Part of this system is the need to protect all points of entry that could be exposed to body fluids while performing job tasks. Points of entry are the mucous membranes of the eyes, nose, and mouth and the skin.

### ENGINEERING AND WORK PRACTICE CONTROLS

Engineering and Work Practice Controls must be used to reduce occupational exposures. Engineering Controls achieve this by using specifically designed equipment and facilities. Work Practice Controls achieve this by changing the way a task is performed.

#### ENGINEERING CONTROLS

- Sharps Removal Device (such as tongs, mechanical devices, and front loaders)
- Hand-Washing Facilities
- Sharps Containers
- Red Bags or Containers

#### WORK PRACTICE CONTROLS

- Personal Protective Equipment (PPE)
- Hand-Washing
- Use of Sharps and Contaminated Materials Containers
- No Eating, Drinking, Applying Cosmetics, or Handling Contacts in Prohibited Areas

**Note: Each Waste Management site is responsible for assuring that engineering controls are made available, used, and maintained on a regular schedule, that employees follow the work practice controls identified for the job or task, and that employees are trained in the use of engineering and work practice controls.**

#### Hand-Washing and Hand-Washing Facilities

Hand-washing facilities for occupationally exposed employees must be nearby and easy to get to. When this is not practical, antiseptic towelettes or antiseptic hand cleansers used with cloth or paper towels followed by soap and water hand washing must be used. For example, this approach might be needed for an emergency response in a remote area of the site.

Employees who use gloves or other personal protective equipment must wash their hands immediately after removing the gloves. Skin must be washed with soap and water. If necessary, mucous membranes must be flushed with water immediately after contact with blood or OPIM.

### **Needles and Sharps**

Careful handling and disposal of needles and other sharp implements or objects cannot be overemphasized. Containers must meet the criteria listed below.

- Puncture resistant.
- Able to be closed prior to removal.
- Leak-proof on sides and bottom.
- Labeled biohazard or color-coded red.
- Easily accessible to personnel and located as close as possible to where sharps might be found.
- Maintained upright throughout use.
- Appropriate in size for devices and materials placed in them.
- Designed with an unobstructed opening that allows sharps to drop in easily.

## ENGINEERING CONTROLS CHECKLIST

Check (✓) Engineering Controls that are in use at this facility.

- Hand-washing facilities
- Sharps containers
- Mechanical pick-up devices
- Tongs
- Front Loaders

A regular schedule to examine and maintain or replace Engineering Controls as needed has been provided. (See *Inspection and Maintenance Schedule Form*, next page.)

(✓)

Hand-washing facilities are readily accessible to occupationally exposed employees. If these are not available, then antiseptic towelettes or antiseptic hand cleansers with paper or cloth towels followed by soap and water hand washing has been provided.

(✓)

Engineering controls are reviewed \_\_\_\_\_time(s) per year.

(✓)

## INSPECTION & MAINTENANCE SCHEDULE FORM

### HAND-WASHING FACILITIES

Sinks with soap (preferably anti-microbial) are available at the following locations for use by occupationally exposed employees:

_____	_____
_____	_____
_____	_____

Wherever hand-washing facilities are not accessible, antiseptic towelettes  (✓) and/or antiseptic hand cleansers and cloth or paper towels  (✓) are available for use at the locations listed below.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### OTHER CONTAINERS FOR CONTAMINATED MATERIALS - - RED BAGS AND SHARPS CONTAINERS (Leakproof, Puncture Resistant, Labeled)

LOCATIONS \_\_\_\_\_

TYPES USED \_\_\_\_\_

REPLACED/DISCARDED WHEN  $\frac{3}{4}$  FULL  (✓)

### LAUNDRY (Leakproof, can readily hold contents, labeled)

LOCATIONS \_\_\_\_\_

TYPES OF CONTAINERS \_\_\_\_\_

METHOD OF DISPOSAL \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

EMPLOYEES HAVE BEEN INFORMED OF AND TRAINED IN THE USE OF ALL OF THE ABOVE ENGINEERING CONTROLS  (✓)

PERSON(S) RESPONSIBLE \_\_\_\_\_

**WORK PRACTICE CONTROL CHECKLIST (√)**

Complete and/or check (√) all that apply.

**HAND-WASHING**

Employees are informed and trained that they must perform the actions described below.

Wash hands as soon as possible after the removal of gloves and other PPE (e.g., goggles).  (√)

Wash hands with soap and water or flush mucous membranes with water as soon as possible after occupational exposure, if applicable.  (√)

**SHARPS**

All disposable and reusable sharps (e.g., scissors) are immediately placed in puncture-resistant, labeled or color-coded, leakproof containers while awaiting disposal or reprocessing/decontamination.  (√)

Employees have been instructed to not overfill containers.  (√)

**PERSONAL HYGIENIC PRACTICES**

Eating, drinking, smoking, applying cosmetics or lip balm, and handling contacts are prohibited in areas where occupational exposure might occur.  (√)

**MISCELLANEOUS WORK PRACTICES**

All procedures involving blood or OPIM are performed in a manner which minimizes splashing, spraying, spattering, and generation of droplets.  (√)

Containers for storage, transport, or shipping of blood or OPIM are labeled or color-coded and closed prior to leaving the facility.  (√)

Containers with sharps are placed within other non-contaminated containers meeting the same required specifications.  (√)

Containers with specimens that could puncture through walls are placed within other containers that meet the same required specifications and are puncture-resistant.  (√)

**Employees Have Been Informed and Trained in All of the Above Work Practice Controls in this Checklist**  (√)

**Work Practice Controls are reviewed on a \_\_\_\_\_ basis.**  (√)

**Person(s) responsible** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## SHARPS INJURIES RECORDKEEPING

### OSHA 300, 300A, FORM 301

#### (LOG AND SUMMARY OF OCCUPATIONAL INJURIES AND ILLNESSES)

The OSHA Act of 1970 requires each non-exempt employer of eleven or more employees during that year to keep a log of all recordable occupational injuries and illnesses.

“Employees” includes full-time, part-time, and temporary employees. You must use OSHA 300, 300A, and/or 301 forms.

You can get these forms from WM Corporate Health and Safety Department. You also can download them from OSHA in either MS-Excel or PDF format at:

<http://www.osha.gov/OshDoc/Additional.html>. New copies must be completed each year.

Follow the guidelines listed below. Refer to the forms for detailed instructions.

- Record incident within seven workdays from learning of occurrence.
- Current 300 form must be present in facility at all times.
- Logs must be maintained and retained for five years.
- Updates must be made upon changes in the extent or outcome of an injury or illness.
- The current year’s 300A form (summary) must be posted no later than February 1 of the following year and remain in place until April 30 of that same year.
- Form must be zeroed out and posted even if there are no incidents.
- Company executive must certify, by signature, that the form is accurate.
- Each separate facility must maintain its own forms.
- OSHA 300, 300A, and 301 forms must be kept confidential.

OSHA also requires certain information regarding sharps injuries. You can meet this requirement by making your own Sharps Injury Log. This log must include at least the information listed below.

- The type and brand of device involved in the incident
- An explanation of how the incident occurred
- The department or work area where the exposure incident occurred

Record needlestick incidents on the OSHA 300 Log. Sharps injury information also may be written on the OSHA 300 Log to reduce paperwork. If you **do not** include sharps injury information on OSHA 300, you must complete both a Sharps Injury Log and OSHA 300. If you **do** include sharps injury information on OSHA 300, names of injured employees must remain confidential.

WM requires that all incidents be entered into the Accident and Injury Management System (AIMS) or subsequent systems within 24 hours. AIMS will

- track all incidents and injuries, including sharps injuries, and
- generate the report OSHA requires for all incidents and injuries, including sharps injuries.

When an incident occurs, a route manager, district manager, or human resources representative reports the incident by following the steps listed below.

1. Log into AIMS through WMVisor. (Make sure you are at the proper WM site.)
2. Click on the Add New Incident option under Action Selector.

3. Fill out the Supervisor's First Report of Incident (SFRI) form. (When completed, the SFRI contains the information that OSHA requires for any incident or injury, including sharps injuries.)

You can now view and/or print your updated OSHA 300 Log/Sharps Injury Log by clicking on Reports under Action Selector. This information on this form must be maintained for at least five years. Names of injured employees must remain confidential.

Some states require a Workers' Compensation Form to be completed. That may substitute for the OSHA 301 form if it includes, at a minimum, the same information as the 301. Completed forms must be maintained confidentially for five years.

---

## PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal protective equipment must be used when the potential for occupational exposure exists.

### AVAILABILITY

Appropriate, properly sized PPE will be provided without cost and made readily accessible to employees when there is the potential for Exposure. For example:

- gloves (puncture resistant—any of the types widely used in our industry),
- eye protection (goggles and/or glasses with solid side shields),
- Tyvek suit,
- face shields, and
- laying a barrier, such as a sheet, over the hazardous material

are considered appropriate if they protect against infectious materials reaching mucous membranes, skin, and work or street clothes.

Hypoallergenic gloves, glove liners, and other alternatives must be made readily accessible for employees who are allergic to standard gloves.

It is the WM site's responsibility to assure that employees are trained on how to select, wear and use the appropriate PPE. For examples of recommended PPE by task, see next page.

### GLOVES

Puncture-resistant gloves (any of the types widely used in our industry) must be worn when it can be reasonably anticipated that an employee may have hand contact with blood, OPIM, potentially contaminated MSW or Sharps.

### EYE AND FACE PROTECTION

Goggles or glasses with solid side shields or chin-length face shields must be worn whenever splashes or droplets of blood or OPIM may be generated and eyes, nose, or mouth contamination might occur.

### PROTECTIVE CLOTHING

Protective clothing must be worn in occupational exposure situations according to the task and degree of exposure anticipated.

**CLEANING, LAUNDERING, DISPOSAL**

All PPE must be removed prior to leaving the work area and placed in the appropriate bags or containers for decontamination and laundering or proper disposal. Should blood or OPIM penetrate garments, they must be removed immediately and placed in appropriate containers for contaminated laundry.

PPE cleaning, repair, and replacement must be performed at no cost to the employee. Home laundering is forbidden.

Disposable gloves must be replaced as soon as possible when contaminated, torn, or punctured. They must not be washed for reuse. Utility gloves in good condition may be decontaminated and reused.

**RECOMMENDED PPE BY TASK**

Task/Activity	Puncture-Resistant Gloves	Protective Clothing	Face Protection	Protective Eye Wear
Removing Sharps from Sorting Line	required	not required	not required	required
Cleanup of Contaminated MSW	required	required	required	required

**Note: The degree of PPE depends on the type of potentially contaminated waste that may be present.**

**LEVELS OF PPE**

WM requires MSW, recycling, and MRF facility workers to wear level D or level C PPE depending on the task. Supervisors who decontaminate and handle improperly disposed of home healthcare waste, sharps, or other medical waste must wear the standard Level D protection. Contamination of sufficient size requires an upgrade to Level C protection.

Level D PPE	Level C PPE
<ul style="list-style-type: none"> <li>• work clothes</li> <li>• work shoes</li> <li>• puncture-resistant gloves</li> </ul>	<ul style="list-style-type: none"> <li>• work clothes</li> <li>• work shoes</li> <li>• puncture-resistant and latex gloves</li> <li>• disposable coveralls</li> <li>• eye protection (goggles and/or glasses with solid side shields)</li> </ul>

## PERSONAL PROTECTIVE EQUIPMENT (PPE) CHECKLIST (√)

### AVAILABILITY

The following types of PPE are available in appropriate sizes for use by employees with potential for occupational exposure:

Gloves (puncture resistant— any of the types widely used in our industry).  (√)

Protective clothing.  (√)

Eye protection (goggles and/or glasses with solid side shields).  (√)

Face shields.  (√)

PPE is provided without cost and made readily accessible.  (√)

### GLOVES

Puncture-resistant gloves (any of the types widely used in our industry) are worn whenever sharps are removed from a sorting line and during cleanup of potentially contaminated MSW.  (√)

Employees who use gloves are trained on when to use them, how to remove them without contaminating themselves, how to appropriately discard disposable gloves, and how to decontaminate utility gloves.  (√)

Gloves appropriate to the task may be obtained thru the site or group Health and Safety:

Issued by or on request of the manager/supervisor.  (√)

Use of bloodborne pathogen spill kits, which contain them.  (√)

Other \_\_\_\_\_  (√)

### FACIAL PROTECTION

Goggles or glasses with solid side shields or chin length face shields are used whenever splashes or droplets of blood or OPIM might contaminate eyes, nose, mouth, or facial skin.  (√)

Facial protective equipment may be obtained by:

Use of bloodborne pathogen spill kits that contain them.  (√)

Other \_\_\_\_\_  (√)

### PROTECTIVE CLOTHING

Protective clothing is available in occupational exposure situations according to task and degree of exposure anticipated.  (√)

Protective clothing may be obtained by issuance by or on request of the manager/supervisor.  (√)

Other \_\_\_\_\_  (√)

Contaminated protective clothing is placed in appropriate containers as soon as possible after contamination. It is then decontaminated and discarded or laundered, according to site policy.  (√)

Laundering of soiled protective clothing is performed by:

(Company) \_\_\_\_\_

**Note: Employees are not permitted to launder their own contaminated clothing.**

If protective clothing is not used, explain reason: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**PERSON(S) RESPONSIBLE FOR SUPPLY AND AVAILABILITY**

Listed below are those responsible for the supply and availability of PPE in this facility.

Name:	Phone:

Employees have been informed about and trained in the selection, use, and disposal/decontamination of the above PPE where applicable.

(✓)

Person(s) responsible for PPE training \_\_\_\_\_

\_\_\_\_\_

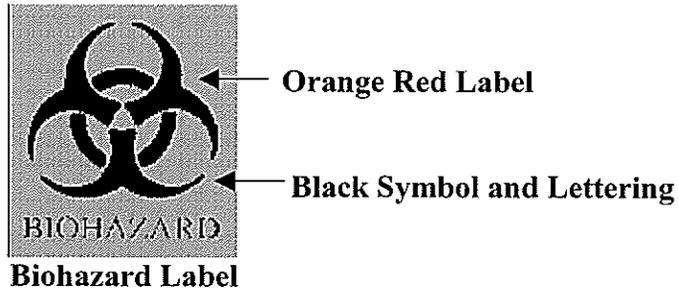
The availability and use of PPE are reviewed on a \_\_\_\_\_ basis by (person(s) responsible) \_\_\_\_\_.

---

## COMMUNICATION OF HAZARDS THROUGH LABELS

### LABELING

The universal biohazard label identifies untreated medical waste. Red bags and red sharps containers also identify untreated medical waste. The biohazard label is fluorescent orange or orange-red with lettering or symbols in a contrasting color as shown below.



Bags and/or containers that are red or have the biohazard label attached should be considered biohazardous waste, and should only be handled by designated and trained employees (incident responders).

Always place warning labels or use red bags or containers when collecting discovered regulated medical waste. Any untreated medical waste stored or transported from this facility must be labeled or color-coded.

Warning labels are not required on regulated waste that has been decontaminated.

The following items should be labeled with the biohazard label or a red bag or container.

- Contaminated laundry containers
- Regulated waste containers
- Sharps containers

***THIS LIST MAY NOT BE ALL-INCLUSIVE.***

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## **CLEANUP AND HOUSEKEEPING PROCEDURES**

WM facilities may be required to deal with either one of two types of medical waste.

1. Regulated Medical Waste
2. Non-Regulated Medical Waste

Both are potential threats to employees. Employees must not handle medical waste unless trained and authorized by the facility to contain and dispose of such waste.

### **REGULATED MEDICAL WASTE**

This type of waste should not come to WM facilities. Nevertheless, it sometimes does. When it does, WM is required to separate it and deal with it in specific ways or perhaps be fined. More importantly, this waste can be dangerous to employees.

Regulated medical waste comes from medical institutions such as hospitals. It is subject to local, state, and federal laws that restrict how it is disposed.

Regulated medical waste includes sharps and items potentially contaminated with blood or OPIM. Such waste can expose employees if they touch the blood or OPIM and then touch broken skin or their eyes, nose, or mouth. Blood or OPIM can also be splattered into the eyes, nose, and mouth.

### **UNREGULATED MEDICAL WASTE**

This type of waste comes from places other than medical institutions. One example is medical waste generated in the home. In many states, unregulated medical waste may be disposed into the solid waste stream under certain conditions.

### **SHARPS WASTE**

Sharps waste can be from a regulated or an unregulated source. Sharps are syringes, needles, or other sharp objects that potentially have been exposed to blood or OPIM. Always treat syringes and needles as if contaminated unless they are in a container labeled “disinfected,” “sterilized,” or “treated as to render the sharps as non-contaminated.” Only trained, designated personnel are authorized to clean up and dispose of sharps.

### **RED PLASTIC BAGS**

These bags may contain any of the items listed below.

- Liquid or semi-liquid blood or OPIM
- Pathological and microbiological waste containing blood or OPIM
- Contaminated items that could release blood or OPIM in a liquid or semi – liquid state if compressed
- Items that are caked with dried blood or OPIM and could release these materials during handling
- Chemotherapeutic waste
- Filled sharps containers

## **CONTAMINATED SHARPS AND/OR MSW POTENTIALLY CONTAMINATED WITH BLOOD OR OPIM**

Containers for these materials must be discarded as soon as possible in other containers that meet the criteria listed below.

- Closeable
- Puncture resistant
- Leakproof (sides and bottom)
- Properly labeled or color-coded

Containers for potentially contaminated materials must meet the criteria listed below.

- Easily accessible
- Located as close as possible to the area where sharps might be found
- Kept upright
- Replaced routinely; not overfilled

When moving containers, they must meet the criteria listed below.

- Be closed just prior to moving
- Be placed in secondary leakproof and puncture-resistant container (if leakage or puncture is possible) that must also meet all of the required characteristics of the primary container.

Reusable containers must not be opened, emptied, or cleaned in a manner that poses a risk of occupational exposure or percutaneous (through the skin) injury.

## **THE INCIDENT RESPONDER**

If sharps, blood, or OPIM is discovered, only Incident Responders are allowed to clean up or handle it. This includes syringes or needles, sharps containers, red-bagged or loose medical waste, spilled blood, or OPIM.

## **SPILL KIT**

Each incident responder should keep a spill kit and PPE supplies immediately available. Spill kits should include the items listed below. You can order these through your PPE provider.

- Medical Waste (red) Bags
- Sharps Container
- Absorbent/Liquid Trapping Material
- Single-Use Whisk Broom and Dust Pan
- Latex Gloves
- Eye Protection (goggles and/or glasses with solid side shields)
- Hypochlorite Solution (pre-mixed)
- Anti-Microbial Waterless Hand Cleaner

## GENERAL PROCEDURES FOR CLEANING UP SHARPS, BLOOD, OPIM, AND OTHER MEDICAL WASTE

If an employee sees sharps or other potentially contaminated items that could expose employees,

- the work process is stopped immediately and
- the incident responder is notified.

The Incident Responders will follow the general procedures listed below:

- Assess the situation and assume responsibility for the removal and disposal.
- Determine what PPE should be used, basing decision on size and location of cleanup. At a minimum, wear puncture-resistant gloves and protective eyewear.
- Retrieve spill kit materials and other items needed for clean up. Items needed depend on extent of cleanup and may include
  - Red bags, sharps containers, pails, and transport boxes.
  - Absorbent and disinfectant.
  - Wipes or disposable rags.
- Containers such as bleach bottles in which needles have been placed (for instance by a home- or self-injector) may be discovered. Such containers sometimes show up in the recycling stream or break open in the MSW stream. Such containers must not be opened. Place such containers in an approved medical waste receptacle. (See *Specific Procedures for Cleaning Up Sharps, Blood, OPIM, and Other Medical Waste* below.)
- If a red bag is discovered and its contents are contained, pick up the bag by its tied-up top and place it into the medical waste transport box.
- Use mechanical devices, such as tongs, dustpans, and brooms to contain and deposit small amounts of medical waste into disposal containers.
- Use mechanical devices such as front loaders, shovels, and brooms (if possible) to contain and deposit large amounts of medical waste into disposal containers.
- Disinfect mechanical devices after use, using the procedure for disinfecting potentially contaminated surfaces. (See *Specific Procedures for Cleaning Up Sharps, Blood, OPIM, and Other Medical Waste* below.)
- Never transport contaminated sharps from the location they were found unless properly contained in a sharps container.
- For decontamination, use
  - 1 part hypochlorite (bleach) to 10 parts water (mixed shortly before use in plastic containers) or
  - an EPA registered tuberculocidal disinfectant.

**Note: The EPA has created a list of appropriate surface disinfectants for blood or OPIM. (See list B or E at <http://www.epa.gov/oppado01/chemregindex.htm>.)**

- Always follow the manufacturer's directions when using cleaners and disinfectants.
- Once waste is removed and disinfecting is complete, all equipment, receptacles intended for reuse, and environmental surfaces must be disinfected if blood or OPIM contamination has occurred.

## **SPECIFIC PROCEDURES FOR CLEANING UP SHARPS, BLOOD, OPIM, AND OTHER MEDICAL WASTE**

Generally, medical waste at WM facilities shows up in four places.

1. A transfer station or landfill as solid waste
2. On a Materials Recovery Facility (MRF) or sorter line and mechanical operations
3. On a Municipal Solid Waste (MSW) route
4. In the body of refuse collection vehicles servicing commercial and residential routes.

Incident Responders who perform duties in the situations listed below should review these procedures immediately.

### **Large Spills**

1. Block off the area to reduce potential of slips or falls.
2. Put on PPE.
2. If the surface has a large amount of blood or OPIM contamination, pour disinfectant onto spill and let sit for 10 minutes. If spill has dried, area may need to soak for a longer time.
3. Place absorbent over the spill to absorb fluid. Once absorbed, sweep or scoop into dustpan or shovel. You can use commercial absorbents containing disinfectant or those such as kitty litter.
4. Place material swept or scooped up into a red plastic bag. If broken glass or other sharps are involved, place the material into sharps container.
5. Spray or soak contaminated surface with disinfectant again and let air-dry.
6. Clean the surface with a detergent cleaner.

### **Mopping Floors**

1. Wear an apron, gloves, goggles, and a face shield.
2. Use a disinfectant / decontamination solution (see General Procedures).
3. Be very careful when handling mop water.
4. Post signs to alert workers when floors are being wetted.
5. Use a mop with a head that can be removed mechanically, rather than by hand.
6. After mopping an area, remove the mop head from the handle and dispose of the head as you would medical waste.
7. Always wear neoprene or butyl rubber gloves when handling cleaning equipment.
8. Carefully pour the used mop water down the drain if allowed by local regulations.
9. Disinfect the mop container as described for contaminated surfaces.

### **Small Spills or Contaminated Surfaces**

1. Put on PPE.
2. Spray or wet surface with cleaner/disinfectant and wipe up.
3. Discard wipe.
4. Spray or wet surface with disinfectant and let air-dry.

### **Carpet**

1. Put on PPE.
2. If spill is on carpeting, sprinkle with disinfecting absorbent, allow absorption according to directions.
3. If spill is dried, soak area before using absorbent.
4. Sweep or scoop up.
5. Clean area with appropriate cleaner.
6. Never vacuum absorbent placed on the spill.

## **MATERIALS RECOVERY FACILITY (MRF)/SORTER LINE AND MECHANICAL OPERATIONS**

### **Operator**

The employee (Sorter, Mechanic, Front Loader Operator, Tipping Floor Employee) who discovers the sharps, blood, or OPIM must follow the procedure below.

1. Immediately stop the line or process.
2. Secure the line so others will not be in danger.
3. Contact the Incident Responder for that shift immediately.

### **Incident Responder**

The Incident Responder must follow the procedure below.

1. Assess the situation.
2. Follow the General and Specific Clean Up Procedures in this **Guidance**.
3. Always perform a mechanical “search” for other needles or waste that might be hiding.

## **MUNICIPAL SOLID WASTE (MSW) ROUTE**

A. If medical waste (whether loose or in a container) is noted in a residential or commercial bin, the employee (e.g., Driver, Helper) and the Incident Responder must follow the procedures listed below.

### **Route Employee**

1. Do not pick up or touch the bin.
2. Notify dispatch or your supervisor as soon as possible. Provide this person with the address of the bin or container that could not be picked up.
3. Follow the procedure your site has identified to notify the customer that the container could not be picked up and what the customer should do to discard the medical waste.

### **Supervisor / Incident Responder**

1. Contact the identified customer regarding the medical waste and provide the information listed below.
  - Recycling or trash containers are not the place for medical waste such as sharps.
  - The medical waste should be removed from the recycling or trash container.
  - Provide appropriate WM number(s) or [www.wastemd.com](http://www.wastemd.com) so the customer can find an alternative way to dispose of his or her medical waste.

B. If a sharp is found in the hopper:

### **Route Employee**

1. Immediately notify dispatch or your supervisor.
2. DO NOT remove the sharp from the hopper.
3. Dump load in disposal area when appropriate.

### **Supervisor / Incident Responder**

1. Retrieve the sharp using procedures in this document.
2. Clean up hopper by putting on appropriate PPE and following the spill clean-up procedure.

C. If medical waste or more than a few sharps are found in the hopper:

**Route Employee**

1. Immediately notify dispatch or your supervisor.
2. DO NOT remove the medical waste or sharps from the hopper.

**Supervisor / Incident Responder**

1. Make arrangements for proper transport to a medical waste facility.
2. Clean up hopper by putting on appropriate PPE and following the spill clean-up procedure.

D. If medical waste has fallen to the ground from containers or hopper:

**Route Employee**

1. Immediately notify dispatch or your supervisor. Do not begin a clean-up procedure.

**Supervisor / Incident Responder**

1. Put on puncture-resistant gloves and other PPE.
2. Use tongs, a scoop, shovel, or other mechanical device to remove the material.
3. Place material in an approved labeled container and prepare for proper transport.
4. Dispose of material properly.
5. Decontaminate the area and equipment used as described in previous sections.
6. Remove gloves and other PPE and dispose of in approved manner.
7. Wash hands.

## WASTE CONTAINMENT AND DISPOSAL

Only Incident Responders using Universal Precautions are permitted to contain encountered medical waste. In this facility, regulated waste is contained, transported, and treated as described below.

### SHARPS CONTAINERS

Sharps containers must meet the criteria listed below.

- Puncture resistant.
- Able to be closed prior to removal.
- Leakproof on sides and bottom.
- Labeled biohazard or color-coded red.
- Easily accessible to personnel and located as close as possible to where sharps might be found.
- Maintained upright throughout use.
- Appropriate in size for devices and materials placed in them.
- Designed with an unobstructed opening that allows sharps to drop in easily.

When sharps containers are  $\frac{3}{4}$  full, secure the lid and ready the container for transport by the company used for medical waste disposal. Immediately replace the container with a new one.

**BIOHAZARD LABELED OR RED BAG LINED CONTAINERS**

This container stores and transports regulated waste (blood or OPIM) other than sharps. When used, tie up the bag and place in designated location for transport by company used for medical waste disposal. Immediately replace the container with a new one.

**REGULATED WASTE LABELING FOR TRANSPORT**

Before transport from this facility, most state environmental agencies require that waste containers be labeled. Individual states require different types of labeling. Each facility must contact state and local environmental agencies to clarify these regulations.

**SPECIFIC LOCATION OF BLOODBORNE PATHOGEN SPILL KITS, SHARPS CONTAINERS, AND RED BAGS**

Location: \_\_\_\_\_

Location: \_\_\_\_\_

Location: \_\_\_\_\_

Location: \_\_\_\_\_

**DISPOSAL CONTAINER LOCATIONS AND DOCUMENTATION**

Sharps containers, red bags and other containment systems used to contain sharps and other contaminated items are located:

Location: \_\_\_\_\_

Location: \_\_\_\_\_

Management of the regulated waste disposal process, including maintenance of documentation and assuring placing any required generator labels for this facility is coordinated by \_\_\_\_\_.

**HOUSEKEEPING CHECKLIST**

**SCHEDULE**

A written schedule for cleaning and decontaminating work sites is available.  (✓)

**HOUSEKEEPING PROCEDURES**

**CLEANING**

All equipment, environmental, and working surfaces are cleaned using appropriate disinfectants as soon as possible after known contamination.  (✓)

Reusable receptacles are inspected, decontaminated, and cleaned on a regularly scheduled basis and as soon as possible after visible contamination.  (✓)

Protective coverings are discarded at the ends of work shifts in which contamination could have occurred and as soon as possible after visible contamination.  (✓)

Sharps containers and other contaminated waste containers are available.  (✓)

Contaminated sharps containers meet the criteria listed below.

Closeable, puncture-resistant, leakproof (sides and bottom), properly labeled or color-coded, easily accessible, located as close as possible to the area where they are used or where sharps may be found, and kept upright.  (√)

Appropriate in size for devices and materials placed in them.  (√)

Designed with an unobstructed opening that allows sharps to drop in easily.  (√)

Closed prior to moving.  (√)

Not overfilled; routinely replaced when no more than 3/4 full.  (√)

Other non-sharps contaminated waste is carefully handled, contained, and discarded in accordance with applicable federal, state, and local regulations.  (√)

**LAUNDRY**

Contaminated laundry meets the criteria listed below.

Handled as little as possible.  (√)

Bagged at the location where it is used (sorting is not permitted).  (√)

Placed and transported in properly labeled or color-coded containers that prevent soak-through or leakage.  (√)

When contaminated laundry is decontaminated and laundered, it is appropriately bagged and labeled (biohazard sign) prior to off-site shipping. Otherwise, it is properly discarded.  (√)

**MISCELLANEOUS**

**Written Understanding**

Written understanding of potential occupational exposure hazards, decontamination procedures, and responsibilities of WM services exist.

Laundry service (name) \_\_\_\_\_  (√)

Other services \_\_\_\_\_  (√)

Person(s) responsible for documenting that the above written understanding has been provided to contracted services

(name) \_\_\_\_\_

**INCIDENT RESPONDERS**

Incident responders have been informed of and trained in complying with all the above housekeeping and clean-up requirements.  (√)

Person(s) responsible \_\_\_\_\_

\_\_\_\_\_

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## HEPATITIS B VACCINE, VACCINATION SERIES, AND POST-EXPOSURE EVALUATION

### HEPATITIS B VACCINATION

The hepatitis B vaccine is a safe, effective immunization against the hepatitis B virus (HBV). It must be **offered free of charge** only to all employees who may have occupational exposure to bloodborne pathogens, such as Incident Responders (see pages 5-7 of this **Guidance**) after they have participated in a required training program (See *Training*).

Employees at risk for Exposure have the option of declining the vaccine. However, any employee having Exposure who does not want to receive the vaccine must sign the *Hepatitis B Vaccination Series Consent or Declination Form*.

If the employee later decides to receive the vaccine, it still must be offered free of charge. New employees or employees whose job tasks have changed such that they become occupationally exposed must be offered the vaccination within **10 working days** of beginning the new job or task.

Hepatitis B vaccination must be made available to eligible employees at a reasonable time and place. It must be given or supervised by a licensed healthcare professional.

### VACCINATION SERIES

The vaccination series consists of three separate injections given over a six-month period. More than 90% of those vaccinated according to the recommended dosage schedule develop immunity to HBV.

The WM site must provide the healthcare professional who performs the employee's hepatitis B vaccination series with a copy or assuring the HCP has a copy of the OSHA Bloodborne Pathogens Standard. You can find the Standard at [www.osha.gov/SLTC/bloodbornepathogens/index.html](http://www.osha.gov/SLTC/bloodbornepathogens/index.html).

Employees who are exempt from the hepatitis B vaccination requirements are those who

- have received the hepatitis vaccination series,
- are immune to HBV, or
- have a medical reason not to have the vaccination series.

At the present time, booster doses of vaccine are not recommended. If in the future the US Public Health Service recommends a booster dose(s) of hepatitis B vaccine, such booster dose(s) must be made available free of charge to employees at risk for Exposure.



## Request for Treatment & Healthcare Professional's Written Opinion for Hepatitis B Vaccination

### Licensed Healthcare Professional

\_\_\_\_\_, an employee of \_\_\_\_\_, has potential ongoing occupational exposure to blood and OPIM. As required by OSHA's Bloodborne Pathogen Standard, CFR 29 1910.1030 (f)(5)(i), (included), we are requesting your written opinion regarding the following:

- Indication for the hepatitis B vaccination, and
- Whether the named employee has received the vaccination series at your facility, if so indicated.

Our employee must

- incur no costs related to this vaccination series including not filing employee or employee's spouse insurance.
- receive counseling as to the safety and efficacy of the vaccine.

Please send only the information listed below concerning our exposed employee in writing to this facility within 15 days of completed evaluation:

- If hepatitis B vaccination was indicated and given
- That employee has been informed of the results of the evaluation

For your convenience, we have included a way to document this information on page 2 of this form. Please complete page 2 and return it or equivalent to our facility.

Please contact: \_\_\_\_\_ at our facility regarding charges for this service or if further information is required.

Thank you.

\_\_\_\_\_  
WM Facility Manager or Supervisor

\_\_\_\_\_  
Date

### Written Opinion for Hepatitis B Vaccination

Please return this form within 15 days of completed evaluation of our employee to:

Facility Name: \_\_\_\_\_

Facility Address: \_\_\_\_\_

Facility Phone: \_\_\_\_\_

To the Attention of: \_\_\_\_\_

Today's Date: \_\_\_\_\_ Date of Evaluation: \_\_\_\_\_

Employee Name: \_\_\_\_\_

Employee's Employer: Waste Management

HCP Providing Service: \_\_\_\_\_

- Hepatitis B vaccination was indicated and given
- Employee has been informed of the results of the evaluation
- Employee has been informed of need for further evaluation or treatment

Date Hepatitis B vaccination was given: \_\_\_\_\_

\_\_\_\_\_  
Signature of HCP Providing Service      Date

Referring Facility Name: \_\_\_\_\_

**Provide copy of completed form to exposed employee and file in employee's medical record.**



## Employee Hepatitis B Vaccination Series Consent or Declination Form

(This form is mandatory.)

I, an employee of this facility, understand that due to my possible occupational exposure to blood or other potentially infectious material, I may be at risk of acquiring hepatitis B virus (HBV) infection if an exposure incident should occur. Hepatitis B virus is a viral infection with a major effect on the liver. Due to this potential, I have been offered the hepatitis B vaccination series that is 90% effective in preventing hepatitis B.

I understand that the vaccination series will include an initial dose followed by a 2nd dose one month later; 3rd dose taken six months after the first. Antibody testing is performed 2 months after the third dose to assure antibody production. An evaluation by a HCP as to the indication for the hepatitis B vaccination, potential side effects, contraindications, and answers to any questions that I may have will be provided before the series.

I have been informed that this vaccine and vaccination series will be provided

1. at no cost to me, the employee, and offered at a reasonable time and place.
2. under the supervision of a licensed physician, or by or under the supervision of another licensed healthcare professional.
3. in accordance with recommendations of the US Public Health Service.
4. with all laboratory tests conducted by an accredited laboratory at no cost to me, the employee.

### PLEASE SIGN CHOICE 1, 2, OR 3 BELOW.

1. I, \_\_\_\_\_ (Name of Employee), **CONSENT** to the hepatitis B vaccination series and follow-up as recommended by the US Public Health Service, offered by Waste Management, and as stated above.

\_\_\_\_\_  
Employee Signature

\_\_\_\_\_  
Date

I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future should I continue to have occupational exposure to blood or other potentially infectious material and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

2. I, \_\_\_\_\_ (Name of Employee), **DECLINE** the hepatitis vaccination series and follow-up.

\_\_\_\_\_  
Employee Signature

\_\_\_\_\_  
Date

3. I, \_\_\_\_\_ (Name of Employee), **DECLINE** the hepatitis vaccination series and follow-up because I have previously had the vaccination series.

\_\_\_\_\_  
Employee Signature

\_\_\_\_\_  
Date

Employee's Job Classification: \_\_\_\_\_

\_\_\_\_\_  
Supervisor Signature

\_\_\_\_\_  
Date

File signed copies in employee's confidential Employee Medical Record File.





# Employee Medical Record

(This or equivalent information is mandatory.)

This document is to be filed confidentially in the Employee Medical Record File.

This record is to be completed upon initial employment. It is not meant to be in itself a complete and current record. Subsequent records may be maintained in the employee's Medical Record File while the employee works at this facility.

Employee Name: Social Security #: \_\_\_\_\_

Date of Hire: \_\_\_\_\_ Separation: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Employee Address: \_\_\_\_\_

Employee Phone: \_\_\_\_\_

### HEPATITIS B VACCINATION INFORMATION

Dates of Vaccination: 1) \_\_\_\_\_ 2) \_\_\_\_\_ 3) \_\_\_\_\_

Type of Vaccine: \_\_\_\_\_

Healthcare Professional provider of vaccine: \_\_\_\_\_

Dates of Vaccination: 1) \_\_\_\_\_ 2) \_\_\_\_\_ 3) \_\_\_\_\_

If employee is exempt from the hepatitis B vaccination, check the reason for exemption below.

- Vaccination previously taken (fill in dates above)
- Antibody testing shows the employee immune
- Vaccine cannot be given for medical reasons

Date and descriptions of previous exposures to blood or OPIM: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Employee Signature \_\_\_\_\_

Date \_\_\_\_\_

File & maintain form in employee's medical record file 30 years plus employment

## POST-EXPOSURE EVALUATION AND FOLLOW-UP

Any employee who has had an **exposure incident** (see *Appendix A: Definitions*) must be offered a post-exposure evaluation and follow-up. The evaluation and follow-up must be free of charge, at a reasonable time and place, under the supervision of a licensed healthcare professional (physician, nurse), and according to current US Public Health Service recommendations.

Following an exposure incident, the **confidential** medical evaluation and follow-up must be made immediately available to the affected employee. Such evaluation and follow-up must include all of the following:

- Documentation of route(s) of exposure and circumstances under which the incident occurred.
- Identification and documentation of the source individual where feasible (unless prohibited by law).
- Immediate testing of source individual's blood (after obtaining written consent) to determine HBV, HCV, and HIV status if available.
  - Results of testing must be made available to the affected employee along with applicable laws/regulations prohibiting disclosure of identity and clinical status of the source individual.
- Determination of affected employee's HBV, HCV, and HIV status.
  - Blood testing must be initiated as soon as possible after consent is obtained.
  - Employee may elect to have baseline blood drawn but delay a decision concerning testing on that blood specimen. In such instance, the blood specimen must be preserved for at least ninety days, whereupon it may be discarded.
- Post-exposure prophylaxis, if indicated, per U.S. Public Health Service guidelines.
- Employee counseling.
- Medical evaluation of any employee-reported illnesses.
- Inclusion of exposure incident on OSHA 300 Injury/illness Log.

## HEALTHCARE PROFESSIONAL'S WRITTEN OPINION

The WM site must obtain and provide the exposed employee with a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation. The written opinion must be limited to indicate if the employee should receive hepatitis B vaccination and if such vaccination has been given. The healthcare professional's written opinion concerning post-exposure evaluation and follow-up must be limited to an indication that the exposed employee has been informed of the results of the evaluation and has been told about any medical conditions resulting from Exposure which may require further evaluation or treatment.

All of the findings or diagnoses must remain confidential and must not be included in the written report.



## Post-Exposure Procedures Checklist

(Completion of all Post-Exposure Procedures is mandatory. Check boxes that apply.)

Date of Incident: \_\_\_\_\_ Incident #: \_\_\_\_\_

Follow these procedures if an employee is exposed to blood or other potentially infectious material through

- parenteral contact (contaminated sharp object punctures the skin),
- mucous membrane contact (blood or OPIM in the eyes, nose, or mouth), or
- non-intact skin contact (blood or OPIM on rash, hangnails, etc.).

### Employee

- Wash skin with soap and water; rinse mucous membranes.
- Identify the source of the contamination if known. (The source is the person whose blood or body fluid [through needle or other medical waste] came in contact with the exposed employee.)
- Notify supervisor immediately. (Some post-exposure prophylactic regimens should be started within 2 hours of exposure.)

### Employer

- Consult with exposed employee regarding incident and HCP referral.
- Complete Exposure Incident Report with employee: copy for HCP; file original.
- Have employee sign Employee Post-Exposure Consent/Declination and file (permission or refusal to test/treat).
- Refer Employee to HCP and have employee (if consents to treatment) take the following documents.
  - Copy of OSHA's Bloodborne Pathogen Standard (29 CFR 1910.1030)
  - "Request for Treatment/HCP Written Opinion" for HCP to sign and return
  - Applicable employee medical records, including hepatitis vaccination status. If records are given by this facility to anyone but the exposed employee, a signed authorization (Medical Records Release Form) must be received from employee first.
  - Copy of Incident Report
- Contact source, if possible, to explain the ramifications of disposal of medical waste into the solid waste/recycling stream. Provide alternative solutions for the disposal of medical waste. If possible, have source sign Source Consent/Declination; file permission/refusal to test blood.
- Received HCP's written opinion within 15 days and file in employees medical record file
- Provided HCP's written opinion to employee within 15 days of receipt by this facility
- Make any necessary changes to procedures and the Bloodborne Pathogen Exposure Control Plan

Supervisor Signature \_\_\_\_\_

Date \_\_\_\_\_

File completed form in exposed employee's medical record file.



# Employee Bloodborne Exposure Incident Report

(This or equivalent information is mandatory.)

Today's Date: \_\_\_\_\_ Date of Exposure: \_\_\_\_\_ Incident Report #: \_\_\_\_\_

Exposed Employee: \_\_\_\_\_ Employee SS#: \_\_\_\_\_

Employee tasks relating to this incident: \_\_\_\_\_

In what location of the facility did the incident occur? \_\_\_\_\_

Type (route) of exposure (through the skin, as in a puncture or cut; mucous membrane; or non-intact skin exposure):

Exact location of exposure (e.g., Tip of third finger on right hand): \_\_\_\_\_

Body fluid to which employee was exposed:

Questions	Yes	No
Source individual identified?		
Source individual's HIV, HCV, HBV status known?		
Source individual consent for testing received?		
Has exposed employee been tested for HBV, HCV, HIV?		
Date(s) of testing: HBV _____ HCV _____ HIV _____		
Has exposed employee been vaccinated for HBV?		
Vaccination Dates: 1 <sup>st</sup> _____ 2 <sup>nd</sup> _____ 3 <sup>rd</sup> _____ Titer _____		

Exposed Employee: Please explain in detail the circumstances under which the incident happened. Use back if needed. \_\_\_\_\_

Include the following with this report to the HCP:

- OSHA Bloodborne Pathogen Standard
- Source blood test results (if available)
- Employee's relevant medical records

I, the exposed employee, have read and agree with this report as filed. I understand that this report will be maintained in my confidential medical record for the length of my employment plus 30 years.

Exposed Employee Signature \_\_\_\_\_

Date \_\_\_\_\_

Supervisor Signature \_\_\_\_\_

Date \_\_\_\_\_

File completed form in employee's confidential medical record file.



## Medical Waste Disposal Source Identification

Today's Date \_\_\_\_\_ Date of discovered medical waste: \_\_\_\_\_

Employee who found waste: \_\_\_\_\_

Identified source of waste:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Route (if applicable): \_\_\_\_\_

Location and description of waste received; job task being performed when discovered; and circumstances surrounding the discovery/exposure (e.g., needles, blood-soaked items found in plastic container):

Location: \_\_\_\_\_

Description of waste: \_\_\_\_\_

Job task: \_\_\_\_\_

Circumstances: \_\_\_\_\_

Action taken (every attempt should be made to identify the source of medical waste found in the solid/recyclable waste stream. The source should be informed of potential dangers these disposal practices present and provided other alternatives for disposal of this waste. It is especially important to identify the source if a WM employee has been exposed to medical waste through a needlestick, or blood on broken skin or in the eyes, nose, or mouth):

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Comments:

\_\_\_\_\_  
 \_\_\_\_\_

Supervisor Signature: \_\_\_\_\_

Location of file: \_\_\_\_\_

File this form.



## Source Individual Testing Consent or Declination Form

Date \_\_\_\_\_

I, \_\_\_\_\_, have been informed that an exposure incident involving an employee of \_\_\_\_\_ has occurred while handling medical waste containing my blood or other potentially infectious material on \_\_\_\_\_ (date).

As required by law, I have been requested to consent to testing my blood for possible infection with HIV and hepatitis B and C. I have been informed that this testing is to alleviate concerns and anxiety of the exposed employee as well as to allow healthcare professionals to proceed with appropriate medical evaluation and treatment of the employee if needed. I have also been informed that, as required by law, the results of these tests will remain confidential between the exposed employee and me.

I, \_\_\_\_\_, consent to having hepatitis B, C, and HIV testing performed under the conditions stated above.

\_\_\_\_\_  
Signature of consenting source individual

\_\_\_\_\_  
Date

I, \_\_\_\_\_, refuse to consent for testing to determine my hepatitis B, C and HIV state of infection.

\_\_\_\_\_  
Signature of consenting source individual

\_\_\_\_\_  
Date

File in exposed employee's confidential medical record file.



## Employee Post-Exposure Evaluation & Follow-Up Consent or Declination Form

(This or equivalent information is mandatory.)

I, \_\_\_\_\_, an employee of this facility, have been offered a post-exposure confidential medical evaluation and follow-up due to the exposure incident involving blood or other potentially infectious material, which occurred on \_\_\_\_\_ (date).

- I have been informed that this evaluation and follow-up will be conducted under the circumstances listed below.
- At no cost to me, the employee; and offered at a reasonable time and place
  - Provided under the supervision of a licensed physician, or by or under the supervision of another licensed healthcare professional
  - Provided in accordance with recommendations of the US Public Health Service
  - Provided with all laboratory tests conducted by an accredited laboratory at no cost to me, the employee

I have been informed that

- I will be notified of the source individual's HIV, HCV, and HBV status (if available), and by law, must keep that information confidential.
- I will receive post-exposure prophylaxis, when medically indicated, as recommended by the US Public Health Service.
- I will receive counseling and evaluation of reported illnesses.
- I will receive a copy of the evaluating healthcare professional's written opinion within 15 days of its receipt by this facility.
- Results of all **blood testing will remain confidential** and will not be released by Waste Management without my written permission.
- If I consent to baseline blood testing, but not HIV testing, my blood is held for 90 days and tested, if I make that choice within that time.

**Complete one choice below.**

I, \_\_\_\_\_, consent to having post-exposure evaluation and follow-up as offered by Waste Management, \_\_\_\_\_, as stated above.

\_\_\_\_\_  
Signature of exposed employee

\_\_\_\_\_  
Date

I, \_\_\_\_\_, refuse to consent to having post-exposure evaluation and follow-up as offered by Waste Management, \_\_\_\_\_, as stated above.

\_\_\_\_\_  
Signature of exposed employee

\_\_\_\_\_  
Date

**File completed form in employee's confidential medical record file.**



## Healthcare Professional's Written Opinion Request for Treatment of Employee Exposed to Blood or Other Potentially Infectious Material

(This or equivalent information is mandatory.)

### Licensed Healthcare Professional:

\_\_\_\_\_, an employee of Waste Management, has suffered an injury that could potentially subject this employee to bloodborne pathogens. We have included all pertinent information required according to the OSHA Standard, 29 CFR 1910.1030.

### You will be provided:

- A copy of the OSHA Standard 29 CFR 1910.1030 (unless previously provided)
- An exposure incident report which includes:
  - Documentation of how the exposure occurred and route of entry
  - Source individual's blood test results, if known (otherwise, source will need to be tested at your facility, if applicable)
- A copy of relevant employee medical records include vaccination status

### Please assure that our exposed employee:

- Is seen immediately
- Incurs no costs related to this incident (our facility will pay for services provided)
- Receives results of source's testing, if identified (employee must be informed of confidentiality laws concerning the source)
- Receives blood testing for HBV, HCV and HIV if consent is given
- Receives any medically indicated post-exposure prophylaxis as currently recommended by CDC/Public Health Service
- Receives counseling and evaluation of reported illnesses

### Please send only the following information concerning our exposed employee in writing to this facility within 15 days of completed evaluation:

- If hepatitis B vaccination was indicated and given
- That employee has been informed of the results of the evaluation
- That employee has been informed of need for further evaluation or treatment as a result of this incident

Please contact \_\_\_\_\_ at our facility regarding charges for this service or if further information is required. Thank you.

\_\_\_\_\_  
Signature of Waste Management Representative

\_\_\_\_\_  
Date



## Written Opinion for Post-Bloodborne Pathogen Exposure

(This or equivalent information is mandatory.)

Please return this form within 15 days of completed evaluation of our employee to:

Facility Name: \_\_\_\_\_

Facility Address: \_\_\_\_\_

Facility Phone: \_\_\_\_\_

To the Attention of: \_\_\_\_\_

Today's Date: \_\_\_\_\_ Date of Evaluation: \_\_\_\_\_

Employee: \_\_\_\_\_

Employee's Employer: \_\_\_\_\_

Healthcare Professional Providing Service: \_\_\_\_\_

**Check boxes below as appropriate.**

- Hepatitis B vaccination was indicated and given
- Employee has been informed of the results of the evaluation
- Employee has been informed of need for further evaluation or treatment as a result of this incident
- Hepatitis B vaccination was given on this date: \_\_\_\_\_

\_\_\_\_\_  
Signature of Healthcare Professional Providing Service

\_\_\_\_\_  
Date

Referring Facility Name: \_\_\_\_\_

**Provide copy to exposed employee, and file in Medical Record.**



### Authorization Letter for the Release of Employee Medical Record Information to a Designated Representative

(Mandatory for release of medical records to anyone other than the named employee.)

I, \_\_\_\_\_ (*full name of worker*), hereby authorize \_\_\_\_\_ (*name of facility*) to release the following medical information from my personal medical records (*Describe generally the information desired to be released*): \_\_\_\_\_

I give permission for this information to be release only to the following (*person(s) or facility to whom records being released*):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I give my permission for this medical information to be used for the following purpose(s):

\_\_\_\_\_  
\_\_\_\_\_

However, I do not give permission for any other use or re-disclosure of this information.

This letter is valid until \_\_\_\_\_.  
(Expiration date of letter)

\_\_\_\_\_  
Full name of Employee or Legal Representative

\_\_\_\_\_  
Date of Signature

\_\_\_\_\_  
Signature of Employee or Legal Representative

\_\_\_\_\_  
Date of Signature

\_\_\_\_\_  
Facility Name

**File signed letter in employee's confidential medical record file.**

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## TRAINING

To comply with OSHA's Bloodborne Pathogen Standard, WM provides two types of training for its employees.

1. Awareness Training for all employees whose job tasks bring them into direct contact with MSW and/or recyclables but who are not allowed to handle sharps, blood, or OPIM
2. Incident Responder Training for those WM designates as employees who will be responsible for the clean up or removal of MSW or recyclables potentially containing sharps, blood, or OPIM

This facility will ensure that all employees with occupational exposure participate in training under the conditions listed below.

- At no cost to the employee and during working hours
- At the time of initial assignment to tasks where occupational exposure may take place, and at least annually thereafter
- If modification of employee's at-risk tasks occur
- If addition of a new task presenting at-risk potential occurs

### AWARENESS TRAINING

Awareness training is required for all employees who are in job positions where contact with MSW or Recycling occurs, but who are not Incident Responders or allowed to handle sharps, blood, or OPIM.

Any part-time, temporary, contract and per-diem employees hired to perform tasks requiring direct contact with MSW or recycling will be provided Bloodborne Pathogen Awareness Training by their employer who will assume responsibility to provide post-exposure procedures.

Components of this training are listed below.

- Material appropriate in content, vocabulary, educational level, literacy, and language of employees
- Explanation of the contents of the Bloodborne Pathogen Standard
- Explanation of epidemiology and symptoms of bloodborne disease
- Explanation of the modes of transmission of BBPs and why avoiding contact with medical waste is important
- How to recognize untreated medical waste
- Explanation of the labeling and color-coding used to indicate untreated medical waste
- Explanation of how to avoid contact with medical waste
- How to report the discovery of untreated medical waste
- Explanation of the procedure to follow if an exposure occurs including method of reporting and medical follow-up available
- Information on post-exposure procedures if an exposure occurs, the benefits of being vaccinated, and that the vaccine and other procedures are free to the employee.
- A trainer knowledgeable in the elements involved in this training program as it relates to this particular facility
- Opportunity for interactive questions and answers with the person conducting the training

## TRAINING FOR OCCUPATIONALLY EXPOSED EMPLOYEES (INCIDENT RESPONDERS)

Training for employees in job positions where exposure to blood or OPIM exists (Incident Responders) must include the items listed below.

- Material appropriate in content, vocabulary, educational level, literacy, and language of employees
- Explanation of the contents of the Bloodborne Pathogen Standard
- General explanation of epidemiology and symptoms of bloodborne disease
- Explanation of the modes of transmission of BBPs and why avoiding contact with medical waste is important
- Explanation of the Exposure Control Plan and how the employee may obtain a copy
- Explanation of how to recognize tasks and other activities that may involve exposure to blood or OPIM
- Explanation of the use and limitations of methods that will prevent or reduce exposure, including engineering and work practice controls
- How to recognize untreated medical waste
- Explanation of how to avoid contact with medical waste
- How to report the discovery of untreated medical waste
- Information on the types, proper use, location, removal, handling, decontamination, limitations, and disposal of PPE
- Detailed explanation of the basis for selection of PPE
- Information on the value, safety, and method of administration of the hepatitis B vaccine; the benefits of being vaccinated if indicated; and that the vaccine is free to employees determined to have occupational exposure
- Information on the proper actions to take and person to contact in an emergency involving blood or OPIM
- Explanation of the procedure to follow if an exposure occurs including method of reporting and medical follow-up available
- Explanation of the federal, state, and local laws regarding disposal of medical waste including disposal from the home
- A trainer knowledgeable in the elements involved in this training program as it relates to this particular facility
- Opportunity for interactive questions and answers with the person conducting the training

## TRAINING MATERIALS

Videos that comply with the requirements of the Standard may be used as well as PowerPoint presentations available on WMVisor. Other training materials used may include computer, on-the-job, and “tool box” training sessions. To assure all components are covered, the BBP training programs used at this facility will address all topics required by the Standard.

## TRAINING DOCUMENTATION

Each employee being trained must sign a training documentation form.

- **Bloodborne Pathogen Incident Responder Training Documentation Form** is to be used for employees who have occupational exposure.
- **Bloodborne Pathogen Awareness Training Documentation Form** is to be used for employees who do not have occupational exposure,
- **Retraining or Update Training Documentation Form** is to be used for specific training and retraining.

Copies of the training program, training documentation forms, trainer qualifications, and any tests given shall be maintained for a minimum of three years from the date of training.

The Person(s) Responsible for training \_\_\_\_\_.

The specific location for training materials \_\_\_\_\_

OSHA may require you to provide

- copies of your site's OSHA 200/300 needlestick log,
- all training materials, including documentation, and
- a copy of your ECP.



## Bloodborne Pathogen Incident Responder Training Documentation Form

(This form is mandatory following training for Occupationally Exposed Employees.)

Trainer and qualifications: \_\_\_\_\_

Title and Summary of Session: “Bloodborne Pathogen Training for Occupationally Exposed Employees”

- Material appropriate in content, vocabulary, educational level, literacy, and language of employees  
Specific explanation of the contents of the Bloodborne Pathogen Standard
- General explanation of epidemiology and symptoms of bloodborne disease
- Specific explanation of the modes of transmission of bloodborne pathogens and why avoiding contact with medical waste is important
- Complete explanation of this Bloodborne Pathogen Exposure Control Plan and how the employee may obtain a copy
- Detailed explanation of how to recognize tasks and other activities that may involve exposure to blood or OPIM
- Thorough explanation of the use and limitations of methods that will prevent or reduce exposure, including engineering and work practice controls
- How to recognize untreated medical waste
- Specific explanation of how to avoid contact with medical waste
- How to report the discovery of untreated medical waste
- Information on the types, proper use, location, removal, handling, decontamination, limitations, and disposal of PPE
- Detailed explanation of the basis for selection of PPE
- Information on the value, safety, and method of administration of the hepatitis B vaccine; the benefits of being vaccinated; and that the vaccine is free to the employee
- Information on the proper actions to take and person to contact in an emergency involving blood or OPIM
- Full explanation of the procedure to follow if an exposure occurs including method of reporting and medical follow-up available
- Detailed explanation of the labeling and color-coding used
- Complete explanation of the federal, state, and local laws regarding disposal of medical waste, including disposal from the home
- An opportunity for interactive questions and answers with the person conducting the training
- A trainer knowledgeable in the elements involved in this training program as it relates to this particular facility



## Bloodborne Pathogen Awareness Training Documentation Form

(This form is mandatory following training for employees whose job tasks bring them into direct contact with MSW and/or recyclables but who are not trained or designated to handle sharps, blood, or OPIM.)

Trainer and qualifications: \_\_\_\_\_

Title and Summary of Session: "Bloodborne Pathogens Awareness."

- Material appropriate in content, vocabulary, educational level, literacy, and language of employees
- Specific explanation of the contents of the Bloodborne Pathogen Standard
- General explanation of epidemiology and symptoms of bloodborne disease
- Specific explanation of the modes of transmission of Bloodborne pathogens and why avoiding contact with medical waste is important
- How to recognize untreated medical waste
- An explanation of the labeling and color-coding used to indicate untreated medical waste
- Specific explanation of how to avoid contact with medical waste
- How to report the discovery of untreated medical waste
- Full explanation of the procedure to follow if an exposure occurs including method of reporting and medical follow-up available
- Information on post-exposure procedures if an exposure occurs, the benefits of being vaccinated, and that the vaccine and other procedures are free to the employee
- An opportunity for interactive question and answers with the person conducting the training
- A trainer knowledgeable in the elements involved in this training program as it relates to this particular facility







## Retraining or Update Training Documentation Form

**Trainer and Qualifications:** \_\_\_\_\_

**Title and Summary of Session:** \_\_\_\_\_

**Type of Training:**

- |  |   |
|--|---|
| <input type="checkbox"/> Retraining on this topic<br><input type="checkbox"/> Training on updated information<br><input type="checkbox"/> Retraining following an incident<br><input type="checkbox"/> Training on new technology (e.g., safety devices) | <input type="checkbox"/> Training on new procedure<br><input type="checkbox"/> Training on new assignment<br><input type="checkbox"/> Other _____<br><input type="checkbox"/> Other _____ |
|--|---|

### Persons Attending Session

Signature	Printed Name	Job Title	Date

Trainer \_\_\_\_\_ Date \_\_\_\_\_

File signed form, place in training file, and maintain for 3 years.

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## APPENDIX A: DEFINITIONS

**Assistant Secretary** means the Assistant Secretary of Labor for Occupational Safety and Health, or designated representative.

**Blood** means human blood, human blood components, and products made from human blood.

**Bloodborne Pathogens** means pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

**Clinical Laboratory** means a workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious materials.

**Contaminated** means the presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.

**Contaminated Laundry** means laundry that has been soiled with blood or other potentially infectious materials or may contain sharps.

**Contaminated Sharps** means any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.

**Decontamination** means the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

**Director** means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designated representative.

**Engineering Controls** means controls (e.g., sharps disposal containers, self-sheathing needles, safer medical devices, such as sharps with engineered sharps injury protections and needleless systems) that isolate or remove the bloodborne pathogens hazard from the workplace.

**Exposure Incident** means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.

**Hand-Washing Facilities** means a facility providing an adequate supply of running potable water, soap and single use towels or hot air drying machines.

**HBV** means hepatitis B virus.

**HIV** means human immunodeficiency virus.

**Licensed Healthcare Professional (HCP)** is a person whose legally permitted scope of practice allows him or her to independently perform the activities required by paragraph (f) Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-up.

**Occupational Exposure** means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

**Other Potentially Infectious Materials (OPIM)** means the following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids.

**Parenteral** means piercing mucous membranes or the skin barrier through such events as needlesticks, human bites, cuts, and abrasions.

**Personal Protective Equipment (PPE)** is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

**Regulated Waste** means liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.

**Sharps** means any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, and box cutters contaminated with blood or OPIM.

**Source Individual** means any individual whose blood or other potentially infectious materials may be a source of occupational exposure to the employee.

**Standard Precautions** means human blood and ALL body fluids (not just OPIM - see definition of OPIM) are treated as if they have HIV, HBV, HCV, and other BBPs, no matter whose blood or OPIM it is.

**Universal Precautions** is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

**Work Practice Controls** means controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).



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## Substance Abuse Program

**Program: Substance Abuse**

**Facility: Kekaha Sanitary Landfill**

**Facility Location: 6900 D Kaunualii Highway, Kekaha, HI 96752**

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### SUBSTANCE ABUSE

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# **SUBSTANCE ABUSE PROGRAM**

FOR

**COMPANY EMPLOYEES**

AND

**CANDIDATES FOR EMPLOYMENT**

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# DRUG AND ALCOHOL POLICY STATEMENT

## INTRODUCTION

Waste Management (WM or Company) is committed to providing employees with a safe and healthy work environment. To ensure safety for employees, customers and the communities in which it operates, WM has taken a zero tolerance approach to substance abuse.

Substance abuse

- Increases the risk of workplace injuries and incidents
- Affects the health and well being of the user
- Lowers productivity and quality

WM uses the federal drug-testing model for its Substance Abuse Program. This federal drug testing model is detailed in 49 CFR, Parts 40 and 382.

Some states or locales may have certain limits on drug and/or alcohol testing not covered by federal drug testing policy. Where needed, this policy will be changed as required by local and/or state laws.

**WASTE MANAGEMENT IS COMMITTED TO MAINTAINING A WORKPLACE THAT IS FREE FROM THE INFLUENCE OF DRUGS AND ALCOHOL ABUSE.**

## SUBSTANCE ABUSE POLICY

No person may

- use
- sell
- make
- handle
- purchase
- transfer
- possess
- consume
- inhale
- transport

or otherwise be involved with drugs or alcohol while on WM property or while operating WM vehicles.

“Drugs and alcohol” includes

- controlled substances
- illegal drugs
- legal drugs illegally used
- intoxicants
- drug paraphernalia
- alcohol

In addition, no employee may work while under the influence of alcohol or drugs. For purposes of this policy “under the influence” means a positive test as determined by the testing lab.

**MEDICATIONS** Employees taking medication that will affect their ability to work safely are required to give their supervisor a statement from the doctor who prescribed the medication. This statement must:

- say that the medication was prescribed with full knowledge of their job duties and
- give recommendations for appropriate work modification

WM does not want to know the name of the medication or why it was prescribed. Employees should have their doctor sign the form included at the end of this document. (See Appendix B for *Physician Statement Regarding Prescription Medication*)

Employees should not take another person's medication. Doing so is illegal. In addition, this might result in a positive drug test and corrective action will result.

**LEGAL DRUGS** Legal drugs illegally used means

**ILLEGALLY  
USED**

- drugs that are not prescribed for the employee or
- drugs that are not taken as prescribed by the employee's doctor

**DRUG  
PARAPHERNALIA** Drug Paraphernalia means any item used to perform any of the actions listed below with regard to drugs.

- use
- sell
- make
- handle
- possess
- consume
- inhale
- transport

**WASTE  
MANAGEMENT'S  
RIGHTS** WM has the right, at all times, to inspect

- all persons,
- their property, and
- WM provided property

prior to entering, while on, and when leaving WM property. Illegal drugs found in or on WM property or vehicles will be turned over to the appropriate law enforcement officials.

**DEFINITION OF DRUGS**

For the purpose of this Policy, “drugs” means any

- controlled substances
- illegal drugs
- legal drugs illegally used
- drug paraphernalia
- intoxicant
- alcohol
- prescription medication
- over-the-counter medication

that if abused, may lead to physical or psychological dependence.

**ADULTERATED OR SUBSTITUTED RESULTS**

Adulterated means contaminated. Substituted means replaced. If a urine specimen has been contaminated, tampered with, or replaced, WM’s Medical Review Officer (MRO) will report it to the Designated Employee Representative (DER) as a refusal to test. A refusal to test is considered the same as a positive test.

**REFUSAL TO TEST**

Employees who refuse to take a drug or alcohol test upon request or when scheduled are terminated.<sup>1</sup>

**EXCEPTIONS**

WM may allow alcohol to be used at WM functions.

An employee may work while taking a drug IF the drug

- has been prescribed by a doctor,
- is being used as directed by the doctor,
- does not reduce the ability to work safely and efficiently, and
- does not pose a risk to workplace safety.

If the drug could prevent the employee from working safely and efficiently, he or she must tell his or her supervisor or Human Resources Representative without delay.

In some instances, the employee may be required to provide a medical statement regarding their ability to safely perform job duties.

**COST**

WM pays all costs for drug and alcohol testing required by WM. This includes pre-employment testing for candidates.

---

<sup>1</sup> unless otherwise directed in any collective bargaining agreement

## PREVENTING SUBSTANCE ABUSE

To maintain a workplace that is free from drugs and alcohol, WM uses a Substance Abuse Program. This program includes:

- education,
- training, and
- drug and alcohol testing

## EDUCATION

Employees learn about

- WM's drug and alcohol policy.
- The health effects of drugs and alcohol.
- WM's Employee Family Assistance Program (EFAP) for substance abuse problems.

See below for more information on the EFAP.

## TRAINING

WM provides training for supervisors so they can recognize

- early warning signs,
- symptoms, and
- behavior

that might indicate a use/abuse problem.

Supervisors also learn how to address performance problems resulting from substance abuse.

## DRUG AND ALCOHOL TESTING

WM has developed a drug and alcohol testing program. The basics of this program are described in this document.

Test results are confidential. The donor is identified at the testing laboratory (lab) with a number only. The results are not made known to anyone except WM employees with a legitimate, business-related reason to know.

The MRO receives the test results from the lab. An MRO is a licensed doctor who knows how to read substance-abuse tests. The MRO sends the results to the Designated Employee Representative (DER). The DER shares the information only as corrective action is required. The results can only be released outside of WM with written permission.

## DRUG TESTING

Urine is tested for controlled substance use. Listed below are the substances the test covers.

- Marijuana
- Cocaine
- Opiates
- Phencyclidine (PCP)
- Amphetamines

## DRUG TESTING (CONTD.)

The urine is sent to a lab that is certified by the Department of Health and Human Services. The collector has been qualified according to DOT standards. The procedure called "Custody and Control" is used for security. A Custody and Control Form (CCF) or Chain of Custody Form (COC) identifies and stays with the specimen. This makes sure that no one can tamper with the urine. It ensures that the urine provided is the urine that is tested.

Custody and Control begins when the urine is collected and ends when it is discarded. Here's how it works:

1. A sample is provided.
2. The sample is labeled with an assigned number. The number is bar coded for confidentiality. The sample is sealed in the donor's presence. It is sealed in a tamper-evident container. This kind of container shows evidence of any attempt to tamper with the seal.
3. The sample is sent to the lab for analysis. Security is very high at the lab. The lab documents everything it does with the specimen. The lab computer confirms that the specimen matches its Custody and Control Form (CCF)/Chain of Custody Form (COC).

At the lab, the urine is screened. If it is positive, then it is tested again. This test is completely separate from the first test. It uses a different technique. It uses a different chemical principle. If this test is negative, no further testing is done. If this test is positive for drugs, a confirmation test is done. If that test is positive for drugs, it will be referred to the MRO for handling. The lab stores the specimen in a secure refrigerator. Negative specimens are discarded within 5 days. Positive specimens are held for one year.

## ALCOHOL TESTING

The first screening is performed on saliva or breath. A qualified Saliva Test or Breath Alcohol Technician collects the test sample. The technician analyzes the sample right away. If the first screening is positive (at or above 0.02), a second test is done after 15 minutes to confirm the result. This second test is on breath only. It is done with a device approved by the federal government. It shows breath alcohol concentration (BAC). If this test is negative, no further testing is done.

Alcohol testing is done

- just before,
- during, or
- just after

on-duty or Company time.

## IF AN EMPLOYEE NEEDS HELP

Employees with substance abuse problems should get help before those problems affect their job performance. Substance abuse problems can also affect qualifications to operate commercial motor vehicles.

Employees are not penalized for seeking assistance. However, corrective action up to and including termination may be taken for poor job performance, regardless of the reason.

## THE EFAP

The Employee Family Assistance Program (EFAP) provides

- assessment,
- counseling, and
- treatment services

for employees who have substance abuse problems. These services are confidential.

Getting help doesn't mean termination of employment. The EFAP helps employees recover from the illness of substance abuse while they continue to meet the duties of their jobs. Getting help is the first step towards

- regaining control,
- rebuilding relationships, and
- resuming good performance.

If an employee, any of their family members, or any of their co-workers need help, they should contact the EFAP at 1.800.852.7461.

## EDUCATION

The EFAP also provides employees education about substance abuse. Employees can learn to recognize

- early warning signs,
- symptoms, and
- behavior

that might indicate a use/abuse problem.

Employees can also learn about the harmful effects of substance abuse. The EFAP can also provide employees with community resources and referrals for help.

## OTHER HELP

Employees may also be eligible for help through WM's health plan or under other WM policies, such as leave-of-absence policies.

## SUMMARY

The Drug and Alcohol Policy applies to all WM employees and candidates. To be hired and to remain employed by WM, everyone must comply with the Substance Abuse Program. This includes drug and alcohol testing when requested.

SUMMARY  
(CONTD.)

Any employee

- whose test is positive for the presence of a prohibited substance,
  - who refuses to test,
  - who acts in a way that clearly obstructs the testing process, or
  - who refuses to cooperate in an investigation of a policy violation
- is in violation of WM's Drug and Alcohol Policy.

**EMPLOYEES WHO VIOLATE THE DRUG AND ALCOHOL POLICY  
WILL BE SUBJECT TO CORRECTIVE ACTION UP TO AND  
INCLUDING TERMINATION.**

## DRUG TESTING POLICY FOR ALL CANDIDATES

**POLICY STATEMENT** This policy is a central part of WM’s Substance Abuse Program. It provides for drug testing of all candidates for all positions at WM. Applicants who are offered a job with WM become job candidates.

**DRUG TESTING** All candidates must pass a pre-employment urinalysis drug test before being hired. This applies to all jobs at WM. Applicants are told about this requirement in writing when they first apply for employment. Applicants who are offered a job must submit a urine sample. This sample is tested for illegal drugs. Candidates cannot begin work at WM until they receive a negative test.

**DOT APPLICANTS** Applicants who apply for DOT positions must provide to WM drug and alcohol violations and DOT reportable accidents for the previous 36-months.

A positive drug or alcohol result or a refusal to test within the past 36 months will disqualify the applicant for employment.

**DILUTE SPECIMEN** A dilute specimen is one where creatinine and specific gravity levels are lower than expected for human urine. WM uses the following guidelines for dilute specimens

<b>Creatinine Level:</b>	<b>Lab Reports As:</b>	<b>Action Required:</b>
Less than 5mg	Substituted	Same as a positive/refusal to test
2-5mg	Cancelled-Dilute	Immediate <b>observed</b> re-test required.
Greater than 5mg	Negative-Dilute	Immediate non-observed re-test required

If the result of the second test is also negative dilute WM policy does not allow for a third test to be conducted. A negative dilute re-test is considered a negative test.

**WITHDRAWAL OF  
JOB OFFER**

If a candidate

- fails to provide the 36-month history of drug and alcohol violations and DOT reportable accidents,
- misses the appointment for collection,
- refuses to sign a consent form,
- refuses to submit to the drug test, or
- fails the drug test

any offers of employment will be withdrawn.

Candidates who test positive for drugs may request a copy of the test result.

# **DRUG AND ALCOHOL TESTING POLICY FOR EMPLOYEES IN DOT-REGULATED POSITIONS**

## **POLICY STATEMENT**

This policy is a central part of WM's Substance Abuse Program. It provides for drug and alcohol testing of WM employees who are covered by the drug and alcohol testing requirements of the Federal Motor Carrier Safety Administration (FMCSA), part of the U.S. Department of Transportation (DOT). Its purpose is

- to reduce employee substance abuse and
- to prevent incidents in the workplace related to substance abuse.

All DOT employees must follow this Policy to remain employed.

Employees who violate this Policy are removed from performing safety sensitive functions. They are also subject to corrective action up to and including termination. Violation includes refusing to take a drug or alcohol test upon request.<sup>1</sup>

All drug and alcohol tests conducted pursuant to this Policy are done in accordance with WM's Drug and Alcohol Testing Procedures. These procedures comply with the Department of Transportation's drug and alcohol testing regulations.

This Policy may be changed without notice if necessary to comply with current or future DOT regulations.

## **DOT COVERED EMPLOYEES**

Employees who

- operate commercial motor vehicles and
- are required to have commercial driver's licenses

must follow this Policy.

DOT covered employees include the types of drivers listed below.

- full-time
- part-time
- casual
- intermittent
- occasional

---

<sup>1</sup> Corrective action measures described in any collective bargaining agreement may also apply.

**PROHIBITED  
CONDUCT**

DOT employees must *NOT*

- report to duty or remain on duty requiring the performance of safety sensitive functions while having a BAC of 0.02 or higher.
- be on duty or operate a commercial motor vehicle while possessing alcohol.
- use alcohol while performing safety sensitive functions.
- perform safety sensitive functions within 4 hours after using alcohol.
- report for duty or remain on duty requiring the performance of safety sensitive functions when the driver uses any drug.

This does not apply if the driver

- is taking medication under a doctor's orders and
- the medication does not adversely affect the driver's ability to safely operate a commercial motor vehicle.

**DRUG AND  
ALCOHOL TESTING**

DOT employees are required to take a urinalysis drug test and an alcohol test under the conditions listed below:

- Pre-Employment (urine test only)
- Pre-Use (urine test only, prior to beginning or upon transfer to a DOT or non-DOT safety sensitive position)
- Reasonable Suspicion
- Post Accident
- Random
- Return-to-Duty
- Follow-Up

**PRE-EMPLOYMENT  
AND PRE-USE**

All candidates must pass a pre-employment urinalysis drug test before being hired. This applies to all jobs at WM. Applicants are told about this requirement in writing when they first apply for employment. Applicants who are offered a job must submit a urine sample. This sample is tested for illegal drugs. All employees transferring into DOT or non-DOT safety sensitive positions must pass a urinalysis drug test.

**REASONABLE  
SUSPICION**

Reasonable suspicion occurs when a supervisor who is trained to detect the signs of alcohol and drug use has reason to believe that the driver performed any of the actions listed under Prohibited Conduct on this page.

## BASIS OF REASONABLE SUSPICION

Supervisors must base their decision about an employee's drug or alcohol use on observations. These observations must be about appearance, behavior, speech or body odor that is

- specific,
- current (happening from recent past and continuing), and
- can be described in words.

The observations may also include indications of the chronic use and/or withdrawal effects of drugs or alcohol.

However alcohol tests are conducted only

- just before,
- while, or
- just after

the driver performs safety sensitive functions.

The supervisor making the observation makes a written record of those observations.

## POST ACCIDENT

A DOT employee must take a drug and alcohol test following an accident involving a commercial motor vehicle. This applies only in the situations listed below.

1. The driver is involved in an accident that results in a fatality.
2. The driver is involved in an accident that results in
  - a citation for a moving violation **and**
  - medical treatment away from the scene of the accident.
3. The driver is involved in an accident that results in
  - a citation for a moving violation **and**
  - one or more damaged vehicles that must be towed.

Employees who must take a post-accident test must remain readily available for a test following the accident. If they do not, they are judged to have refused to take the test.

DOT employees required to take a post accident test must not use alcohol for eight hours after the accident or until undergoing the post accident test, whichever occurs first.

Post accident drug and alcohol testing conducted by the authorities is NOT a substitute for conducting our own post accident test (or, if applicable, reasonable suspicion). In cases where the authorities have conducted their own test, this will require the driver to provide a separate specimen for the WM required test.

## RANDOM

DOT employees are required to submit to random drug and alcohol testing upon request.

Random drug tests are unannounced and occur periodically throughout the year. However, alcohol tests are conducted only

- just before,
- while, or
- just after

the driver performs safety sensitive functions.

## TEST RATES

Random drug testing is conducted at the annual rate of 50% of the average number of DOT positions. Random alcohol testing is conducted at the annual rate of 10% of the average number of DOT positions. Test rates may be adjusted by DOT.

## EMPLOYEE SELECTION FOR RANDOM TESTING

Employees are selected for random testing by a scientifically valid method. This method ensures that each DOT employee has an equal chance of being selected each time selections are made.

## RETURN-TO-DUTY AND FOLLOW-UP TESTING

An employee who is not terminated after a positive urine drug test or breath alcohol test, per state law or a collective bargaining agreement, must

- sign a Last Chance Agreement,
- be evaluated by a Substance Abuse Professional (SAP),
- have negative test results before returning to duty, and
- be in compliance with whatever treatment plan the SAP requires.

The employee may return to duty only after a SAP releases him or her for return. After the required evaluation, the SAP writes a letter confirming that he or she may return to duty.

The employee will also be required to take random drug and alcohol tests no fewer than six times throughout the next year.

Follow-up alcohol testing is conducted only

- just before,
- while, or
- just after

the employee performs safety sensitive functions.

All return-to-duty and follow-up tests must be performed using observed collection.

**REFUSAL TO TEST** Employees who refuse to take a drug or alcohol test upon request or when scheduled are terminated.<sup>1</sup>

A refusal to test is considered the same as a positive result. Any conduct that interferes with the testing process is considered a refusal to test, and therefore, a positive result. Examples of this are

- missing the appointment and
- going the next day because of personal preference.

Refusing to sign step 4 of the Alcohol Testing Form is considered a refusal to test when the employee takes an alcohol confirmation test. In this case the employee will be terminated.<sup>1</sup>

**CONSEQUENCES  
OF A POSITIVE  
DRUG OR  
ALCOHOL TEST<sup>1,2</sup>**

DOT employees will be terminated if

- alcohol test shows a BAC of 0.04 or higher or
- urine test shows the presence of drugs as determined by the MRO.

DOT employees with a BAC between 0.02 and 0.039

- will be removed from safety sensitive duties for a minimum of 24 hours and suspended, pending an evaluation and return-to-duty recommendation from a SAP.
- will be terminated if they refuse to go to a SAP for evaluation and comply with the follow-up recommendations an/or treatment.
- must pass a return-to-duty breath alcohol and urine drug test, sign a Last Chance Agreement, and undergo follow-up testing for up to 60 months if requested by the SAP, including no less than 6 random tests in the first year.

A second test of 0.02 or higher or a positive urine test will lead to termination as required by the terms of the Last Chance Agreement.

An employee may take sick time, vacation time or any other accrued time and/or apply for short-term disability (STD) to cover lost wages.

---

<sup>1</sup> Consequences of a positive drug or alcohol test or a refusal to test for employees covered by a collective bargaining agreement may differ from other employees.

<sup>2</sup> In accordance with California State Law, all Commercial Drivers with a BAC of 0.01 or higher must be placed out of service for 24 hours.

CONSEQUENCES  
OF A POSITIVE  
DRUG OR  
ALCOHOL TEST  
(CONTD.)

DOT candidates are also subject to the rules and regulations of the Department of Transportation. These rules and regulations are incorporated into WM's Substance Abuse Program.

WM is required by DOT regulations to obtain a three-year history of a DOT candidate's drug and alcohol testing and accident history from the candidate's prior employer. In addition, the prior employer must provide and drug and alcohol testing and accident records they have from previous employers. Therefore, if a DOT employee tests positive on a drug or alcohol tests, that will follow the person for *at least* three years.

Candidates who have tested positive for drugs or alcohol at a prior employer must provide documentation that they have successfully completed a SAP evaluation and are following the recommended course of treatment.

DILUTE SPECIMENS

A dilute specimen is one with creatinine and specific gravity levels that are lower than expected for human urine. The DOT has established the following guidelines for dilute specimens

Creatinine Level:	Lab Reports As:	Action Required:
Less than 2mg	Substituted	Same as positive/refusal to test
2-5mg	Cancelled- Dilute	Immediate <b>observed</b> re-test required
Greater than 5mg	Negative Dilute	Immediate <b>non-observed</b> re-test required

If the result of the second test is also negative dilute, WM policy does not allow for a third test to be conducted. A negative dilute re-test is considered a negative test.

ADULTERATED OR  
SUBSTITUTED  
RESULTS

Adulterated means contaminated. Substituted means replaced. If a urine specimen has been contaminated, tampered with, or replaced, the MRO will report it to the Designated Employee Representative (DER) as a refusal to test. A refusal to test is considered the same as a positive test.

## SPLIT SAMPLE TEST

DOT employees or candidates who have a verified positive, adulterated or substituted test result will be contacted by the MRO. They may explain the test result or disclose any prescription medication that they are taking that may have caused the result. This information will remain confidential. They may also request a split sample test. The split sample is a portion of the original specimen that has been stored at the lab. The sample will be sent to a different lab for testing and the employee or candidate is responsible for the cost of the test. The result of the split sample test will be the test result of record. The employee or candidate will not be able to provide a new specimen.

## GETTING HELP

If the SAP determines that the employee needs assistance with a substance abuse problem, the employee must follow any treatment program recommended by the SAP.

Employees can get information from the EFAP or a SAP about available

- experts,
- treatment, and
- rehabilitation programs.

## FOLLOW-UP TESTING

Employees who have been identified by a SAP as needing help must undergo follow-up testing when they return to safety sensitive functions.

Follow-up testing

- consists of at least six tests in the first 12 months,
- may continue for up to 60 months, and
- may include both drug and alcohol testing.

Per DOT regulations, all follow-up tests will be done under observed collection.

Employees with questions concerning WM's DOT Drug and Alcohol Testing Policy may contact the Background Screening and Drug Testing Unit (BDU) at 866-875-4884.

## **DRUG AND ALCOHOL TESTING POLICY FOR EMPLOYEES IN NON-DOT POSITIONS**

### **POLICY STATEMENT**

This policy is a central part of WM's Substance Abuse Program. It provides for the drug and alcohol testing of WM employees under certain circumstances. Its purpose is

- to reduce employee substance abuse and
- to prevent incidents in the workplace related to substance abuse.

WM believes that drug and alcohol testing is a valuable and appropriate way to address safety concerns. All non-DOT employees must follow this Policy to remain employed. Violation includes refusing to take a drug or alcohol test when scheduled or upon request.

Some states and locales may have certain restrictions on drug and/or alcohol testing. This policy will be modified to the extent that local and/or state laws require.

### **EMPLOYEES WHO VIOLATE THIS POLICY ARE SUBJECT TO CORRECTIVE ACTION UP TO AND INCLUDING TERMINATION.**

### **DRUG AND ALCOHOL TESTING**

Non-DOT employees are required to take a urinalysis drug test and alcohol breath test under the conditions listed below:

- Pre-employment (urine test only)
- Pre-use (urine test only, prior to beginning or upon transfer to a DOT or non-DOT safety sensitive position)
- Reasonable Suspicion
- Post accident
- Random
- Return-to-duty
- Follow-up

These situations are explained below.

### **PRE- EMPLOYMENT AND PRE-USE**

All candidates must pass a pre-employment urinalysis drug test before being hired. This applies to all jobs at WM. Applicants are told about this in writing when they first apply for employment. Applicants who are offered a job must submit a urine sample. This sample is tested for illegal drugs. All employees transferring into DOT or non-DOT safety sensitive positions must pass a urinalysis drug test.

REASONABLE SUSPICION	<p>Reasonable suspicion occurs when a supervisor has reason to suspect that the employee</p> <ul style="list-style-type: none"> <li>• has used drugs or alcohol or</li> <li>• is under the influence of drugs or alcohol</li> </ul> <p>that negatively affects or could negatively affect the employee's job performance.</p>
BASIS OF REASONABLE SUSPICION	<p>Supervisors must base their decisions about an employee's drug or alcohol use on observations. These observations must be about appearance, behavior, speech or body odor that is</p> <ul style="list-style-type: none"> <li>• specific,</li> <li>• current (happening in recent past and continuing), and</li> <li>• can be described in words.</li> </ul> <p>The observations may also include indications of the chronic use and/or withdrawal effects of drugs or alcohol.</p>
POST ACCIDENT	<p>Reasonable suspicion guidelines must be followed when deciding whether a drug and/or alcohol test should be performed after an on-the-job accident.</p> <p>Post accident drug and alcohol testing conducted by the authorities is NOT a substitute for conducting our own post accident (or, if applicable, reasonable suspicion) test. In cases where the authorities have conducted their own test, this will require the driver to provide a separate specimen for the WM required test.</p>
RANDOM	<p>Non-DOT employees are required to submit to random drug and alcohol testing upon request.</p> <p>Random drug tests are unannounced and occur periodically throughout the year, however alcohol tests are only conducted</p> <ul style="list-style-type: none"> <li>• just before,</li> <li>• while, or</li> <li>• just after</li> </ul> <p>the employee performs his/her job functions.</p>
TEST RATES	<p>Random drug and alcohol testing is conducted at the rate of 10% of the average number employees in safety sensitive positions and non-safety sensitive positions. Tests rates may be adjusted by WM.</p>
EMPLOYEE SELECTION FOR RANDOM TESTING	<p>Employees are selected for random testing by a scientifically valid method. This method ensures that each safety sensitive employee has an equal chance of being selected each time selections are made.</p>

## RETURN-TO-DUTY AND FOLLOW-UP TESTING

Non-DOT employees who are not terminated after a positive urine drug test or alcohol test, per state law or a collective bargaining agreement, must

- sign a Last Chance Agreement,
- be evaluated by a Substance Abuse Professional (SAP),
- have negative test results before returning to duty, and
- be in compliance with whatever treatment plan the SAP requires.

The employee may return to duty only after a SAP releases him or her for return. After the required evaluation, the SAP writes a letter confirming that he or she may return to duty.

The employee will also be required to take random drug and alcohol tests no fewer than six times throughout the next year.

Follow-up alcohol testing is conducted only

- just before,
- while, or
- just after

the employee performs his/her job functions.

All return-to-duty and follow-up tests must be performed using observed collection.

## REFUSAL TO TEST

Employees who refuse to take drug or alcohol random tests are terminated immediately.

A refusal to test is considered the same as a positive result. Any conduct that interferes with the testing process is considered a refusal to test, and therefore a positive result. Examples are

- missing the appointment and
- going the next day because of personal preference.

Refusing to sign Step 4 of the Alcohol Testing Form is considered a refusal to test when the employee takes an alcohol confirmation tests. In this case the employee is terminated.

## CONSEQUENCES OF A POSITIVE DRUG OR ALCOHOL TEST

Non-DOT employees will be terminated if

- alcohol test shows a BAC of 0.04 or higher or
- urine test shows the presence of drugs as determined by the MRO.

**CONSEQUENCES OF A POSITIVE DRUG OR ALCOHOL TEST (CONTD.)**

- Non-DOT employees with a BAC between 0.02 and 0.039
- will be removed from duty for a minimum of 24 hours and suspended, pending an evaluation and return-to-work recommendation from a SAP.
  - will be terminated if they refuse to go to a SAP for evaluation and comply with follow-up recommendations and/or treatment.
  - must pass return-to-duty breath alcohol and urine drug test, sign a Last Chance Agreement, and undergo random testing for up to 60 months if requested by the SAP, including no less than 6 random tests in the first year.

A second test of 0.02 or higher or a positive urine drug test will lead to termination as required by the terms of the Last Chance Agreement.

An employee may take sick time, vacation time or any accrued time and/or apply for short-term disability (STD) to cover lost wages.

**DILUTE SPECIMENS**

A dilute specimen is one where creatinine and specific gravity levels are lower than expected for human urine. WM has established the following guidelines for dilute specimens

<b>Creatinine Level</b>	<b>Lab Reports As:</b>	<b>Action Required:</b>
Less than 2mg	Substituted	Same as positive/refusal to test
2-5mg	Cancelled-Dilute	Immediate <b>observed</b> re-test required
Greater than 5mg	Negative Dilute	Immediate <b>non-observed</b> re-test required

If the result of the second test is also negative dilute, WM policy does not allow for a third test to be conducted. A negative dilute re-test is considered a negative test.

**ADULTERATED OR SUBSTITUTED RESULTS**

Adulterated means contaminated. Substituted means replaced. If a urine specimen has been contaminated, tampered with, or replaced, the MRO will report it to the Designated Employee Representative (DER) as a refusal to test. A refusal to test is considered the same as a positive result.

For employees, a positive test results in corrective action up to and including termination. For candidates, WM withdraws any job offer.

## SPLIT SAMPLE TEST

Non-DOT employees or candidates who have a verified positive, adulterated or substituted test result will be contacted by the MRO. They may explain the test result or disclose any prescription medication that they are taking which may have caused the result. This information will remain confidential. They may also request a split sample test. The split sample is a portion of the original specimen that has been stored at the lab. The sample will be sent to a different lab for testing and the employee or candidate is responsible for the cost of the test. The result of the split sample test will be the test result of record. The employee or candidate will not be able to provide a new specimen.

Employees with questions concerning WM's Non-DOT Drug and Alcohol Testing Policy may contact the Background Screening and Drug Testing Unit (BDU) at 866-875-4884.

## DEFINITIONS

Several of the terms used throughout this Policy are defined below.

**CHAIN OF CUSTODY** A chain of custody tracks the handling and storage of a urine specimen. The tracking begins when the urine is collected. It ends when the urine is discarded. That way, the urine tested is the urine provided. This procedure makes sure that no one can tamper with the specimen.

**COMMERCIAL MOTOR VEHICLE** The vehicles listed below are considered “commercial motor vehicles”:

1. Vehicles with a gross combination weight rating of 26,001 or more pounds. This includes a towed unit with a gross vehicle weight rating of more than 10,000 pounds.
2. Vehicles with a gross vehicle weight rating of 26,001 or more pounds.
3. Vehicles that are designed to transport 16 or more passengers including the driver.
4. Vehicles that are used in the transportation of hazardous materials that require a warning placard.

**CONFIRMATORY TEST** A confirmatory test is done if the first test is positive (shows drug or alcohol use). Its purpose is to make sure the first test is correct. It shows the presence of a drug or alcohol.

*FOR DRUGS* At this time, the method to confirm positive drug tests is GC/MS. This means “gas chromatography/mass spectrometry.” GC/MS is highly accurate. It has been called the “gold standard” of drug testing processes. This test is performed on all urine specimens that test positive on the first test. It can detect a drug or other substances that show the drug is present (drug metabolite). This test is completely separate from the first test. It uses a different technique. It also uses a different chemical principle. If this test is negative, no further testing is done. A positive test results in corrective action up to and including termination.

*FOR ALCOHOL* If a first test shows a BAC of 0.02 or higher, a second Breathalyzer test is used to make sure the first test was correct. If this test is negative, no further testing is done. A positive test results in corrective action up to and including termination.

## DEFINITIONS (CONTD.)

DRUG METABOLITE	A drug metabolite is the specific substance produced when a given drug passes through the body and leaves in the urine. In other words, the body “metabolizes” the drug, producing one or more other substances that end up in the urine.
EMPLOYEE FAMILY ASSISTANCE PROGRAM (EFAP)	EFAP is a program provided through a contracted service. It assists employees in dealing with drug or alcohol dependency. It can also help employees with other personal problems.
INITIAL TEST OR SCREENING TEST	See also Confirmatory Test.
<i>FOR DRUGS</i>	The first test is a urine test. An immunoassay screen is used. If the test is negative then no further testing is done. If the test is positive, a Confirmatory Test is done.
<i>FOR ALCOHOL</i>	The first test for alcohol is a Breathalyzer test. If the test is negative, then no further screening is done. If the test is positive (BAC of 0.02 or higher), a Confirmatory Test is done. This second test uses a Breathalyzer.
MEDICAL REVIEW OFFICER (MRO)	A MRO is a licensed doctor. The MRO receives the lab results from the drug testing program. MROs know about substance abuse problems. They also have medical training to interpret and evaluate positive test results along with the employees’ medical histories.
DOT SAFETY SENSITIVE FUNCTIONS	The following functions are considered DOT safety sensitive functions when performed by a driver of a commercial motor vehicle. <ol style="list-style-type: none"><li>1. Waiting to be dispatched or to operate a commercial motor vehicle.</li><li>2. Inspecting, conditioning, or servicing a commercial motor vehicle.</li><li>3. Driving a commercial motor vehicle.</li><li>4. Loading or unloading (or assisting or supervising loading or unloading) a commercial motor vehicle.</li><li>5. Repairing, obtaining assistance, or remaining in attendance upon a disabled commercial motor vehicle.</li></ol>

## **DEFINITIONS (CONTD.)**

**NON-DOT  
SAFETY  
SENSITIVE  
POSITION**

A non-DOT safety sensitive position requires the performance of specific physical or supervisory tasks. If these tasks are done incorrectly, injury or death to employees or others could result. In addition, significant property or environmental damage could occur.

## APPENDIX A: NON-DOT SAFETY-SENSITIVE POSITIONS

Definition: A non-DOT safety sensitive position requires the performance of specific physical or supervisory tasks. If these tasks are done incorrectly, injury or death to employees or others could result. In addition, significant property or environmental damage could occur.

### Landfill

Mechanic / Fueler  
Tire Replacer  
Parts Runner  
Heavy Equipment Operator  
Spotter  
Wood Chipper / Grinder  
Tipper Operator  
Helper

### Transfer Station

Mechanic  
Tire Replacer  
Parts Runner  
Transfer Truck Driver  
Heavy Equipment Operator  
Spotter  
Helper

### MRF

Mechanic  
Heavy Equipment Operator  
Spotter  
Helper

### Hauling

Vehicle Mechanic  
Fabricator / Container Repair  
Tire Replacer  
Parts Runner  
Bin Delivery  
Portalet Driver  
Helper

### MISC

Any employee who drives regularly and on a consistent basis as part of his or her job duties (includes employees who receive a car allowance, are issued a company vehicle, or who participate in the Runzheimers Program)

Workers running mobile machinery

Mechanics

Helpers



## **APPENDIX B:**

PHYSICIAN STATEMENT REGARDING PRESCRIPTION MEDICATION



**Physician Statement Regarding Prescription Medication**

**Supervisor completes this section.**

WM Site \_\_\_\_\_ Date \_\_\_\_\_

Employee Name \_\_\_\_\_ Address \_\_\_\_\_

State/Zip Code \_\_\_\_\_ Telephone Number \_\_\_\_\_

Job Title \_\_\_\_\_ Supervisor Name \_\_\_\_\_

**Physician Instructions:** Your assistance is needed to determine if the above named individual can safely perform the essential functions of his or her job. Please complete the section below and select the appropriate recommendation. Thank you for your help and cooperation.

Physician Name \_\_\_\_\_

Address \_\_\_\_\_

State/Zip Code \_\_\_\_\_

Telephone Number \_\_\_\_\_

The employee whose name appears above is under my care. I have prescribed medication (s) for this employee. I have reviewed Waste Management’s description of the employee’s job duties.

- The medication(s) I have prescribed will not affect the safe performance of those job duties.
- The medication(s) I have prescribed will affect the safe performance of those job duties. The employee is unable to return to work at this time. Next medical evaluation is \_\_\_\_\_
- The medication(s) I have prescribed will affect the safe performance of those job duties; therefore, I am recommending the following activity restriction(s):  
 \_\_\_\_\_  
 \_\_\_\_\_

Expected duration of activity restrictions: \_\_\_\_\_

Physician  
 Signature \_\_\_\_\_ Date \_\_\_\_\_

**Please do not reveal either the employee’s condition(s) or the medication(s) you prescribe for him/her. Waste Management’s sole concern is for the safety of its employees and the community.**

**SECTION I - PART E**  
**EMERGENCY ACTION PLAN**



**Program:** EMERGENCY ACTION PLAN  
**Facility:** Kekaha Municipal Solid Waste Landfill – Phase II (KLF)  
**Location:** 6900-D Kaunualii Highway, Kekaha, HI 96752  
**Date:** March 2016

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- A FIRE PREVENTION PLAN
- B POST EARTHQUAKE FORMS & POST SEVERE WEATHER FORMS
- C BOMB THREAT CALL CHECKLIST
- D TRAINING FORMS

## **1.0 INTRODUCTION**

This Emergency Action Plan was prepared by Waste Management of Hawaii, Inc. (WMH) for the Kekaha Sanitary Landfill (KLF) – Phase II and contains procedures to be implemented in the event of an emergency at the KLF. All personnel on-site at the KLF, including contractors and subcontractors will be informed of the procedures and requirements of this Plan, as they relate to potential fire, explosion, health, safety, or other hazards.

If there are any questions regarding the procedures described in these plans, please contact KLF/WMH Management.

### **1.1 EMERGENCY RESPONSE PERSONNEL**

In the event of an emergency, the Emergency Coordinator (EC) (i.e., Site Manager) has primary responsibility for responding to, correcting, documenting, and reporting emergencies. This includes responding appropriately to ensure the safety of KLF personnel and the public. Possible actions may involve evacuation from the site or evacuation of adjacent residents.

Section 2.0 contains a list of emergency response telephone numbers, including the key KLF/WMH personnel. This list is posted in the main administration office, in the scale house, and the maintenance shop. The first person on the scene will follow the normal procedures for emergency response, as outlined in this Plan, until the designated EC (or alternate) arrives at the scene. All EC's will be properly trained in this procedure.

### **1.2 RELEASE OF INFORMATION TO THE PUBLIC / MEDIA**

Inquires from the media are likely in the event of an emergency. The WMH Director of Operations or other designated spokesperson will coordinate all media relations and responses to any media request. Any release of information to the public shall be channeled through the County's Public Information Officer (808-241-4909 or 808-241-4905 after business hours). If approached or contacted by the press, unauthorized personnel should not answer any questions or make any statement to the media. The primary contacts at the County of Kauai are as follows:

- Chief, Division of Solid Waste Management: (808) 241-4838
- Environmental Services Officer: (808) 241-4846
- County Engineer: (808) 241-4996



### **1.3 SITE MAPS**

A KLF site location map (Figure 1), site evacuation route map (Figure 2), and building evacuation route map (Figure 3) are attached to this Plan. These figures detail exits, evacuation routes, locations of fire extinguishers, fire alarms, first aid kits, emergency shower, emergency shut-offs, and the designated KLF evacuation area, which is currently in front of the main gate facing Kaumualii Highway (see Figure 2).

### **1.4 ALTERNATE WASTE DISPOSAL PLAN**

In the event the liner associated with any landfill cell is damaged, the alternate waste disposal plan is to seek authorization to temporarily landfill municipal solid waste (MSW) in other areas of the landfill that will have minimal impact on the damaged portion of the landfill.

**2.0 EMERGENCY RESPONSE AGENCIES / TELEPHONE NUMBERS:**

<b>AMBULANCE</b>	<b>911</b>
<b>FIRE DEPARTMENT</b>	<b>911</b>
<b>POLICE DEPARTMENT</b>	<b>911</b>
<b>HOSPITAL:</b>	Kauai Veterans Memorial Hospital 4643 Waimea Canyon Dr. Waimea, Hawai'i 96796 Telephone: (808) 338-9431

A map and driving directions to Kauai Veterans Memorial Hospital are included in Figure 4.

**KLF/WMH KEY PERSONNEL:****PRIMARY EMERGENCY COORDINATOR (EC):**

John Ruiz (KLF Site Manager):  
Office: (808) 337-1416  
Mobile: (808) 645-1290

**ALTERNATE ECS:**

Ian Imamura (KLF Operations Manager)  
Office: (808) 337-1416  
Mobile: (808) 645-0664

Tina Alder (WMH Environmental Protection Specialist)  
Office: (808) 668-2985  
Mobile: (785) 554-1994

**OTHER AGENCIES, UTILITIES, AND RESPONSE SUPPORT PROVIDERS:**

County of Kauai Environmental Services Management:	(808) 241-4838
Kauai Civil Defense Agency:	(808) 241-1800
Kauai Police Department	(808) 241-1711
American Red Cross, Kauai County:	(808) 245-4919
National Response Center:	(800) 424-8802
Poison Center:	(800) 222-1222
Hawaii Gas Company (Kauai):	(808) 245-3301
Kauai Island Utility Cooperative:	(808) 246-4300
Kekaha Agriculture Association:	(808) 337-9262
Kauai County Department of Water:	(808) 245-5444
After Hours, call Police Department	(808) 241-1711
U.S. EPA Region 9:	(415) 947-8000

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**Revised September 2016, Waste Management**



### **3.0 EMERGENCY PROCEDURES**

Listed below are specific types of emergencies and detailed procedures to be followed by site personnel in the event of an emergency. After an emergency, waste disposal will resume at the KLF only after key WM personnel have deemed the situation safe. WMH will ensure that human health and the environment are protected prior to restoring disposal services/operations in the aftermath of an emergency or disaster.

#### **3.1 EVACUATION PROCEDURE**

All personnel on-site will be notified of the evacuation via telephones, cellular phones, and/or hand-held two-way radios. If radios/phones are not operational, KLF personnel will be alerted verbally by the EC and/or EC alternates.

##### **Evacuating Buildings:**

- Walk; do not run to the nearest exit. Personnel and visitors will be directed to immediately reconvene at the KLF evacuation area (via the safest route), which is located **IN FRONT OF THE MAIN GATE FACING KAUMUALII HIGHWAY** (see Figure 2).
- When the evacuation is ordered, the Operations Specialist will bring the contractor sign-in log to the evacuation point (located in the office reception area, on the counter in front of the Operations Specialist). This is to identify any visitors present on-site.
- EC or EC alternates will be responsible for checking the facilities to insure that everyone leaves the buildings.
- If outside emergency support is required, call 911 and report the emergency. Inform the 911 operator that there is an emergency and give the following information:
  - ✓ Caller's name and location
  - ✓ Type of emergency
  - ✓ Type of emergency aid required

Answer any questions that the emergency operator asks. Stay on the phone with the operator until told to hang up.

##### **Evacuating the Landfill:**

- Administration personnel will contact any contractors or consultants working on-site via cellular phones and/or verbally to give the order to evacuate.
- Key KLF personnel will coordinate movement of landfill customers/waste haulers from the disposal area onto the main haul road. Construction personnel will do the same. All persons will then proceed to the designated evacuation area located **IN FRONT OF THE MAIN GATE FACING KAUMUALII HIGHWAY** (see Figure 2).



The EC (or Alternate EC) responsibilities:

- ✓ Coordinating evacuation of the KLF including notification of adjacent property owners/tenants, as required.
- ✓ Coordinating with incoming emergency response personnel.
- ✓ Conducting a head count at the designated assembly area/evacuation point.
- ✓ Notifying incoming drivers/haulers via hand-held two-way radios or cellular phone to avoid the site.
- ✓ Notifying KLF/WMH Management of the emergency.
- ✓ Notifying the County of Kauai, Solid Waste Division of the emergency.
- ✓ Notifying WM Safety personnel of the emergency (if appropriate) – determine if a 24-Hour Report is required.
- ✓ Determining when the “all clear” signal can be given to return to the site.

### **3.2 FIRE PROCEDURE**

Procedures outlined below will be followed for emergencies involving fire, including structure or large surface fires, buffer zone fires, incoming waste load fires, and equipment fires. A 4,000-gallon water truck, loader, and bulldozer are available 24-hours a day to aid in fire fighting. Fire extinguishers are provided in all buildings and site vehicles for use in extinguishing small fires. See Appendix A for additional information on the KLF Fire Prevention Plan.

#### **3.2.1 STRUCTURE FIRE OR SURFACE FIRE**

The EC will notify all personnel on-site at the KLF of the fire via oral information and/or hand-held two-way radios. If possible, cellular phone communication will be established. In the event of a large structure fire or surface fire:

1. Assess the fire - Identify its location, source, and size.
2. If the fire is small (less than one cubic yard), and can be approached safely with an evacuation route, and available personnel are trained in the appropriate use of fire equipment, an attempt can be made to put it out with a fire extinguisher. Do not attempt to fight the fire alone.
3. If the fire is large, evacuate the building immediately and proceed to the designated evacuation area. Avoid entering a burning structure for any reason.
4. Call 911 to report the fire. Inform the 911 operator that there is a fire emergency and give the following information:
  - ✓ Caller’s name and location.
  - ✓ Location of the fire.



- ✓ Materials involved, if known.
  - ✓ Whether medical aid is required.
5. Limit access to area and isolate electrical power at main breaker.
  6. Remove vehicles from the area if time allows and does not present a risk to personnel.
  7. Remove fuel sources (i.e., flammables from shop) if time allow and does not present a risk to personnel.
  8. Upon arrival of the local Fire Department personnel, direct them to the location of the fire and provide assistance as appropriate.

### **3.2.2 BUFFER ZONE OR BRUSH FIRE**

If a brush fire/buffer zone fire exists in the area surrounding the landfill, maximum effort will be made to prevent the fire from reaching refuse fill areas by utilizing on-site assets. In the event of a brush fire/buffer zone:

1. Maintain existing firebreaks between MSW fill areas and surrounding vegetation. Roads are maintained on the landfill perimeters, which also serve as a firebreak.
2. Excavate additional firebreaks between the landfill and the oncoming fire. Excavated soils will be bermed on the fireside of the firebreak for additional protection.
3. Water down areas between the firebreak and the disposal area using the on-site water trucks.
4. If the fire threatens the landfill, daily cover will be put on the active face and it will be wetted down to prevent a landfill fire caused from flying cinders.
5. Equipment and fuel sources will be moved to safe locations as practicable.
6. Unnecessary personnel will be evacuated from the site/area.
7. If unable to extinguish the fire, follow the procedures for calling 911 as detailed in Section 3.2.1 above, and summon the help of the local fire department.

### **3.2.3 INCOMING WASTE LOAD FIRES**

Scale house attendants and KLF operations personnel are trained and directed to notice any smoke, steam, heat, or burning material in incoming waste loads, and prevent it from contacting combustible materials or being buried at the working face before all combustion is extinguished. If there is a fire in an incoming waste load or if a fire occurs at the disposal area:

1. Determine the source of the fire.



2. If the fire is small, put out with a fire extinguisher.
3. Cut the fire out of the active face with a dozer (excavate) and move (separate) burning waste from the disposal area to the table. Isolate the fire before it spreads.
4. Smother the fire by covering it with soil. The faster that soil can be placed over the fire, the more effective this method will be in controlling and extinguishing the fire.
5. If necessary, apply water from the on-site water truck to soak the fire.
6. Spread the waste to ensure fire is out and does not re-flash.
7. If unable to extinguish the fire, follow the procedures for calling 911 as detailed in Section 3.2.1 above, and summon the help of the local fire department.

### 3.2.4 VEHICLE OR EQUIPMENT FIRE

To avoid equipment fires, do not operate equipment with trash, paper or other objects in or near the engine compartment. Always stay alert – watch for hot spots in the equipment, blistering paint, or other signs of a fire (smoke or the smell of smoke). If detected, contact KLF Management or other operations personnel via two-way radio immediately.

In the event of a vehicle or equipment fire, the operator will:

1. Bring the vehicle or equipment to a safe stop. If safe to do so, the vehicle/equipment should be parked away from fuel supplies, uncovered solid wastes, or other machinery.
2. Immediately (or as soon as possible), shut off the engine and engage the brake to prevent movement of the vehicle/equipment.
3. Get out of the equipment.
4. Alert KLF Management/personnel via two-way radio immediately.
5. Attempt to control the fire using fire extinguishers or an on-site water truck (depending on the size of the fire).
6. If unable to control the fire, follow the procedures for calling 911 as detailed in Section 3.2.1 above, and summon the help of the local fire department.

In the event of any of the above-mentioned fires, the EC will:

- ✓ Assess the situation and possible hazards that may result.
- ✓ Order evacuations, medical care, shutdowns, etc. (as necessary).
- ✓ Notify adjacent property owners/tenants (as necessary).
- ✓ Coordinate with incoming emergency response personnel.
- ✓ Conduct a head count at the designated evacuation point.
- ✓ Notify incoming drivers/haulers via two-way radio or cellular phone to avoid the site.
- ✓ Notify KLF/WMH Management of the emergency.

- ✓ Notify the County of Kauai, Solid Waste Division of the emergency.
- ✓ Notify WM Safety personnel of the emergency (if appropriate) - determine if a 24-Hour Report is required.
- ✓ Determine when the “all clear” signal can be given to return to the site.

### 3.2.5 LANDFILL SUBSURFACE FIRE

There are two primary causes of subsurface fires at landfills:

1. When smoldering waste is buried at the working face. Typically, this occurs at relatively shallow depths and is detected by surface expression such as visible smoke or depressions forming in recently placed waste.
2. When excess oxygen is allowed to enter the waste mass. This may occur at any depth depending on the oxygen source. At relatively shallow depths, visible smoke and surface depressions are likely. If the fire is deep, it is more likely to burn slowly without visible flame or large quantities of smoke, and is characterized by rapid oxidation of an organic waste. Underground combustion/oxidation may go undetected until a sinkhole or smoke appears.

The methods used to extinguish the near surface fire may include:

- Cutting off the oxygen supply by smothering with fine-grained soil and/or the use of plastic membranes; or
- Physically putting the fire out, which involves excavating down to the fire, removing and extinguishing burning material, confirming that all burning material is extinguished, and placing waste back into the excavation area. *This procedure should only be done under supervision of personnel experienced with extinguishing landfill fires.*

The primary method used to extinguish subsurface combustion within the landfill is to smother the smoldering area. However, if a subsurface fire is suspected, the appropriate WM engineer will be contacted and the fire will be dealt with using appropriate and industry accepted measures.

If a landfill subsurface fire is suspected at the KLF, the WM Market Area Director of Engineering, Director of Environmental Protection, and Director of Air Programs will be notified.

#### Criteria For Internal & State of Hawaii Department of Health (DOH) notification:

- The presence of smoke coming from the landfill (requires immediate notification).
- The presence of visible fire (requires immediate notification).
- Sudden subsidence, typically less than 25 feet across, particularly in areas recently filled. Irregular subsidence due to factors other than fires is common at landfills.



When there is any doubt regarding why an area has subsided, the appropriate WM Engineering and Environmental Protection Manager will be consulted to determine whether the presence of a fire is likely.

Once a subsurface fire has been verified, the DOH shall be notified orally within 24 hours and a detailed plan outlining steps to control the fire shall be provided, in writing, within 7 days.

The response required will be determined by the location of the fire. No personnel shall be permitted within the area until it is confirmed that the fire is extinguished, and the area is determined to be safe. However, if a subsurface fire is suspected, the appropriate WM engineer will be contacted and the fire will be dealt with using appropriate and industry accepted measures.

### **3.3 MEDICAL EMERGENCY PROCEDURE**

#### **3.3.1 INJURY ACCIDENT RESPONSE PROCEDURES**

If an accident occurs, KLF Management will be notified immediately. First aid kits are maintained in the office, the break room, and in the WM vehicle (see Figure 3). If you are properly certified, begin first aid (e.g., stop bleeding, begin CPR, etc). Do not move the victim unless necessary to prevent further injury. If the nature of an injury requires additional treatment, the local emergency response provider is to be notified by dialing 911. The person making the call should inform the operator of the following:

- The nature and location of the emergency;
- What first aid measures have been initiated; and
- The need for any special equipment (i.e., hazardous materials response, confined space rescue, or vehicle extrication).

Persons with major injuries should never be moved without professional assistance. Major injuries include second or third degree burns, unconsciousness, severe bleeding, broken limbs, and any head, back, or neck injury.

Records of all site accidents and first aid treatments will be maintained at the KLF office. Accident reports will be filed with insurance companies and State agencies as required.

After the situation has stabilized, KLF Management will arrange for investigation of the cause of the accident. A complete investigation report should be completed within seven days of the incident. The report should include a review of the actions leading up to the incident, factors that contributed to or mitigated the severity of the incident, and recommendations to prevent reoccurrence.

The EC will be responsible for:

- ✓ Coordinating with incoming emergency response personnel.
- ✓ Notifying KLF/WMH Management of the emergency.
- ✓ Notify the County of Kauai, Solid Waste Division of the emergency.
- ✓ Notifying WM Safety personnel of the emergency (if appropriate) - determine if a 24 Hour Report is required.
- ✓ Notifying OSHA or other regulatory agency if required.

### **3.4 SPILL/RELEASE RESPONSE PROCEDURE**

In the event of a spill/release, immediately alert all personnel in the area and notify the EC and/or KLF Management. If necessary, secure the facility and evacuate to an upwind area or designated evacuation point. The KLF has a low potential for spills of hazardous materials, but incidents are possible in the event of vehicle accidents or malfunctions that could cause spills of coolant, fuel, or lubricants.

#### **3.4.1 MINOR SPILL**

A release is considered “minor” if it extends outside the secondary containment provisions and the spill/release is limited to the immediate area with no potential for it to enter into the existing drainage facilities or for it to present an immediate fire hazard or exposure danger.

In the event of a minor spill/release, KLF personnel will:

1. Secure the area to protect all personnel and public from any immediate danger.
2. Extinguish any sources of ignition. Vehicles should be turned off. Avoid sparks, movement, or any activity that may create static electricity.
3. Ensure that no danger to human health exists and then stop the flow at the source only if it is safe to do so (e.g., shut off power, turn off valves, and plug leaks). No site personnel shall come into contact with unknown or hazardous substances that have been brought into the facility.
4. If it is safe to do so and available personnel are trained in the proper use of required personal protective equipment (PPE), contain the spill with soil berms, equipment from the spill kit (i.e., absorbent pads, particulate sorbent, shovels, hand tools, etc.) and /or block off drains downstream. Used sorbent pads will be collected in a drum for proper disposal.

#### **3.4.2 MAJOR SPILL**

KLF personnel are not trained as first responders in the event of a major spill/release. A spill/release is considered “major” if it extends outside the secondary containment provisions and the spill has traveled beyond the immediate area or if the spill/release has entered the existing drainage facilities.

In the event of a major spill/release of petroleum products, KLF personnel will:

1. Secure the area to protect all employees and public from any immediate danger.



2. Extinguish any sources of ignition. Vehicles should be turned off. Avoid sparks, movement, or any activity that may create static electricity.
3. Ensure that no danger to human health exists and then stop the flow at the source only if it is safe to do so (e.g., shut off power, turn off valves, and plug leaks).
4. Call 911 to alert the fire department or the emergency response clean-up contractor, Pacific Commercial Services, LLC 808-478-8930 and give the following information:
  - ✓ Caller's name and location.
  - ✓ Location of the spill/release.
  - ✓ If known, materials and volumes involved.
  - ✓ Whether medical aid is required.
  - ✓ Whether fire hazard exists.

The EC will be responsible for the following:

- ✓ Coordinating with incoming emergency response personnel.
- ✓ Notifying KLF/WMH Management of the emergency.
- ✓ Notify the County of Kauai, Solid Waste Division of the emergency.
- ✓ Notifying WM Safety personnel of the emergency (if appropriate) - determine if a 24 Hour Report is required.
- ✓ Notify the WMH Environmental Protection Manager who will then report the incident to the proper regulatory agencies and arrange for the proper disposal of any waste materials (if necessary). The waste material from the cleanup will be characterized, transported, and disposed of according to State and Federal Regulations. Refer to the KLF SPCC Plan (Volume I - Section IV) for more information regarding spills and spill response.

### 3.5 EARTHQUAKE

A "significant earthquake" is defined here as one that produces any sign of damage to on-site structures, including but not limited to, overturned furniture, wall cracks, or structural shifts.

During a significant earthquake:

- Remain calm.
- Immediately cease or limit landfilling operations.
- If indoors, stay there. Objects that fall due to the shaking generally cause hazards and injuries. Move quickly away from windows, shelves, cabinets, and glass partitions. Get under a desk or table, or sit in an interior doorway or corner. Do not leave the building unless the building is unsafe.



- If outdoors, get to an open area away from structures, power lines, and trees.
- If driving, pull over to the side of the road and stop. Avoid overpasses and power lines. Stay inside vehicle until shaking has stopped.
- If in a crowded public place, do not rush for the doors. Crouch and cover head with hands and arms.

### After the significant earthquake:

- Unless there is an immediate life-threatening emergency, do not attempt to use the telephone.
- Promptly (when it is safe to do so) conduct a visual survey of the site to identify any slope failures, downed power lines, gas and water leaks, broken electrical wiring or sewage lines fires, tank leaks/spills, or other conditions that could threaten worker or public safety.
  - ✓ If there is damage, turn the utility off at the source and immediately report damage to the utility company.
  - ✓ Warn others to stay away.
  - ✓ If a fire occurs, follow the procedures set forth in Section 3.2.
  - ✓ If injuries occur, follow the procedures set forth in Section 3.3.
  - ✓ In the event of inoperable telephone systems, notification of the appropriate agencies/businesses will be accomplished in the most expedient manner available (two-way radios, cellular phones, person to person, overnight mail, etc.).
- Check buildings for cracks and damage including the roof and foundation.
- Turn on portable radio for instructions and news reports. Cooperate fully with public safety officials and instructions.
- Do not use vehicles unless there is an emergency. Keep the streets clear for emergency vehicles.
- Be prepared for aftershocks.
- Remain calm and lend a hand to others.
- If the site is evacuated, leave a message telling others where personnel can be found.

### The EC will be responsible for the following:

- ✓ Coordinating evacuation of the KLF including notification of adjacent property owners/tenants, as required.
- ✓ Coordinating with incoming emergency response personnel.
- ✓ Conducting a head count at the designated evacuation point.
- ✓ Notify incoming drivers/haulers via two-way radio or cellular phone to avoid the site.



- ✓ Notify KLF/WMH Management of the emergency.
- ✓ Notify the County of Kauai, Solid Waste Division of the emergency.
- ✓ Notifying WM Safety personnel of the emergency (if appropriate) - determine if a 24- Hour Report is required.
- ✓ Determining when the “all clear” signal can be given to return to the site.
- ✓ Notify the WMH Environmental Protection Manager who will fill out Post-Earthquake Forms (Appendix B) and report the incident to the proper regulatory agencies (if necessary).

### 3.6 SEVERE STORM RESPONSE PROCEDURES

The KLF is not located within a 100-year floodplain area as delineated by the Federal Emergency Management Agency (FEMA) of the Federal Insurance Administration (*Floodplains*). The following measures will be taken to protect against excessive erosion, flooding, and wind damage before and during severe storms.

#### Prior to a forecasted storm:

1. KLF personnel will inspect all drainage on-site structures to verify that they are in working order.
2. Diversion berms will be constructed around the current disposal area as needed to prevent run-on from entering the waste fill, and to prevent runoff from the waste fill areas of the site.
3. Interim cover will be placed over exposed waste at the end of the working day prior to the forecasted beginning of a severe storm.

At the discretion of WMH Management, the site may be closed for business during storm periods. In this event, the working face will be closed and covered with interim cover and graded to direct run-off to the drainage features.

The WMH Environmental Protection Manager or the KLF Site Manager conducts monthly inspections, which include checking and monitoring the integrity of the site’s drainage systems. A Severe Storm Inspection (Post-Hurricane/Severe Storm Forms [Appendix B]) will be conducted, if necessary, during any prolonged storm event to correct or repair any conditions that have been damaged or that may cause damage to on-site or off-site facilities.

### 3.7 HURRICANES

Hurricane season occurs from June through November in the northern hemisphere. Typically, the National Weather Service provides 24 to 48 hour warnings before a hurricane is likely to approach. There are two types of warnings – a “Hurricane Watch” is a notice that is given when hurricane conditions threaten within 24 to 26 hours; a “Hurricane Warning” is a notice that is given when hurricane conditions are expected within 24 hours or less. Typically, waste management facilities support cleanup efforts by providing disposal

capacity for debris and other solid wastes generated by the hurricane. Demands on solid waste management facilities are highest immediately following the hurricane and through the early phase of recovery. Local authorities and emergency coordinators rely on waste management facilities to provide capabilities and capacities for waste management so a prioritized and coordinated cleanup can begin as quickly as possible. Hurricanes and storms may generate contaminated debris or other atypical wastes that require special handling, processing, or disposal procedures that are not addressed by the facility permit and require special approval for disposal from the DOH.

Once a “Hurricane Watch” is issued and the potential effects of a hurricane are verified by local authorities (i.e., severe flooding, storm surge, high winds, etc.), KLF Management will consider acquiring the following supplies and materials to ensure adequate equipment to handle the increase in waste and ensure airspace availability following a hurricane.:

- Fuel;
- Additional Soil Cover or alternate material;
- Vehicles and Heavy Equipment;
- Grinders/Chippers;
- Auxiliary Lighting;
- Pumps;
- Generators;
- Fire Suppressant Equipment;
- Rain Gear; and
- PPE

In the event of a hurricane-making landfall on the island of Kauai, KLF personnel will perform the following as preparation:

- Conduct a briefing to entire staff on the status of conditions and severity of the hurricane and how it may impact the facility and service area/region. Discuss emergency operating procedures for facility.
- Power outages should be anticipated and procedures will be employed (when the KLF re-opens to accept waste) as needed to manually track the date the waste was received, the quantity by weight or volume, and the origin of the waste.
- Inspect all on-site drainage structures to verify that they are in working order.
- Diversion berms will be constructed around the current disposal area as needed to prevent run-on from entering the waste fill, and to prevent runoff from the waste fill areas of the site.



- Interim cover will be placed over exposed waste at the end of the working day.

Once a “Hurricane Warning” is issued the EC will track the hurricane front (via radio, television, internet, etc.) and implement the following procedures to properly shutdown all operations at the KLF:

- If possible, all electrical lines, breakers, and gas valves should be shut down to prevent any potential fires. Unplug all appliances.
- Secure facility property, structures, landfill equipment, and office (preserve records and data [electronic and hard copies]) in case of flooding or power failure. Anything that is not secured may become a damaging projectile in the event of high winds. Cover all windows with wood panels (if possible).
- Check batteries and stock up on first aid supplies, and drinking water.
- Gas up vehicles, generators, and emergency tanks.
- KLF Management will require that site personnel return to their homes. If on-site, evacuate to the main office building and stay there (shelter in place) and stay away from windows.

### After the Hurricane:

2. KLF/WMH Management will promptly (when it is safe to do so) conduct a visual survey and damage assessment of the site to identify any compromised building structures, slope failures, downed power lines, and water leaks, broken electrical wiring, fires, tank leaks/spills, or other conditions that could threaten worker or public safety.
  - If fires occur, follow the procedures set forth in Section 3.2.
  - If injuries occur, follow the procedures set forth in Section 3.3.
3. Turn on portable radio for instructions and news reports. Cooperate fully with public safety officials and instructions.
4. Do not use vehicles unless there is an emergency. Keep the streets clear for emergency vehicles.
5. Remain calm and lend a hand to others.
6. If the site is evacuated, leave a message telling others where personnel can be found.

### The EC will be responsible for:

- ✓ Ensuring that KLF safety programs are fully implemented.
- ✓ Coordinating evacuation of the KLF including notification of adjacent property owners/tenants, as required.
- ✓ Communicating with the County of Kaua’i and the State of Hawai’i, as well as local authorities and emergency response personnel to inform them:
- ✓ When the KLF becomes operational after the storm;

- ✓ The situation at the KLF, such as waste storage capacity, transportation coordination, site conditions, personnel status, etc.
- ✓ In the event of inoperable telephone systems, notification of the appropriate agencies/businesses will be accomplished in the most expedient manner available (cellular phones, person to person, overnight mail, etc.).
- ✓ Notifying incoming drivers/haulers via radio or cell phone to avoid the site.
- ✓ Notifying WM Safety personnel of the emergency - determine whether a 24-Hour Report is required.
- ✓ Conducting a Post-Hurricane Inspection (Post-Hurricane/Severe Storm Forms [Appendix B]).

Hurricanes leave behind debris made up of construction materials, damaged buildings, sediments, green waste, and personal property. Hurricane debris obstructs roads and disables electrical power and communication systems over wide areas. The goals of post-hurricane efforts will be to increase debris diversion rates, minimize environmental impacts, reduce waste management costs, minimize threats to health and safety, and shorten the duration of the cleanup effort. WMH may be asked to provide assistance at collection sites across the island to monitor incoming debris. These efforts will be coordinated with the DOH or emergency response personnel.

### **3.8 BOMB THREAT (PHONE CALL)**

The most basic preventative measures are properly securing the site so that an explosive device cannot be easily placed without detection.

A higher probability of bomb threats due to a history of past threats, a neighborhood or community trend, or a situation involving a particularly vengeful individual may warrant more extensive measures such as more stringent security, training programs, package instructions, more involved search and evacuation procedures, and recorders on appropriate telephones. Such a high probability will also warrant more contact with local law enforcement authorities. The KLF does not have a high probability of bomb threats. A bomb call threat checklist is included in Appendix C.

#### If the Bomb Threat is Called In:

1. Listen while the caller talks and fill out the attached bomb threat call checklist (see Appendix C).
2. Inform the caller that the building is occupied and that the detonation of a bomb could result in death or serious injury to many innocent people.
3. Attempt to determine the location and description of the bomb and time of detonation. Obtain as much information as possible including time of call, background noise, etc.
4. Notify the KLF Site Manager or other on-site manager.



5. KLF Management will report the bomb threat to the local police department.
6. Search the area if time permits. Do not touch any suspicious items. Report any suspicious items to the KLF Site Manager and the local police department.
7. Evacuate the area where any suspicious items are located.

### **3.9 CIVIL DISTURBANCE/DEMONSTRATION**

1. Do not become a spectator. Leave the area of the disturbance to avoid injury or arrest.
2. Lock all doors, gates, and windows. Close all drapes and avoid window areas. Do not argue with or agitate the participants.
3. Remain calm, be courteous, and do not do anything to provoke an incident.
4. Contact the KLF Site Manager and local police department as soon as possible.
5. If required to protect employees and company property, service may have to be limited and/or access to the building may have to be restricted.
6. Keep telephone lines open and avoid unnecessary inquiries regarding the incident.

### **3.10 ARMED ROBBERY**

1. If confronted by an armed robber, do not argue with the individual.
2. Give the individual what he wants. Do not block his option to escape.
3. Remember what you can about the incident including individual's height, weight, hair length, color of eyes, color of hair, race, distinguishing marks or scars. If a weapon or vehicle is visible, try to remember as much detail about it as possible.
4. After the incident is over, call the police immediately.
5. Under no circumstances should you try to intercede or stop the robbers involved in the incident.

### **3.11 TERRORIST THREATS**

#### In the office:

1. Close business.
2. If there are customers or visitors in the building, provide for their safety by asking them to stay – not leave. When authorities provide directions to shelter-in-place\*, they want everyone to take those steps immediately, where they are, and not drive or walk outdoors.

*\*Note: One of the instructions you may be given in an emergency where hazardous materials may have been released into the atmosphere is to shelter-in-place. This is a precaution aimed to keep you safe while remaining indoors (this is not the same thing as going to a shelter in case of a storm). Shelter-in-place means selecting a small, interior room, with no or few*



*windows, and taking refuge there. It does not mean sealing off your entire home or office building.*

3. Unless there is an imminent threat, ask employees, customers, and visitors to call their emergency contact to let them know where they are and that they are safe. Turn on call-forwarding or alternative telephone answering systems. Change the recording on voice mail to indicate that the business is closed, and that staff and visitors are remaining in the building until authorities advise it is safe to leave.
4. Close and lock all windows, exterior doors, and any other openings to the outside. If you are told there is danger of explosion, close window shades, blinds, or curtains.
5. Have employees familiar with your building's mechanical systems turn off all fans and heating and air conditioning systems. Some systems automatically provide for exchange of inside air with outside air – these systems in particular need to be turned off, sealed, or disabled.
6. Gather essential disaster supplies, such as nonperishable food, bottled water, battery-powered radios, first aid supplies, flashlights, batteries, duct tape, plastic sheeting, and plastic garbage bags.
7. Select interior room(s) above the ground floor, with the fewest windows or vents. The room(s) should have adequate space for everyone to be able to sit in. Avoid overcrowding by selecting several rooms if necessary. Large storage closets, utility rooms, pantries, copy and conference rooms without exterior windows will work well. Avoid selecting a room with mechanical equipment like ventilation blowers or pipes, because this equipment may not be able to be sealed from the outdoors.
8. It is ideal to have a hard-wired telephone in the room(s) you select. Call emergency contacts and have the phone available if you need to report a life-threatening condition. Cellular telephone equipment may be overwhelmed or damaged during an emergency.
9. Use duct tape and plastic sheeting (heavier than food wrap) to seal all cracks around the door(s) and any vents into the room.
10. Bring everyone into the room(s). Shut and lock the door(s).
11. Write down the names of everyone in the room, and call your business' designated emergency contact to report who is in the room with you, and their affiliation with your business (employee, visitor, and customer).
  12. Keep listening to the radio or television until you are told all is safe or you are told to evacuate. Local officials may call for evacuation in specific areas at greatest risk in your community.

### In A Vehicle:

If you are driving a vehicle and hear advice to shelter-in-place on the radio, take these steps:



1. If you are very close to home, your office, or a public building, go there immediately and go inside. Follow the shelter-in-place recommendations for the place you pick described above.
2. If you are unable to get to a home or building quickly and safely, pull over to the side of the road. Stop your vehicle in the safest place possible. If it is sunny outside, it is preferable to stop under a bridge or in a shady spot, to avoid being overheated.
3. Turn off the engine. Close windows and vents.
4. If possible, seal the heating/air conditioning vents with duct tape.
5. Listen to the radio regularly for updated advice and instructions.
6. Stay where you are until you are told it is safe to get back on the road. Be aware that some roads may be closed or traffic detoured. Follow the directions of law enforcement officials.

Local officials on the scene are the best source of information for your particular situation. Following their instructions during and after emergencies regarding sheltering, food, water, and clean up methods is your safest choice.

Remember that instructions to shelter-in-place are usually provided for a duration of a *few hours, not days or weeks*. There is little danger that the room in which you are taking shelter will run out of oxygen – suffocation is not likely.

### **3.12 HIGH GROUNDWATER LEVELS**

The primary pumping station in the Kekaha area (Kawaiele) is a drainage pumping station that is operated and maintained by the State of Hawaii Agribusiness Development Corporation (ADC) and the Kekaha Agriculture Association (KAA), in coordination with the U.S. Navy. The Kawaiele pumping station uses three pumps that can achieve a flow of 50 mgd to prevent flooding of the Mana Plains, while maintaining groundwater levels for agricultural and Navy PMRF activities. The pump station uses a transducer level control system to maintain a groundwater level at approximately 2 ft below sea level. A variable frequency drive controller automatically controls the pumps, operating on an uninterrupted basis 24 hours a day.

The County relies on the ADC and the Navy to continue to maintain and operate the pump station, and they have indicated their commitment to do so into the indefinite future.

Due to the remote possibility that the Kawaiele pumping station becomes temporarily inoperable due to maintenance or other issues, the groundwater in the area of the KLF may rise. If KLF staff observe conditions (i.e. unusual muddy areas, flooding conditions not due to rain, etc.) indicating high groundwater levels, the ADC and the KAA will be immediately contacted. Phone numbers for the ADC and KAA are provided in Section 2.0.

### 3.13 TSUNAMI HAZARD

Tsunamis are a series of waves that can travel an average of 450 miles per hour in the open ocean and are typically produced by unpredicted earthquakes or underwater landslides. The Pacific Tsunami Warning Center provides warnings before a tsunami is likely to approach. There are three types of warnings—a “Tsunami Watch” is a notice that is given when an event may impact an area without confirmation that a tsunami is underway; a “Tsunami Advisory” is a notice that is issued due to dangerous coastal conditions produced by a tsunami without major widespread inundation; a “Tsunami Warning” is a notice that is given when major widespread inundation is imminent or expected. Although, the KLF is located within the tsunami evacuation zone, it is outside the tsunami inundation zone.

The following measures will be taken to protect against excessive erosion and flooding during tsunamis.

Prior to an anticipated tsunami:

1. KLF personnel will inspect all drainage on-site structures to verify that they are in working order.
2. Diversion berms will be constructed around the current disposal area as needed to prevent run-on from entering the waste fill, and to prevent runoff from the waste fill areas of the site.
3. Interim cover will be placed over exposed waste following the forecasted beginning of a Tsunami Warning.

At the discretion of WMH Management, the site may be closed for business during Tsunami Warning periods. In this event, the working face will be closed and covered with interim cover and graded to direct run-off to the drainage features. Appropriate local authorities and emergency coordinators will be contacted should a Tsunami Warning be issued (Section 2.0).

Once a “Tsunami Watch” or “Tsunami Advisory” is Issued:

A tsunami may generate contaminated debris or other atypical wastes that require special handling, processing, or disposal procedures that are not addressed by the facility permit and require special approval for disposal from the DOH. After the potential effects of a tsunami are verified by local authorities (i.e., severe flooding, storm surge, high winds, etc.), the KLF will consider acquiring supplies and materials (fuel, additional soil cover or alternate material, vehicles, heavy equipment, grinder/chippers, auxiliary lighting, pumps, generators, fire suppressant equipment, rain gear, personnel protective equipment, etc.) to ensure adequate equipment to handle the increase in waste and ensure airspace availability following a tsunami.



In the event of a tsunami reaching the island of Kaua'i, KLF personnel will perform the following as preparation:

1. Conduct a briefing to entire staff on the status of conditions & severity of the tsunami and how it may impact the facility and service area / region. Discuss emergency operating procedures for facility.
2. Power outages should be anticipated and procedures will be employed (when the KLF re-opens to accept waste) as needed to manually track the date the waste was received, the quantity by weight or volume, and the origin of the waste.
3. Inspect all drainage on-site structures to verify that they are in working order.
4. Diversion berms will be constructed around the current disposal area as needed to prevent run-on from entering the waste fill, and to prevent runoff from the waste fill areas of the site.
5. Interim cover will be placed over exposed waste at the end of the working day.

### Once a "Tsunami Warning" is Issued:

1. The EC (or manager in charge) will track the tsunami front (via radio, television, internet, etc.) and implement the following procedures to properly shutdown all operations at the KLF:
  - If possible, all electrical lines/breakers/gas valves should be shut down to prevent any potential fires. Unplug all appliances.
  - Secure facility property, structures, landfill equipment, and office (preserve records and data [electronic and hard copies]) in case of flooding or power failure. Anything that is not secured may become a damaging projectile in the event of high winds. Cover all windows with wood panels (if possible).
  - Check batteries and stock up on first aid supplies, and drinking water.
  - Vehicles, generators, and mobile refuelers will be moved to the top of the Phase II.
  - KLF Management will require that site personnel return to their homes. If on-site, evacuate to the main office building and stay there (shelter in place) – stay away from windows.

### After the Tsunami:

1. KLF / WMH Management will promptly (when it is safe to do so) conduct a visual survey & damage assessment of the site to identify any compromised building structures, slope failures, downed power lines, and water leaks, broken electrical. Appropriate agencies will be contacted (Section 2.0).
2. Wiring, fires, tank leaks/spills, or other conditions that could threaten worker or public safety.
  - If fires occur, follow the procedures set forth in Section 3.2.



3. If injuries occur, follow the procedures set forth in Section 3.3. Turn on portable radio for instructions and news reports. Cooperate fully with public safety officials and instructions.
4. Do not use vehicles unless there is an emergency. Keep the streets clear for emergency vehicles.
5. Remain calm and lend a hand to others.
6. If the site is evacuated, leave a message telling others where personnel can be found.

The EC (or manager in charge) will be responsible for:

1. Ensuring that KLF safety programs are fully implemented.
2. Coordinating evacuation of the KLF including notification of adjacent property owners/tenants, as required.
3. Communicating with the County of Kaua'i and the State of Hawai'i, as well as local authorities and emergency response personnel to inform them:
  - o When the KLF becomes operational after the storm;
  - o The situation at the KLF, such as waste storage capacity, transportation coordination, site conditions, personnel status, etc.
  - o In the event of inoperable telephone systems, notification of the appropriate agencies/businesses will be accomplished in the most expedient manner available (cellular/mobile phones, person to person, overnight mail, etc.).
4. Notifying incoming drivers/haulers via radio or cell phone to avoid the site.
5. Notifying WM Safety personnel of the emergency - determine whether a 24-Hour Report is required.
6. Conducting a Post-Tsunami Inspection (Post-Tsunami / Severe Storm Forms [Appendix B]).

If a tsunami hazard causes the acceptance of waste to cease, the KLF will submit a written evaluation to the DOH prior to resuming waste acceptance. The evaluation (Appendix B) will certify that the landfill and its associated environmental controls are functional, equivalent or better than required, and that operation of the landfill will not cause a violation of environmental regulations. Any findings and corrective actions will furthermore be described and evaluated. The KLF can resume acceptance of waste upon submission of the evaluation to the DOH.





#### 4.0 EMERGENCY EQUIPMENT & PPE

The EC monitors and stores all emergency equipment and PPE supplies stocked. Any deficiencies in supply or operation are corrected as soon as possible.

KLF emergency equipment and locations (Figure 3) consists of:

- Eye wash station (maintenance shop)
- Shovels
- Spill kit - contains absorbent (kitty litter), containment booms, sorbent pads (maintenance shop & mobile tank trucks)
- First aid kits (site vehicles & buildings)
- Fire extinguishers (all buildings, site vehicles & landfill equipment)

KLF PPE includes:

- Hard hats
- High visibility safety vests
- Dust masks
- Ear plugs
- Steel toed work boots
- Safety glasses (as needed)
- Gloves



## **5.0 ADMINISTRATIVE PROCEDURES**

The WMH Environmental Protection Manager will work with the EC to ensure that corrective measures (if necessary) are implemented, follow-up reports / inspections are completed, and that the appropriate agencies and parties are notified.

### **5.1 EMERGENCY REPORTING**

Emergency reporting will be in compliance with federal, state, local and WM requirements. KLF reporting includes:

- Reporting of significant events/emergency incidents to the EC (or manager in charge), WMH Management, and to the WM Safety & Environmental Protection representatives.
- Reporting of significant events/emergency incidents to the proper agencies (if necessary) as soon as possible.

If it is determined that the KLF has had a release, fire, or explosion involving hazardous materials that could threaten human health, or the environment outside the facility, the following actions should be taken:

- The EC shall immediately notify the appropriate local authorities and help these local officials decide whether local areas should be evacuated.
- The Environmental Protection Manager will immediately notify the DOH . This report shall include:
  - ✓ Name and telephone number of reporter
  - ✓ Name and address of facility; time and type of incident
  - ✓ Name and quantity of material(s) involved to the extent known
  - ✓ The extent of injuries, if any
  - ✓ The possible hazards to human health, or the environment, outside the facility

### **5.2 TRAINING**

In accordance with federal, state, local and WM requirements, KLF personnel are trained annually on the *Emergency Action Plan* and what their roles/responsibilities are in the event of an emergency. The KLF emergency training requirements include:

- As required, testing of the plan by key staff.
- Semi-annual drills with all employees (documentation form attached).
- Location of all emergency shut down and main electrical power switches.
- Fire hazards of the materials and hazards to which employees are exposed.



- Location and operation of fire extinguishers.
- Proper and safe handling of gasoline and other petroleum products including cleanup of minor spills.
- Location of the KLF Emergency Action Plan.
- Location of evacuation routes and re-assembly/evacuation points for the site.
- Training documentation forms are included in Appendix D. All trainings and drills are documented and placed in the KLF Operating Record/Files.

### **5.3 PLAN UPDATE AND DISTRIBUTION**

**THE *EMERGENCY ACTION PLAN* IS A LIVING DOCUMENT AND WILL BE REVIEWED AT LEAST ANNUALLY FOR ACCURACY AND RELEVANCE AND UPDATED AS WARRANTED BY CHANGES IN SITE CONDITIONS OR PROCEDURES. UPDATES TO THIS PLAN WILL BE SUBMITTED TO APPROPRIATE AGENCIES IN A TIMELY MANNER.**

The *Emergency Action Plan* is part of the KLF Site Operations Manual, of which there are four controlled copies – one copy will remain on-site at the KLF, one (1) copy will be kept on-site at the Waimanalo Gulch Sanitary Landfill, one (1) copy will be submitted to the DOH, and one (1) copy will be submitted to the County of Kaua'i. A Copy of the Plan will also be placed in the break room at the KLF.



**FIGURES**





**Figure 1: Site Location Map**



L:\work\ERW\To be filed\Waste Management of Hawaii\Kekaha Landfill Phase II\CAD\Kekaha Landfill PH2 Site Map.dwg 12/21/09 2:47 PM shimotor

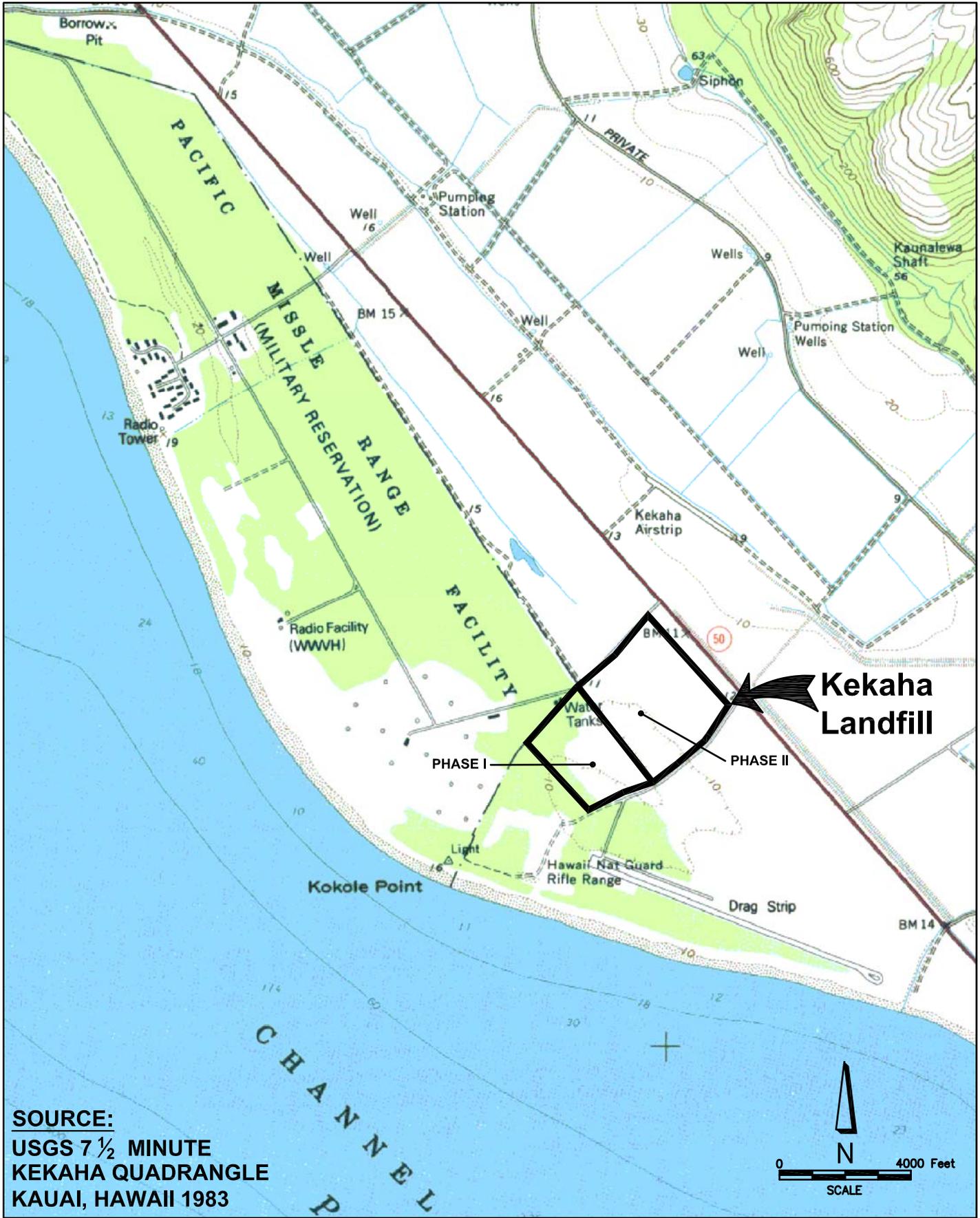


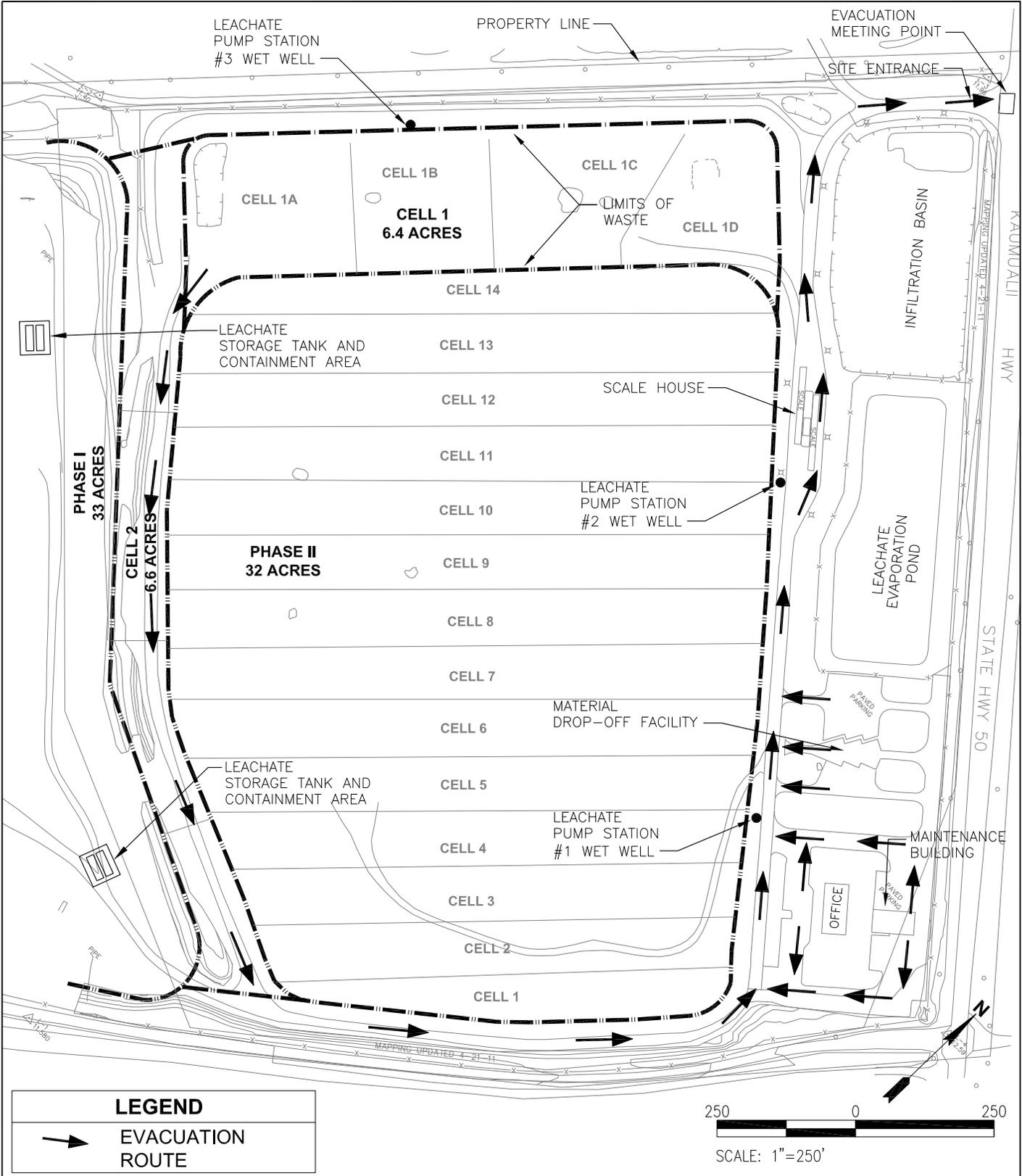
Figure 1  
Site Location Map  
Kekaha Municipal Solid Waste Landfill  
Kekaha, Hawai'i





**Figure 2: Site Layout Map**





LEGEND	
	EVACUATION ROUTE



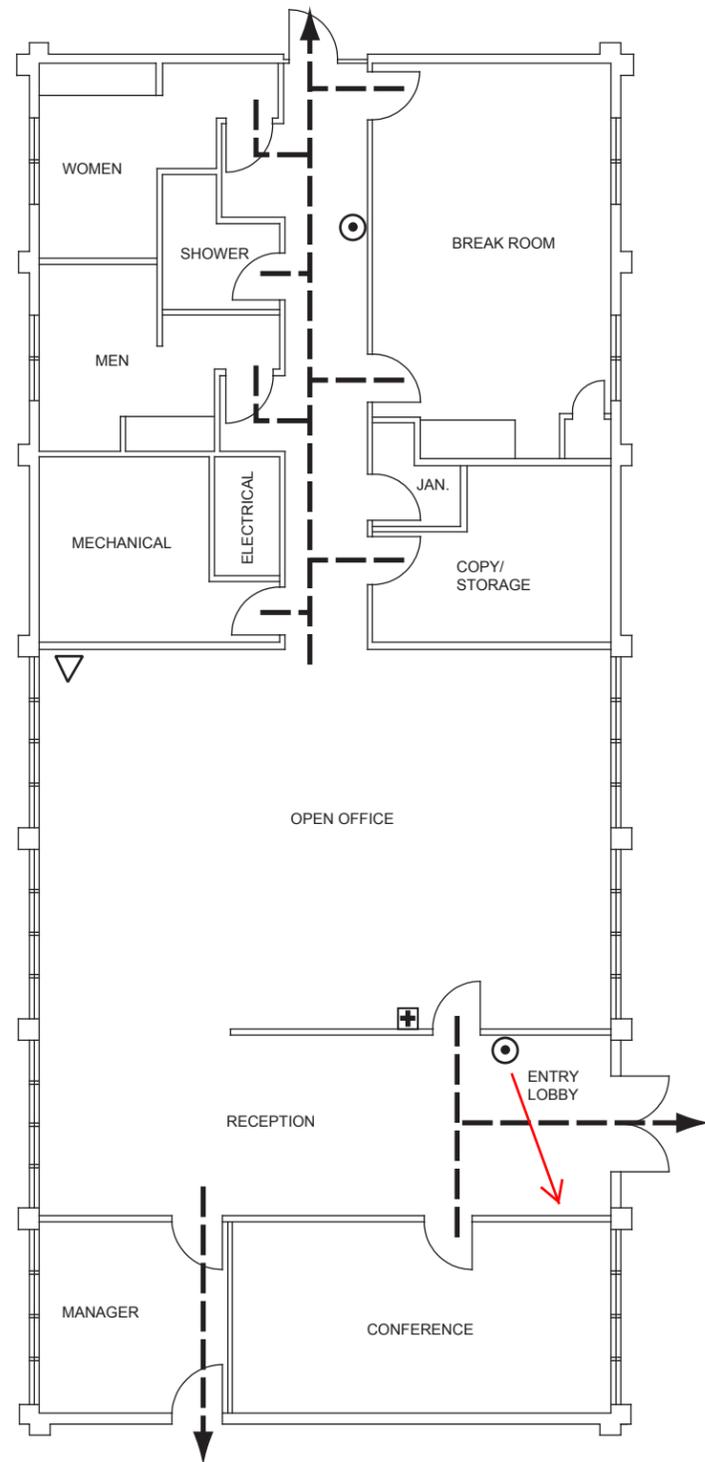
**Figure 2**  
**Site Layout Map**  
**Kekaha Municipal Solid Waste Landfill**  
**Kekaha, Hawai'i**



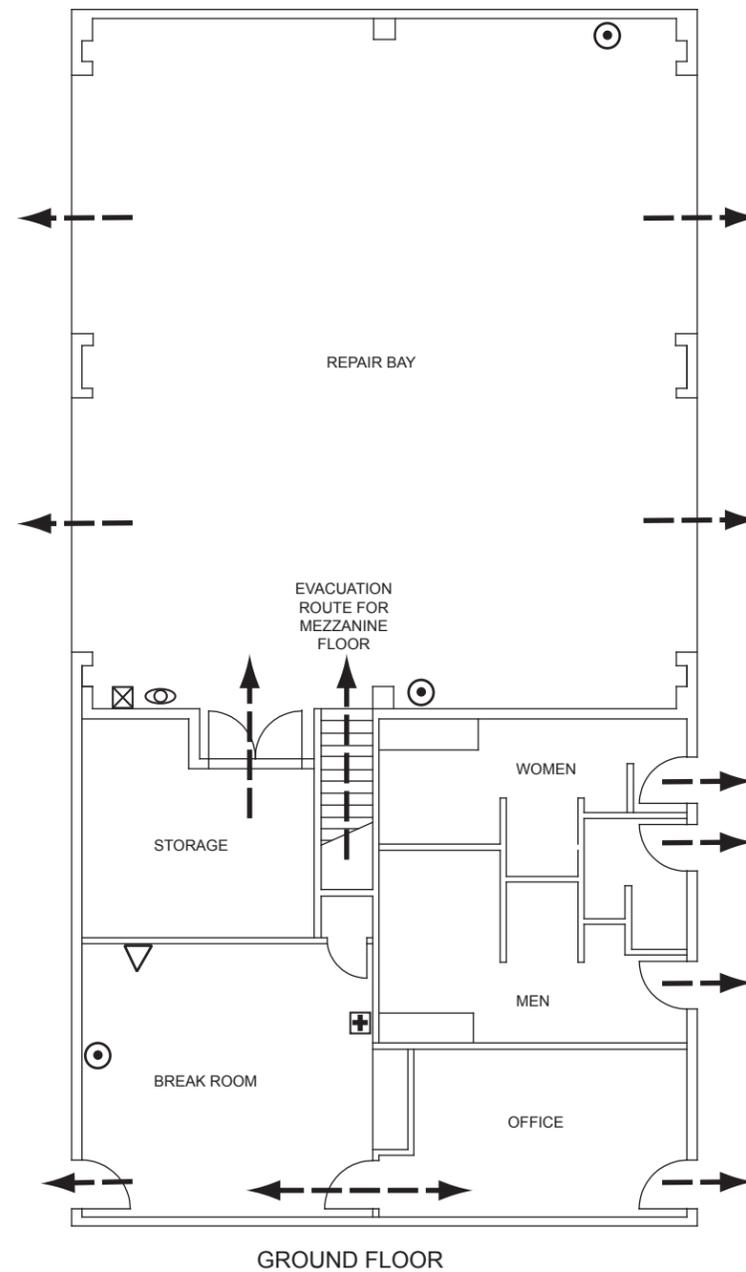


**Figure 3: Building Emergency Evacuation Routes**



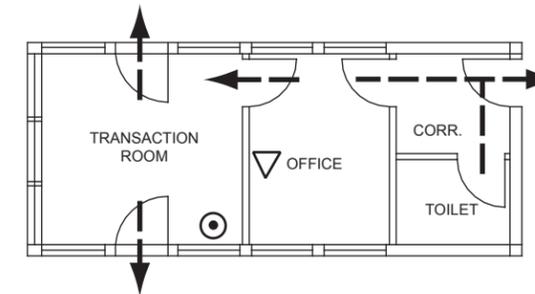


**Office Building**

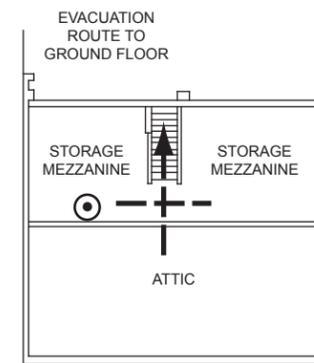


GROUND FLOOR

**Maintenance Shop**



**Scale House**



MEZZANINE FLOOR

Legend	
▽	Methane Monitor
+	First Aid Box
⊙	Fire Extinguisher
⊠	Emergency Shower
⦶	Eyewash Station
← - - -	Evacuation Route

**Figure 3**  
**Building Emergency Evacuation Routes**  
**Kekaha Municipal Solid Waste Landfill**  
**Kekaha, Hawai'i**





**Figure 4: Hospital Route Map**



# Directions to 4643 Waimea Canyon Dr, Waimea, HI 96796

Total Time: 12 mins, Total Distance: 5.86 mi

Distance

- |          |  |  |
|----------|--|--|
| <b>A</b> | 1. Starting at 21.988509,-159.747421 on KAUMUALII HWY go 5.64 mi going toward AKIALOA RD |  |
|          | 2. Turn <b>L</b> on WAIMEA CANYON DR(HI-550) go 0.22 mi                                  |  |
| <b>B</b> | 3. Arrive at 4643 WAIMEA CANYON DR, WAIMEA, on the <b>L</b>                              |  |

Time: 12 mins, Distance: 5.86 mi



Veterans Memorial Hospital  
4643 Waimea Canyon Road  
Waimea, Hawaii  
(808)-338-9431

**Figure 4**  
**Hospital Route Map**  
**Kekaha Municipal Solid Waste Landfill**  
**Kekaha, Hawai'i**





**APPENDIX A**

**FIRE PREVENTION PLAN**





## **APPENDIX A - FIRE PREVENTION PLAN**

This Fire Prevention Plan for the Kekaha Sanitary Landfill (KLF) – Phase II-Cell 1 Vertical Expansion designates:

- Housekeeping procedures that help to prevent fires
- Potential fire hazards
- Proper handling and storage procedures for combustible materials
- Potential ignition sources and their control procedures
- Type of fire protection equipment available to control fire hazards

The names and job titles of personnel responsible for maintenance of equipment and systems installed to prevent or control ignition of fires and control of accumulation of flammable or combustible waste materials are:

- KLF Site Manager: John Ruiz
- KLF Emergency Coordinator: John Ruiz
- KLF Operations Manager: Ian Imamura
- WMH Environmental Protection Manager: Justin Lottig

### **HOUSEKEEPING PROCEDURES FOR FIRE PREVENTION:**

- Avoid the accumulation of combustible materials.
- Keep flammable and combustible materials away from ignition sources.
- Keep all stairways, fire fighting equipment locations, and exit paths clear.
- Report spill/leaks promptly to management to assure corrective action is taken.
- Remove all waste at the end of each shift and placing it in the appropriate waste receptacles.
- Store all oily rags in an approved receptacle.
- Store flammables in an approved flammable cabinet a minimum of 25 feet from sources of ignition.
- Store work clothes in metal lockers.
- Use correct cleaning agents and avoiding the use of flammable/combustible materials for cleaning.



- Contain and clean up fuel spills immediately. Soil contaminated with spilled fuel will be excavated and, if authorized, disposed of at the working face.

**POTENTIAL FIRE HAZARDS, POTENTIAL IGNITION SOURCES, PROPER HANDLING/STORAGE PROCEDURES, AND FIRE PROTECTION EQUIPMENT**

Tables A-1 and A-2 list the potential fire hazards, potential ignition sources, proper handling/storage procedures, and fire protection equipment that can control these hazards.

**TABLE A-1**

**SITE LOCATIONS WITH POTENTIAL FIRE HAZARDS AND POTENTIAL IGNITION SOURCES**

<b><u>LOCATION</u></b>	<b><u>POTENTIAL FIRE HAZARDS</u></b>	<b><u>POTENTIAL IGNITION SOURCES</u></b>
<b>Administrative Offices</b>	Combustible materials (e.g., paper, cardboard, etc.) Electrical cords/outlets/wiring Flammable/combustible liquids (e.g., aerosol cans, solvents, etc.)	Open flames (e.g., smoking materials, etc.) Hot surfaces (e.g., appliances, electrical wiring, etc.) Open flames (e.g., smoking materials, etc.)
<b>Maintenance Shop</b>	Flammable/combustible liquids (e.g., diesel, solvents, product oils, etc.) Combustible materials (e.g., paper, cardboard, etc.) Electrical cords/outlets/wiring Flammable/oxidizing gases (e.g., acetylene, oxygen, etc.) Open flames (e.g., welding, cutting, etc.) Contaminated materials (e.g., oily rags, etc.)	Open flames (e.g., welding, smoking materials, etc.) Sparks from friction (e.g., grinding) Hot surfaces (e.g., power tools, electrical wiring, etc.) Static electricity Internal combustion engines (e.g., vehicles, forklifts, etc.) Open flames (e.g., welding, smoking materials, etc.)



**TABLE A-2**

**CONTROL PROCEDURES AND FIRE PROTECTION EQUIPMENT  
FOR POTENTIAL FIRE HAZARDS AND POTENTIAL IGNITION SOURCES**

**POTENTIAL FIRE HAZARDS/  
IGNITION SOURCES**

**CONTROL PROCEDURE/FIRE PROTECTION EQUIPMENT**

**Combustible materials**

- Avoid accumulation of combustible materials (e.g., empty boxes, cartons, loose paper, etc.)
- Keep combustible materials away from ignition sources including establishment/enforcement of no smoking/no open flame areas
- Keep all stairways, firefighting equipment locations and exit paths clear
- Remove all waste (e.g., dust, lint, loose paper, etc.) at the end of each shift in each work area (including floors, ceilings, walls, ledges, beams, and equipment) and place in appropriate waste receptacle
- Store work clothes in metal lockers
- Maintain fire extinguishing equipment capable of handling Class A fires within 75 feet of combustible materials
- Perform annual maintenance and monthly inspections on fire extinguishing equipment
- Train personnel in use of fire extinguishing equipment

**Electrical cords/outlets/wiring**

- Inspect power cords for damaged insulation and damaged plugs
- Discontinue use of a power cord that gets warm
- Maintain electrical motors in good operating condition
- Do not overload motors, cords or other electrical equipment
- Maintain fire-extinguishing equipment capable of handling Class C fires near electrical equipment
- Perform annual maintenance and monthly inspections on fire extinguishing equipment
- Train personnel in use of fire extinguishing equipment

**Flammable/combustible liquids**

Keep materials in covered containers when not in use  
Do not transport materials in open containers  
Store flammable liquids in containers with appropriate warning labels  
Do not store near sources of heat/ignition  
Inert and verify inert atmosphere of containers, piping, tanks that have contained flammable/combustible liquids prior to exposure to heat/flame  
Maintain fire-extinguishing equipment capable of handling Class B fires within 50 feet of flammable/combustible liquids  
Perform annual maintenance and monthly inspections on fire extinguishing equipment  
Train personnel in use of fire extinguishing equipment

**Welding/cutting operations**

Establish approved areas for cutting and welding  
Establish approved procedures for a hot work program to restrict cutting/welding in all other areas along with a designated individual for approving such cutting/welding  
Utilize only approved equipment for cutting/welding  
Train all personnel that perform cutting/welding  
Verify training of contractors who perform cutting/welding  
Provide contractor orientation of potential fire hazards on-site  
Do not perform cutting/welding within 35 feet of combustible materials  
Implement hot work permit program  
Maintain fire extinguishing equipment capable of handling Class A, B, and C fires near the welding operation  
Perform annual maintenance and monthly inspections on fire extinguishing equipment  
Train personnel in use of fire extinguishing equipment

**Flammable/oxidizing gas cylinders**

Do not store cylinders near sources of heat/flame  
Cylinders stored inside buildings will be in a well-protected, well-ventilated, dry location at least 20 feet from highly combustible materials  
Cylinders storage will be located where passing/falling objects will not damage cylinders  
Do not store cylinders where they could be subject to tampering by unauthorized personnel  
Do not store cylinders near elevators, stairs or passageways  
Do not store cylinders in unventilated enclosures  
Do not store oxygen cylinders near highly combustible materials such as oil/grease  
Maintain fire extinguishing equipment capable of handling Class A, B, and C fires within 75 feet of welding areas

**Open flames**

Keep sources of ignition including open flames away from combustible materials  
Establish and enforce no smoking/no open flame areas  
Establish and enforce a hot work program  
Maintain fire extinguishing equipment capable of handling Class A, B, C fire near areas with open flames

**Contaminated materials**

Keep sources of ignition away from contaminated materials  
Store contaminated materials in appropriate waste receptacle (e.g., oil rag container)  
Maintain fire extinguishing equipment capable of handling Class A, B, and C fires where contaminated materials are stored

**Hot surfaces**

Keep sources of ignition including hot surfaces away from combustible materials  
Maintain fire extinguishing equipment capable of handling Class A, B, and C fires near areas with hot surfaces

**Sparks from friction**

Keep sources of ignition including sparks from friction away from combustible materials  
Maintain fire extinguishing equipment capable of handling Class A, B, and C fires near areas where sparks from friction may occur

**Static electricity**

Utilize proper grounding/bonding procedures when moving volatile liquids  
Verify continuity of grounds on a regular basis  
Maintain fire extinguishing equipment capable of handling Class A, B, and C fires within 50 feet of flammable/combustible liquid storage

**Internal combustion engines**

Maintain internal combustion engines in good repair  
Clean up spills/leaks from internal combustion engines promptly and store contaminated material safely  
Report spills/leaks from internal combustion engines promptly to supervision to assure corrective action is taken  
Maintain fire extinguishing equipment capable of handling Class A, B, and C fires on all vehicles

**FIRE PROTECTION EQUIPMENT**

The KLF is equipped with fire extinguishers that are fully charged and ready for use at all times. Each extinguisher is inspected on an annual basis and recharged as necessary. A qualified service company performs the annual inspections, and all extinguishers display a current inspection tag. Inspection and recharging will be performed following each use. The main office, scale house, vehicle maintenance building, all landfill equipment, and landfill vehicles are equipped with fire extinguishers.

The fire prevention plan and fire control procedures for the KLF will be revisited following the occurrence of a significant fire to determine if modifications are warranted.

**FIRE EXTINGUISHER USE**

All KLF equipment operators are trained annually on the proper usage of fire extinguishers. Documentation of training sessions are kept on-site as part of the KLF Operating Record/Files.

All landfill equipment has a charged ABC fire extinguisher with at least a 20-pound rating. This type of extinguisher is good for:

- A – Ordinary combustibles (paper, leaves, general trash, etc.)
- B – Flammable liquids (diesel fuel, hydraulic oil, motor oil, etc.)
- C – Electrical equipment (electrical wiring system on the equipment)

Use the P.A.S.S. method for extinguishing a small fire:

P ull the pin.

A im at the base of the flame.

S queeze the handle.

S weeping motion from side-to-side.

If the fire has grown beyond a small fire, clear the area and allow the fire department to extinguish the fire.





**APPENDIX B**

**POST EARTHQUAKE FORMS**

**&**

**POST SEVERE WEATHER (POST HURRICANE / SEVERE STORM / TSUNAMI) FORMS**





**KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II  
EARTHQUAKE DAMAGE REPORT FORM**

Date / Time of Seismic Event: \_\_\_\_\_

Date / Time of Inspection: \_\_\_\_\_

Note: Fill out one form for each damage observation.

1. What is damaged? \_\_\_\_\_

2. Location of damage: \_\_\_\_\_

3. Description of Damage: \_\_\_\_\_

Log of Corrective Actions Implemented: \_\_\_\_\_

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Date damage was repaired: \_\_\_\_\_

Damage repaired by: \_\_\_\_\_



**KEKAHA MUNICIPAL SOLID WASTE LANDFILL – Phase II  
POST EARTHQUAKE INSPECTION SHEET**

Date of Earthquake: \_\_\_\_\_

Date of Inspection: \_\_\_\_\_

Distance from Epicenter: \_\_\_\_\_

Epicenter Location: \_\_\_\_\_

Time of Earthquake: \_\_\_\_\_

Time of Inspection: \_\_\_\_\_

Person(s) Conducting Inspection: \_\_\_\_\_  
\_\_\_\_\_

		<u>Damage Evident</u>	
		<b>Yes</b>	<b>No</b>
<b>Drainage Structures</b>			
•	down drains	_____	_____
•	inlet/outlet structures	_____	_____
<b>Fueling / Maintenance Area</b>			
•	Maintenance buildings	_____	_____
•	2,000-gallon diesel AST	_____	_____
•	Mobile #1, 300-gallon diesel tank	_____	_____
•	Mobile #2, 182-gallon engine oil tank	_____	_____
•	Miscellaneous 55-gallon drums	_____	_____

Any leaks/spills? \_\_\_\_\_



	<u>Damage Evident</u>	
	Yes	No
<b>Side Slopes</b>	_____	_____
<b>Landfill Cover</b>	_____	_____
<b>Access Roads</b>	_____	_____
<b>Landfill Heavy Equipment</b>	_____	_____
<b>Fencing</b>	_____	_____
<b>Facility Buildings</b>		
• Admin office	_____	_____
• Scale house	_____	_____
• Telephones	_____	_____
• Computers	_____	_____
• Scales	_____	_____
• Maintenance shop	_____	_____
<b>Water Supply</b>		
• Main water meter	_____	_____
• Mainline	_____	_____
• Water truck	_____	_____
• Backflow preventer	_____	_____
<b>Power Line(s)</b>	_____	_____



	<u>Damage Evident</u>	
	Yes	No
<b>Leachate Collection System</b>		
• Wet Well #1		
○ manhole	_____	_____
○ sump/riser	_____	_____
○ transducer system/panel	_____	_____
○ pipes/hoses	_____	_____
○ pumps	_____	_____
○ power	_____	_____
• Wet Well #2		
○ manhole	_____	_____
○ sump/riser	_____	_____
○ transducer system/panel	_____	_____
○ pipes/hoses	_____	_____
○ pumps	_____	_____
○ power	_____	_____
• Wet Well #3		
○ manhole	_____	_____
○ sump/riser	_____	_____
○ transducer system/panel	_____	_____
○ pipes/hoses	_____	_____
○ pumps	_____	_____
○ power	_____	_____

Any leaks/spills? \_\_\_\_\_

Any vapors evident? \_\_\_\_\_



**Damage Evident**

**Yes                      No**

**Leachate Evaporation Pond**

- |  |       |       |
|--|-------|-------|
| • Aerator mooring posts and guide wires  | _____ | _____ |
| • Aerators   | _____ | _____ |
| • Batten Strip on aerator support pad  | _____ | _____ |
| • Forcemain outlet   | _____ | _____ |
| • Forcemain meter  | _____ | _____ |
| • Sideslope geocell system   | _____ | _____ |
| • Geocell and geosynthetic anchor trench   | _____ | _____ |
| • Float level switch, junction box, and wires                                    | _____ | _____ |
| • Float supports and floats  | _____ | _____ |
| • 2-inch gravel protection layer on base   | _____ | _____ |
| • Observational geotextile   | _____ | _____ |
| ○ Observational geotextile torn or cut?  |       |       |
| ○ If geotextile damaged, was granular operations layer disturbed?                |       |       |
| ○ If granular operations layer disturbed, was damage done to cushion geotextile? |       |       |
| ○ If cushion geotextile was damaged, is geomembrane damaged?                     |       |       |

Any leaks/spills? \_\_\_\_\_

Any vapors evident? \_\_\_\_\_



	<u>Damage Evident</u>	
	Yes	No
<b>Perimeter Gas Probes</b>		
• GPII-1		
○ concrete pad	_____	_____
○ casing	_____	_____
• GPII-2		
○ concrete pad	_____	_____
○ casing	_____	_____
• GPII-3		
○ concrete pad	_____	_____
○ casing	_____	_____
• GPII-4		
○ concrete pad	_____	_____
○ casing	_____	_____
• GPII-6		
○ concrete pad	_____	_____
○ casing	_____	_____
• GPII-7		
○ concrete pad	_____	_____
○ casing	_____	_____

	<u>Damage Evident</u>	
	Yes	No
<b>Groundwater Monitoring Wells</b>		
• MWII-2		
○ concrete pad	_____	_____
○ protective housing	_____	_____
○ casing	_____	_____
○ guard posts	_____	_____
• MWII-4		
○ concrete pad	_____	_____
○ casing	_____	_____
• MWII-5		
○ concrete pad	_____	_____
○ casing	_____	_____



- MWII-6
  - concrete pad \_\_\_\_\_
  - casing \_\_\_\_\_
  
- MWII-7
  - concrete pad \_\_\_\_\_
  - protective housing \_\_\_\_\_
  - casing \_\_\_\_\_
  - guard posts \_\_\_\_\_

Any evidence of damage to wells such as:

- ponded water? \_\_\_\_\_
  
- settlement around the wells? \_\_\_\_\_

Was there any damage to landfill structures, cover or systems caused by the above seismic event?

YES \_\_\_\_\_ NO \_\_\_\_\_

If yes, complete an Earthquake Damage Report Form.



**KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II  
EARTHQUAKE DAMAGE REPORT FORM**

Date / Time of Earthquake: \_\_\_\_\_  
Date / Time of Inspection: \_\_\_\_\_

Note: Fill out one form for each damage observation.

- 1. What is damaged? \_\_\_\_\_
- 2. Location of damage: \_\_\_\_\_
- 3. Description of Damage: \_\_\_\_\_

Log of Corrective Actions Implemented: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date damage was repaired: \_\_\_\_\_  
Damage repaired by: \_\_\_\_\_



**KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II  
SEVERE WEATHER (POST HURRICANE / SEVERE STORM / TSUNAMI) INSPECTION  
SHEET**

Type of Storm (Depression, Tropical Storm, Hurricane): \_\_\_\_\_

Date of Storm: \_\_\_\_\_

Date of Inspection: \_\_\_\_\_

Category of Hurricane (if applicable): \_\_\_\_\_

Recorded Wind Speed(s): \_\_\_\_\_

Time of Hurricane: \_\_\_\_\_

Time of Inspection: \_\_\_\_\_

Person(s) Conducting Inspection: \_\_\_\_\_  
\_\_\_\_\_

**Damage Evident**

**Yes                  No**

**Drainage Structures**

- down drains \_\_\_\_\_
- inlet/outlet structures \_\_\_\_\_

**Fueling / Maintenance Area**

- Maintenance buildings \_\_\_\_\_
- 2,000-gallon diesel AST \_\_\_\_\_
- Mobile #1, 250-gallon diesel tank \_\_\_\_\_
- Miscellaneous 55-gallon drums \_\_\_\_\_

Any leaks/spills? \_\_\_\_\_



	<u>Damage Evident</u>	
	Yes	No
<b>Side Slopes</b>	_____	_____
<b>Landfill Cover</b>	_____	_____
<b>Access Roads</b>	_____	_____
<b>Landfill Heavy Equipment</b>	_____	_____
<b>Fencing</b>	_____	_____
<b>Facility Buildings</b>		
• Admin office	_____	_____
• Scale house	_____	_____
• Telephones	_____	_____
• Computers	_____	_____
• Scales	_____	_____
• Maintenance shop	_____	_____
<b>Water Supply</b>		
• Main water meter	_____	_____
• Mainline	_____	_____
• Water truck	_____	_____
• Backflow preventer	_____	_____
<b>Power Line(s)</b>	_____	_____



**Damage Evident**

**Yes                      No**

**Leachate Collection System**

- Wet Well #1
  - manhole \_\_\_\_\_
  - sump/riser \_\_\_\_\_
  - transducer system/panel \_\_\_\_\_
  - pipes/hoses \_\_\_\_\_
  - pumps \_\_\_\_\_
  - power \_\_\_\_\_
  
- Wet Well #2
  - manhole \_\_\_\_\_
  - sump/riser \_\_\_\_\_
  - transducer system/panel \_\_\_\_\_
  - pipes/hoses \_\_\_\_\_
  - pumps \_\_\_\_\_
  - power \_\_\_\_\_
  
- Wet Well #3
  - manhole \_\_\_\_\_
  - sump/riser \_\_\_\_\_
  - transducer system/panel \_\_\_\_\_
  - pipes/hoses \_\_\_\_\_
  - pumps \_\_\_\_\_
  - power \_\_\_\_\_

Any leaks/spills? \_\_\_\_\_

Any vapors evident? \_\_\_\_\_



	<u>Damage Evident</u>	
	Yes	No
<b>Leachate Evaporation Pond</b>		
• Aerator mooring posts and guide wires	_____	_____
• Aerators	_____	_____
• Batten Strip on aerator support pad	_____	_____
• Forcemain outlet	_____	_____
• Forcemain meter	_____	_____
• Sideslope geocell system	_____	_____
• Geocell and geosynthetic anchor trench	_____	_____
• Float level switch, junction box, and wires	_____	_____
• Float supports and floats	_____	_____
• 2-inch gravel protection layer on base	_____	_____
• Observational geotextile	_____	_____
○ Observational geotextile torn or cut?		
○ If geotextile damaged, was granular operations layer disturbed?		
○ If granular operations layer disturbed, was damage done to cushion geotextile?		
○ If cushion geotextile was damaged, is geomembrane damaged?		

Any leaks/spills? \_\_\_\_\_

Any vapors evident? \_\_\_\_\_



	<u>Damage Evident</u>	
	Yes	No
<b>Perimeter Gas Probes</b>		
• GPII-1		
○ concrete pad	_____	_____
○ casing	_____	_____
• GPII-2		
○ concrete pad	_____	_____
○ casing	_____	_____
• GPII-3		
○ concrete pad	_____	_____
○ casing	_____	_____
• GPII-4		
○ concrete pad	_____	_____
○ casing	_____	_____
• GPII-6		
○ concrete pad	_____	_____
○ casing	_____	_____
• GPII-7		
○ concrete pad	_____	_____
○ casing	_____	_____

	<u>Damage Evident</u>	
	Yes	No
<b>Groundwater Monitoring Wells</b>		
• MWII-2		
○ concrete pad	_____	_____
○ protective housing	_____	_____
○ casing	_____	_____
○ guard posts	_____	_____
• MWII-4		
○ concrete pad	_____	_____
○ casing	_____	_____
• MWII-5		
○ concrete pad	_____	_____
○ casing	_____	_____



- MWII-6
  - concrete pad \_\_\_\_\_
  - casing \_\_\_\_\_
  
- MWII-7
  - concrete pad \_\_\_\_\_
  - protective housing \_\_\_\_\_
  - casing \_\_\_\_\_
  - guard posts \_\_\_\_\_

Any evidence of damage to wells such as:

- ponded water? \_\_\_\_\_
  
- settlement around the wells? \_\_\_\_\_

Was there any damage to landfill structures, cover or systems caused by the above event?

YES \_\_\_\_\_ NO \_\_\_\_\_

If yes, complete a Hurricane / Severe Storm / Tsunami Damage Report Form.



**KEKAHA MUNICIPAL SOLID WASTE LANDFILL – Phase II  
SEVERE WEATHER (POST HURRICANE / SEVERE STORM / TSUNAMI) DAMAGE  
REPORT FORM**

Type of Event (Depression, Tropical Storm, Hurricane, Tsunami):

\_\_\_\_\_

Date / Time / Duration:

\_\_\_\_\_

Date / Time of Inspection:

\_\_\_\_\_

Note: Fill out one form for each damage observation.

1. What is damaged? \_\_\_\_\_

2. Location of damage: \_\_\_\_\_

3. Description of Damage: \_\_\_\_\_

Log of Corrective Actions Implemented: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date damage was repaired: \_\_\_\_\_

Damage repaired by: \_\_\_\_\_





**APPENDIX C**

**BOMB THREAT CALL CHECKLIST**





**BOMB THREAT CALL CHECKLIST:**

Date: \_\_\_\_\_ Time: \_\_\_\_\_ A.M. / P.M.

Call Received by:

\_\_\_\_\_

Exact words of caller:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Questions to Ask:**

When will bomb explode? \_\_\_\_\_

Where is the bomb located? \_\_\_\_\_

What does the bomb look like? \_\_\_\_\_

What kind of bomb is it? \_\_\_\_\_

Why did you place the bomb? \_\_\_\_\_

What do you hope to accomplish by this action? \_\_\_\_\_

What is your name? \_\_\_\_\_

Where are you calling from? \_\_\_\_\_

**Voice Characteristics:**

Male \_\_\_\_ Female \_\_\_\_ Child \_\_\_\_ Loud \_\_\_\_ Soft \_\_\_\_ Nasal \_\_\_\_

Raspy \_\_\_\_ High \_\_\_\_ Low \_\_\_\_ Familiar \_\_\_\_ Pleasant \_\_\_\_

Other

\_\_\_\_\_



***Speech Characteristics:***

Fast \_\_\_\_ Slow \_\_\_\_ Stutter \_\_\_\_ Slurred \_\_\_\_ Intoxicated \_\_\_\_

Other \_\_\_\_\_

***Accent Characteristics:***

Local \_\_\_\_ Region \_\_\_\_ Foreign \_\_\_\_

Other \_\_\_\_\_

***Manner of Caller:***

Calm \_\_\_\_ Angry \_\_\_\_ Deliberate \_\_\_\_ Emotional \_\_\_\_

Laughing \_\_\_\_ Incoherent \_\_\_\_ Other \_\_\_\_\_

***Background Noises:***

Office Machines \_\_\_\_ Street Traffic \_\_\_\_ Factory Machines \_\_\_\_ Music \_\_\_\_

Airplanes \_\_\_\_ Trains \_\_\_\_ Trucks \_\_\_\_ Animals \_\_\_\_

Other \_\_\_\_\_

***Origin of Call:***

Internal \_\_\_\_ External \_\_\_\_ Local \_\_\_\_ Long Distance \_\_\_\_

Did caller appear to be familiar with the facility? \_\_\_\_\_

Number/extension at which call was received: \_\_\_\_\_



***Contacts Made:***

Operations/District Manager:      Date \_\_\_\_\_ @ \_\_\_\_\_ am / pm

Police Department:                      Date \_\_\_\_\_ @ \_\_\_\_\_ am / pm

Fire Department:                         Date \_\_\_\_\_ @ \_\_\_\_\_ am / pm

Other:                                         Date \_\_\_\_\_ @ \_\_\_\_\_ am / pm

Other:                                         Date \_\_\_\_\_ @ \_\_\_\_\_ am / pm





**APPENDIX D**

**TRAINING FORMS**





**TRAINING**

Training will be per the "Training" subsection of the Emergency Action Plan and Fire Prevention Plan.

This Program is hereby approved:

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
DATE









**ACKNOWLEDGEMENT FORM**

I, (print name) \_\_\_\_\_ have received training on the Kekaha Municipal Solid Waste Landfill – Phase II Emergency Action Plan Program. I had the opportunity to have questions answered pertaining to the training material and instructions that were presented to me by the Company. I understand the training I have received and agree to abide by the standards presented.

\_\_\_\_\_  
(Employee) Print Name

\_\_\_\_\_  
(Employee) Signature

\_\_\_\_\_  
(Instructor) Print Name

\_\_\_\_\_  
(Instructor) Signature

\_\_\_\_\_  
Date



**SECTION II**  
**OPERATIONS PLAN**



**OPERATIONS PLAN**  
**KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II**  
**KEKAHA, KAUA‘I**



**PREPARED FOR**  
**WASTE MANAGEMENT OF HAWAII, INC.**  
**JANUARY 2016**



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## FIGURES

1	Site Location Map
2	Site Layout Map
3	LCRS System Layout
4	Liner System Detail

## ATTACHMENTS

A	Waste Accumulation / Generation Waste Log
B	Vector Control Summary Form
C	MDOF Operations Plan

## ACRONYMS AND ABBREVIATIONS

---

ADC	alternative daily cover
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
CQA	Construction Quality Assurance
DOH	Department of Health, State of Hawaii
ft	feet or foot
GCL	Geosynthetic clay liner
HAR	Hawaii Administrative Rules
HDPE	high density polyethylene
KLF	Kekaha Municipal Solid Waste Landfill
LCRS	leachate collection and removal system
Mg	megagram
mph	miles per hour
MSW	municipal solid waste
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standard
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
WMH	Waste Management of Hawaii.



# 1 INTRODUCTION

---

This section of the Kekaha Municipal Solid Waste Landfill (KLF) – Phase II Site Operations Manual provides information regarding existing landfill facilities and operating systems, and describes general procedures, requirements, and methodologies to be used by KLF Phase II personnel in the landfill's daily operation. This material was developed based on operating permits, applicable regulations, Waste Management policies and directives, and incorporates proven operations techniques. This section should be used in conjunction with other applicable sections of the *Kekaha Municipal Solid Waste Landfill Operations Manual*, to ensure that landfill operations are conducted in the best possible manner.



## 2 SITE UTILIZATION CONCEPT

---

### 2.1 Landfill Disposal Areas

The KLF is a municipal solid waste (MSW) disposal area situated on approximately 98 acres of land in Kekaha on the island of Kaua'i (Figure 1). The MSW disposal area is comprised of two distinct refuse fill areas identified as Phase I and Phase II. Phase I began operations in 1953 and continued until operations ceased on October 8, 1993. Phase II began operations on October 9, 1993. Features of Phase II include a materials drop-off facility, scale house, maintenance shop, and administration building. A used oil drop-off is located in the maintenance building. A Site Layout Map is provided as Figure 2.

The permitted Phase II fill area (38.4 acres) consists of the original Phase II (32.1 acres) and the Cell 1 lateral expansion (6.4 acres) of Phase II. The original Phase II area is subdivided into 14 waste disposal cells (each about 2.3 acres in size and approximately 100 ft wide and 800 to 1,100 ft long), while the Cell 1 lateral expansion of Phase II is subdivided into 4 smaller waste disposal cells (each about 200 ft wide and 200 ft to 280 ft long). The Phase II landfill (including the Cell 1 expansion) is currently permitted to receive waste up to 120 ft above msl.

The Phase II-Cell 2 lateral expansion will increase the permitted waste footprint of Phase II by approximately 6.4 acres and provide an additional 947,000 cubic yards of additional airspace. This Site Operations Plan addresses all current operations and future operational requirements associated with the Phase II-Cell 2 expansion.

### 2.2 Site Life and Capacity

Aerial surveys are flown for the KLF Phase II on an annual basis and are located on site at the landfill. Quantities of airspace filled and remaining and landfill cell fill sequencing are updated annually as part of the KLF Phase II Annual Operating Report, which is submitted to the State of Hawai'i Department of Health (DOH) by July 31 of each year. These documents are also maintained on site as part of the KLF Phase II Operating Record/Files.

### 2.3 Landfill Ancillary Facilities

Listed below are the KLF Phase II ancillary facilities and areas designated for activities that are essential to the overall functioning of the landfill as a waste disposal site:

- Administration building
- Scale house
- Maintenance shop
- Material drop-off facility

The landfill disposal areas and locations of the items listed above are shown on Figure 2.

## **2.4 Site Utilities**

Existing KLF Phase II utilities include:

- Water supply
- Telephone
- Electrical power
- Septic tanks and leaching field systems

## **2.5 Environmental Monitoring & Control Systems**

Existing environmental monitoring and control systems at the KLF Phase II include the following:

- Liner and Leachate Collection and Removal System (LCRS)
- Perimeter Gas Monitoring System
- Surface Water Management System
- Storm Water Pollution Management and Control System
- Groundwater Monitoring Well Network

### **2.5.1 Liner and Leachate Collection and Removal System**

With the exception of the closed Phase I area, all disposal areas at the KLF Phase II are equipped with a bottom and side slope composite liner and LCRS meeting Federal (Subtitle D equivalent) and State (Hawai'i Administrative Rules [HAR] §11-58.1-14) requirements. Refer to Section 3 Landfill Construction (below) for details of the liner systems at the KLF.

The current Phase II LCRS consists of a drainage gravel layer on the cell floor, trenches constructed within the liner system (containing drainage gravel & perforated high density polyethylene [HDPE] pipes), leachate collection manholes, pump stations (e.g., Wet Wells), automatic sump pumps, discharge pipes, pump sensors and controls, and an evaporation pond. The current extraction program in place at the KLF Phase II maintains the site's leachate levels in compliance with federal (Subtitle D) and state regulations, which require that leachate not be allowed to accumulate on the landfill bottom liner to a depth of more than 1-foot (ft), not including leachate contained in the collection sumps. When the leachate level in a wet well reaches a pre-determined height, the pump will automatically start, and pump leachate out of the wet well until the level has dropped to a set height. Leachate is pumped to the leachate evaporation lagoon.

The leachate extraction and collection system proposed for Cell 2 consists of sumps with pumps and controls. Each of the four Cell 2 subcells will be graded to direct leachate toward a collection sump from which leachate will be pumped to the existing leachate evaporation pond via force main. No holding tanks will be used. The sizing of the evaporation pond is sufficient to accommodate the additional leachate generated from Cell 2.

Data such as leachate levels (depths in the wet wells and sumps), pump run times, total flow, and gallons of leachate pumped are recorded on a leachate log, which is maintained

on site as part of the KLF Phase II Operating Record/Files. Leachate levels in each of the existing Phase II wet wells and proposed Cell 2 sumps should be checked at least monthly, except during periods of heavy rain, at which time the levels should be checked daily.

The leachate lagoon occupies 2-acres on the northeast side of the landfill and has a capacity of approximately 3,699,000 gallons. The leachate level in the evaporation pond should be checked at least weekly, except during period of heavy rain, at which time the levels should be checked at least once per day. The leachate level in the evaporation pond shall not exceed a 6 ft depth, leaving about 2 ft of freeboard. The permittees shall make contingency plans to address potential exceedances, such as pumping leachate into tanks and disposing of pumped leachate at a permitted wastewater treatment facility in accordance with applicable regulations. WMH will maintain a contract with a local pumping and hauling company that can haul leachate to a permitted wastewater treatment facility in the event that the leachate evaporation pond becomes overfilled.

The major components of the KLF Phase II LCRS are shown on Figure 3. Refer to Section III of this Site Operations Manual – *Leachate Management Plan* for a detailed description of operation, maintenance, and management procedures associated with leachate at the KLF Phase II.

Leachate monitoring and sampling activities are conducted semiannually at the KLF Phase II in conjunction with the site's groundwater monitoring program. Refer to Section 2.5.5. Groundwater Monitoring Network (below) and Section VI of this Site Operations Manual - *KLF Groundwater and Leachate Monitoring Plan* for a detailed description of the groundwater monitoring program.

### **2.5.2 Perimeter Gas Monitoring System**

In accordance with the landfill gas monitoring requirements of the Federal Resource Conservation and Recovery Act (RCRA) Subtitle D regulations, HAR and the KLF Solid Waste Permit (No.LF-0053-09), a perimeter gas monitoring system is installed at the KLF Phase II to detect landfill gas migration from the KLF Phase II. The gas probe network is monitored on a quarterly basis. Refer to Section VII of this Site Operations Manual – *Perimeter Gas Monitoring Plan* for a detailed description of the perimeter gas monitoring system at the KLF Phase II.

### **2.5.3 Surface Water Management System**

Pursuant to the *surface water requirements* in RCRA Subtitle D regulations 40 Code of Federal Regulations (CFR) §258.27, and HAR Title 11, Chapter 58.1-15(h):

Municipal solid waste landfill units shall not:

- (a) Cause a discharge of pollutants into waters of the United States, including wetlands, that violates any requirements of the Clean Water Act, including, but not limited to, the National Pollutant Discharge Elimination System (NPDES) requirements, pursuant to section 402.
- (b) Cause the discharge of a nonpoint source of pollution to waters of the United States, including wetlands, that violates any requirement of an area-wide or State-wide water quality management plan that has been approved under section 208 or 319 of the Clean Water Act, as amended.

The proposed surface water management system for Phase II, including Cell 2, is similar to the permitted Phase II design for storm water conveyance. The system includes diversion berms located on the sideslopes approximately 10 to 30 ft below the perimeter of the landfill top deck that direct surface water to rock-lined downdrains, which in turn convey water to perimeter infiltration drainage ditches or to the infiltration basin on the northwest corner of the facility.

Refer to Section V of this Site Operations Manual – *Surface Water Management Plan* for a detailed description of the surface water management system at the KLF Phase II.

#### **2.5.4 Storm Water Pollution Management and Control System**

Storm water run-off associated with industrial activities is regulated by the NPDES General Permit (HAR §11-55, Appendix B). Because there is no storm water discharge point from the KLF Phase II, a request for exclusion under the NPDES General Permit was submitted to the DOH by the County of Kaua'i, Inc. on September 7, 2007 and resubmitted on February 27, 2013.

In addition, the KLF Phase II implements a *Spill Prevention Control and Countermeasure Plan* (see Section IV of this Site Operation Manual) to prevent releases of petroleum products used on site from being discharged to surface water.

#### **2.5.5 Groundwater Monitoring Network**

In accordance with HAR §11-58.1-16, a groundwater monitoring program is in place at the KLF Phase II for the purpose of early detection of changes to groundwater in the area of the landfill. The program includes a groundwater well network, and sampling, monitoring, and analytical procedures.

KLF Phase II groundwater and leachate monitoring activities are conducted pursuant to the KLF Phase II Groundwater and Leachate Monitoring Plan, which complies with the CFR, Solid Waste Disposal Facility Criteria (and its revisions) in 40 CFR §258 (Subtitle D), and HAR §11-58.1. Refer to Section VI of this Site Operations Manual – *Groundwater and Leachate Monitoring Plan*, for a complete description of the KLF Phase II Groundwater Monitoring Program.

## 3 LANDFILL CONSTRUCTION

---

### 3.1 Composite Liner

The Phase II liner consists of the following elements, listed from bottom to top, as shown in the Phase II as-builts:

- 6-inch thick granular foundation (sideslopes only)
- Prepared granular sub base grade
- Geosynthetic clay liner (GCL) consisting of a smooth 20-mil HDPE with an adhered bentonite powder layer on one side
- Single-sided textured 60-mil HDPE geomembrane (textured side down) against bentonite component of the GCL on the side slope
- Smooth 60-mil HDPE geomembrane against bentonite component of the GCL on the base
- 24-inch sand drainage layer (base and side slope)

The Cell I expansion liner consists of the following elements, listed from bottom to top, as shown in the Cell 1 as-builts:

- Prepared sub base grade
- 60-mil HDPE geomembrane (textured on both sides)
- GCL composite consisting of bentonite powder/granules encapsulated between a carrier non-woven geotextile and a cover of non-woven geotextile, needle punched for additional strength
- 60-mil HDPE geomembrane (textured on both sides)
- 16 oz/yd<sup>2</sup> non-woven cushion geotextile
- 12-inch granular drainage layer (leachate collection)
- 6 oz/yd<sup>2</sup> separator geotextile
- 24-inch gravel operations layer

The planned Cell 2 expansion liner will consist of the following elements, listed from bottom to top:

- Prepared sub base grade
- Optional nonwoven cushion geotextile (sub base material dependent)
- Sub base 60-mil HDPE geomembrane (textured on both sides)
- GCL (lower component)
- 60-mil HDPE geomembrane (upper component), textured on both sides

- Nonwoven cushion geotextile
- 12-inch granular drainage layer (leachate collection)
- Nonwoven separator geotextile
- 24-inch gravel operations layer

See Figure 4 for a general detail of the Cell 2 liner system.

### **3.2 Cell Construction Requirements**

Similar to previous liner installations conducted as part of Phase II, the Cell 2 expansion cell areas will be excavated to the lines and grades specified in construction plans developed by a registered professional engineer. The sub grade will be prepared using gravel or soil with a maximum particle size of  $\frac{3}{4}$  inch. A registered surveyor will provide accurate as-built documentation of the base grade, and the liner installer must accept the sub grade in a written statement prior to beginning the installation of geosynthetic materials.

Construction Quality Assurance (CQA) documents will be prepared. CQA documents prepared for the existing Phase II cells are located on site at the KLF Phase II. In general, the following requirements shall be followed during cell construction:

- Geosynthetic installation must be performed by a qualified contractor who has installed a minimum of 500,000 square feet of similar liners, or who is working under the supervision of the liner manufacturer. All geosynthetic installation must be performed under CQA protocols developed by a registered professional engineer and implemented by a qualified CQA inspector responsible to the engineer. The KLF Phase II must notify the DOH, in writing, five (5) days prior to any liner installation work.
- No waste may be placed in newly constructed cells until the CQA engineer has certified the construction in a summary report containing a documented control program of all phases of liner installation. The report will certify that the construction was prepared according to plans and specifications, and will be submitted to the DOH for approval. If the DOH requests, an inspection of the new cell can be arranged with the engineer and KLF Phase II site management.

## 4 OPERATIONAL PROCEDURES

---

### 4.1 KLF Waste Acceptance Policy

Certain wastes are prohibited from being disposed at the KLF Phase II. Refer to Section I, Part B of this Site Operations Manual – *Waste Acceptance / Hazardous Waste Exclusion Program*, for a detailed description of the KLF Phase II's waste acceptance policy, methods used to detect and prevent the disposal of hazardous/unacceptable wastes, and special waste identification and handling procedures.

KLF Phase II personnel take necessary steps to ensure compliance with all operating and regulatory requirements associated with waste acceptance. Landfill personnel have the authority and responsibility to reject unauthorized loads, have unauthorized material removed by the transporter, assess appropriate surcharges, and have unauthorized materials properly managed by the facility.

### 4.2 Incoming Waste

Waste from the island of Kaua'i arrives at the KLF Phase II using the following delivery methods:

- Transfer trailers from off-site transfer stations
- Direct commercial haul
- Residential self-haul

Scale house attendants and KLF Phase II equipment operators (operations personnel) monitor the incoming waste. They are trained annually on the KLF Phase II Waste Acceptance / Hazardous Waste Exclusion Program and are familiar with the rules and regulations governing the various types of waste that can or cannot be accepted at the KLF Phase II. The KLF Phase II is not required to accept any solid waste that may cause problems in maintaining full and continuous compliance with the solid waste permit. If the scale house attendant or operations personnel have any doubt or concern regarding the acceptability of a particular waste load, they will contact KLF Phase II Management for guidance prior to the load being deposited at the working face.

Once a waste load has been determined to be acceptable by the scale house attendant, it is weighed and the hauler proceeds to either the Material Drop-off Facility (residential self-haul) or the active disposal area (transfer trailers and commercial haul). The active disposal area is a designated portion of the waste cell, which is any lined area that has or will receive waste and has not been closed. Waste tonnage data is entered into the scale house records.

### 4.3 Traffic Control

Signs are posted to direct incoming traffic from the front gate to the scale house. After being processed at the scale house, waste haulers are directed to the disposal area by signs, traffic barricades, cones, or traffic controllers. KLF Phase II operations personnel are posted at key

locations, as needed to direct traffic to the MSW disposal areas. Traffic signs posted along the main haul road also inform customers of the on-site speed limit of 15 miles per hour (mph).

In addition, rules for waste disposal and prohibited waste are prominently displayed on signs at the site entrance and at the scale house.

#### **4.4 Waste Unloading**

At least one landfill operator is present (at all times) at the disposal area during hours when the landfill is accepting waste. Landfill equipment is to be operated at least 15 ft away from an unloading vehicle. At the landfill disposal area, KLF Phase II traffic controllers stop vehicles/trucks at a staging area and then direct the waste haulers to unload in a specific area known as the “tipping area”. KLF Phase II equipment operators and traffic controllers communicate using two-way radio to coordinate the vehicle/truck traffic in the disposal area so that landfill customers enter the tipping area safely when landfill equipment is pushing waste from the unloading area to the working face. Vehicle/truck traffic will be directed to unload at the tipping area away from landfill equipment pushing trash in the area.

During waste unloading, a 15-ft clearance between vehicles is maintained at all times, and no more than two people should be out of a vehicle at any time. The traffic controller will also ensure that children and pets are kept in their vehicles at all times. Drivers / landfill customers must stay within 6 ft of their vehicle. A landfill safety flyer has been created to distribute to all incoming traffic and is shown in Section I Part D.

KLF Phase II equipment operators observe the unloading operations to monitor the waste for unacceptable materials. All KLF Phase II personnel at the working face are equipped with two-way radios to facilitate coordinated and safe traffic control, and also to stop any attempts to salvage materials from waste deposited at the working face. Scavenging is prohibited at the KLF Phase II.

#### **4.5 Waste Placement**

Waste placement within the KLF Phase II must conform to standard procedures to provide maximum protection of the synthetic liners, to ensure adequate stability of the base and waste mass, and to ensure the best performance of the leachate collection system.

In general, the “area fill” method of land filling is used, which consists of spreading and compacting waste in horizontal layers (“lifts”), which form the waste cells.

##### **4.5.1 General Lift Construction**

After waste is unloaded at the tipping area, waste placement procedures are as follows:

- A bulldozer enters the tipping area, pushes the waste to the working face, and spreads it into layers up to 2 ft thick.
- A compactor traverses the working face area to compact the waste.
- Large or bulky objects are separated from the waste at the working face, placed in the upper portion of the advancing waste layer, and crushed by compaction

equipment to prevent bridging and voids that could result in localized subsidence.

- Successive layers of compacted waste form lifts advance/build up to form the waste cell.
- At the end of each working day, the exposed waste at the working face is covered with a minimum of six inches of soil or an alternative daily cover (ADC) (as approved by the DOH).
- Waste placement and compaction proceeds until final elevations and grades are achieved.

During waste placement operations, the waste surface will be graded to prevent surface water run-on and promote water run-off.

#### **4.5.2 Wet Weather Disposal Operations**

Wet weather operations are implemented when excessive precipitation may make normal operations difficult. In advance of the rainy season or extended wet periods a specific wet weather disposal area and access road are designated for use based on filling plan progress and the approximate waste volume expected. A wet weather pad is constructed by covering the disposal area (and road[s] leading to, if necessary) with crushed rock type material. This allows for safe driving and continuous unloading during rainy weather. It also helps to minimize the tracking of mud onto public roads. During wet weather, the active working face is kept relatively small and soil is stockpiled nearby for daily cover.

#### **4.5.3 Initial Select Lift**

The first layer of solid waste shall be a minimum of 5 ft of select waste (pre-compaction). Any objects with dimensions greater than 24 inches will be removed prior to placement to prevent damage to the liner. The initial lift within each landfill cell will consist of a mixture of MSW, household trash, etc., not to include large, sharp, or possibly damaging objects such as pipe, re-bar, lumber, or bulky materials. This lift, in addition to the 24-inch thick operations layer and the 12-inch thick drainage gravel layer, will provide adequate protection to the underlying geosynthetic liner.

Placement of a minimum 5-ft thick select waste layer is monitored by the Waste Management of Hawaii, Inc. (WMH) Environmental Protection Manager (or properly trained KLF Phase II personnel) to ensure compliance with the site's operating permit and to maintain liner integrity. Select waste refresher training is conducted (as necessary) to ensure that KLF Phase II operations personnel are aware of the importance of select waste placement in new cells. Operators are instructed on what materials are appropriate for use in the select lift, and that they should pull any unacceptable objects from waste loads that may have been dumped for use as select waste. Documentation of training is kept on site as part of the KLF Phase II Operating Record/Files.

KLF Phase II equipment operators follow the standard operational procedures listed below to ensure that landfill equipment does not damage the underlying liner.

- Only tracked, low ground pressure bulldozers or landfill equipment with rubber wheels are allowed on the surface of lining system (the operations layer).
- A minimum of 5 ft of select waste is placed above the operations layer before any heavy point-load landfill equipment, such as compactors, are operated over the area.
- Only moderate compaction is applied to the top portion of the initial select lift.

If damage to the liner or liner system is suspected, the KLF Phase II operator must notify the Foreman immediately. The Foreman will contact the KLF Phase II Site Manager and appropriate personnel.

#### **4.5.4 Landfill Side Slopes**

For waste mass and liner system stability, special care is given to the configuration of the waste as it rests against the side slope of the liner system. As stated earlier in this section, waste configurations are based on a slope stability analysis specific to each cell or area of the landfill. The top surface of the cells will be sloped at least five percent to facilitate drainage. Side slopes in the MSW landfill area will not exceed a slope of 3.5H:1V (horizontal to vertical).

### **4.6 Cover Material Requirements**

Landfill operations require various phases of cover to be utilized throughout the life of the landfill. This section describes the requirements for cover at the KLF Phase II. Soil cover material or ADC is used at the KLF Phase II to reduce infiltration of surface water (leachate reduction); to minimize odors, and to deter nuisance vectors such as insects, rodents, and birds. In addition, tarps are used as ADC where appropriate.

#### **4.6.1 Daily Cover**

In accordance with HAR §11-58.1-15(b)(1), the active MSW disposal area is covered at the end of each day with a minimum of 6 inches of daily cover soil, or ADC to control disease vectors, fires, odors, or blowing litter. Trucks deliver daily cover to the refuse disposal area where it is applied to the working face, by bulldozers, at the end of each day (under normal operating conditions). ADC in the form of tarps are also used at the KLF Phase II if appropriate conditions exist. Tarps used as ADC shall be approved by the DOH prior to use. If additional waste is to be placed in the same area, the upper part of the cover soil may be scraped off for subsequent reuse, prior to further lift progression.

#### **4.6.2 Intermediate Cover**

Intermediate cover, consisting of a minimum of 12 inches of soil (including 6 inches of daily cover), is required over all inactive waste areas, which are defined as areas that do not receive waste within a 30-day period. Inactive areas shall be graded to promote surface water drainage. Effective drainage minimizes ponding, infiltration, and erosion. Any areas that have vehicular traffic shall also be covered with intermediate cover.

### **4.6.3 Final Cover**

A final cover system will be placed over the final lift of waste in filled areas that have reached design final grades. A final cover performs the following functions:

- Separates the waste from the environment
- Adjusts the landfill surface topography to provide appropriate slopes to promote run-off and controlled drainage of surface water
- Controls erosion by conveying run-off at non-scouring flow rates
- Minimizes surface-water infiltration into the waste
- Controls and contains landfill gas

The proposed final cover configuration for the KLF Phase II will meet or exceed the existing State and Federal regulatory requirements and will be constructed in accordance with the KLF Phase II *Closure and Post Closure Plan*, included in Section VIII of this Site Operations Manual. Refer to the Plan for a detailed description of the proposed final cover design, associated CQA program, and additional closure and post-closure activities for the KLF Phase II.

### **4.6.4 Cover Integrity**

Intermediate and daily cover integrity is inspected and monitored by the KLF Phase II Site Manager or WMH Environmental Protection Manager for proper placement, the presence of vectors, “flagging” waste, and erosion as part of monthly inspections, vector control inspections, and internal site compliance tasks. Site operations will mitigate any deficiencies in intermediate cover by restoring or adding the cover material, grading, track-walking or compacting the area.



## 5 SPECIALIZED LANDFILL PROCEDURES

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### 5.1 Storage and Disposition of Unacceptable Waste

Information regarding all hazardous or unacceptable wastes that are managed, transported off site, or generated on site is maintained on site as part of the KLF Phase II Operating Record/Files.

#### 5.1.1 Hazardous Waste

The KLF Phase II *Waste Acceptance / Hazardous Waste Exclusion Program* (Section I – Part B of this Site Operation Manual) establishes procedures for preventing, detecting, and managing wastes that are not suitable for disposal at the landfill. If hazardous wastes are detected at the landfill working face and the hauler/generator is unknown, the KLF Phase II has procedures in place to manage or temporarily store the waste in a designated area until a licensed contractor transports the waste off site for proper disposal (see Section I – Part B). Any hazardous wastes generated on site by equipment maintenance activities are properly stored in appropriate containers in the maintenance shop area.

#### 5.1.2 Non-Hazardous Unacceptable Waste

In accordance with HAR§11-58.1-65(b) and (c), scrap vehicles, tires, compressed gas tanks, vehicle batteries, and chlorofluorocarbon (CFC) [Freon]-containing appliances (white goods such as refrigerators, freezers, and air conditioners) may not be disposed of at the KLF Phase II. Scrap vehicles are readily identifiable at the scale house and will be rejected at the scale house. Tires, CFC-containing appliances, and compressed gas tanks are occasionally encountered in mixed loads after they have been dumped at the working face. In these cases, KLF Phase II personnel will carefully transport the waste to the temporary storage area and the waste will be identified, logged, placed in bins or separated onto pallets, labeled, and stored until a licensed contractor transports the waste off site for proper disposal, as required by federal and state regulations. This temporary storage area is away from normal traffic flow and allows for a safe storage environment. Waste-specific storage and disposition guidelines are described below.

##### 5.1.2.1 Tires

Tires that are pulled from the working face are temporarily stored at the tipping area until they are moved to the MDOF. The number of tires collected is recorded on the KLF Phase II Daily Operations Log. The tires are taken for recycling on a monthly basis by the County of Kaua'i.

##### 5.1.2.2 CFC-Containing Appliances

CFC-containing appliances are handled and stored in a manner to prevent damage, spills or releases of oil, lubricants, or CFCs. Refrigerators, freezers, air conditioners, and any other items containing CFCs are handled in accordance with 40 CFR §82.156(f), as amended. Refer to the KLF Phase II *Refrigerant Management Plan*, located in Section I – Part B (Appendix B of the *Waste Acceptance / Hazardous Waste Exclusion Program*) of this Site Operations Manual. CFC-containing items are removed from the designated

storage area and transported off site to a convenience center where the refrigerant is properly removed or the appliance is sent for metal recycling.

### 5.1.3 Site Generated Waste

A site's generator status is determined by the quantity of hazardous waste generated at the site on a monthly basis. The KLF Phase II is classified as a conditionally exempt small quantity generator. Wastes that are generated on site at the KLF Phase II include, but are not limited to:

Site Generated Waste	
Oil Filters	Spent Lead Acid Batteries
Transmission Filters	Scrap Tires
Fuel Filters	Spent Anti-Freeze
Water Filters	Empty Paint, Aerosol Cans
Hydraulic Filters	Empty Containers
Used CRTs	Used Tires
Air Filters	Paint Solvent/Thinner
Used Oil	Scrap Metal
Lubricating Oil	Welding Slag
Spent Solvent	Leachate
Spent Absorbents/Rags	

The quantity of site generated waste streams are identified and tracked on the *Waste Accumulation / Generation Waste Log* (see Attachment A). Load check items and items pulled from the working face are included on this log. The KLF Phase II utilizes third-party contractors for transportation, recycling, and disposal of site generated waste. Each vendor signs an Environmental Service Agreement. Wastes are properly managed on site according to applicable regulations:

- Appropriate containers and tanks are used for temporary storage.
- Wastes are proper marked and labeled.
- The temporary storage location of these wastes is inspected as part of the KLF Phase II monthly facility inspections.

All documentation related to waste generation and characterization (e.g., waste log, lab analytical data, material safety data sheet, off site shipping records, etc.) is maintained on site at the KLF Phase II as part of the Operating Record/Files for at least three (3) years, as required by federal regulations.

## 5.2 Special Handling Procedures

All special waste materials must be pre-approved prior to acceptance at the KLF Phase II. Refer to the KLF Phase II *Waste Acceptance / Hazardous Waste Exclusion Program* (Section I – Part B of this Site Operations Manual) for a description of the KLF's special waste acceptance policy.

Specialized handling and operating procedures are implemented at the KLF to manage the following waste streams for disposal at the KLF:

### **5.2.1 Friable and Non-friable (Non-hazardous) Asbestos Waste**

Refer to the KLF *Asbestos Management and Disposal Plan* (see Section I – Part B - Appendix A) for detailed management and disposal procedures of asbestos/asbestos-containing wastes. If the asbestos waste is properly packaged, there are no operational cut-offs that would preclude the KLF Phase II from accepting asbestos waste.

### **5.2.2 Treated Medical Waste**

Treated medical wastes that have been rendered non-infectious (sterilized or incinerated) may be disposed at the KLF Phase II. Treated medical waste may pose a physical threat to KLF Phase II operations personnel or the public due to the presence of sharps. The KLF Phase II must be notified at least 24-hours prior to the actual receipt of the waste.

When the load arrives on site, the scale house attendant will notify KLF Phase II equipment operators so that a disposal pit or trench can be excavated into the waste at the working face. The medical waste is unloaded near the trench/pit and pushed (by landfill equipment) into the excavated trench/pit. To protect public health as well as the health of the KLF Phase II employees, treated medical waste is backfilled with waste and compacted as soon as possible after dumping. Additionally, six inches of soil material is placed over the entire working face at the end of the working day.

### **5.2.3 Contaminated Materials**

Contaminated materials (soils, debris, and other materials contaminated with petroleum or other chemical products, and polychlorinated biphenyl (PCB)-contaminated soils not regulated under the TCSA) may be accepted at the KLF Phase II. The DOH will be notified anytime the KLF Phase II accepts contaminated materials. All correspondence incorporated in this policy will include the following: acceptance date(s), quantity and description, origin of waste, waste profile sheet/approval manifest, proposed management of material, and special management / handling procedures for the waste.

Soils that are below the DOH Environmental Action Levels (EAL's) for Direct Exposure in an Industrial Setting may be used as daily cover, provided that the daily cover is not exposed for more than 24 hours. Contaminated soil that exceeds the DOH EAL's in a residential setting shall not be used as intermediate or final cover.

Trucks delivering contaminated material must be covered. KLF Phase II personnel will oversee the unloading of all contaminated materials and will ensure the materials are removed completely from the trucks. If necessary, a water truck will be available during dry or windy conditions to suppress dust while contaminated materials are being unloaded. Disposal of contaminated material will not occur when wind speeds are in excess of 30 mph. All documentation relating to contaminated materials acceptance is maintained on site as part of the KLF Phase II Site Operating Record/Files.

#### **5.2.4 PCB-Contaminated Waste**

PCB-contaminated waste can be accepted for disposal at the KLF Phase II following verification that the waste contains less than 50 parts per million PCBs. Small non-leaking capacitors contained in fluorescent light ballasts, white goods, and other electrical appliances are not considered regulated PCB wastes. If approved, the KLF Phase II must be notified at least 24-hours prior to the actual receipt of the waste.

Proper manifest documents are required to accompany the hauler into the landfill. The generator is required to ensure that the load does not pose any air emission problems, i.e., dust conditions. The hauler is then directed to a designated unloading area away from the tipping area to ensure a reduced chance of exposing the general public and KLF Phase II employees to PCB-contaminated waste. If necessary, a water truck will be available to provide dust control during unloading. Disposal of PCB-contaminated waste will not occur when wind speeds are in excess of 30 mph.

#### **5.2.5 Dead Animals and Offal**

Dead animals and offal (hides, intestines and other waste from slaughtered animals) can be brought to the KLF Phase II for disposal. The transporter must inform the scale house attendant that they have dead animals or offal and the scale house attendant will notify KLF Phase II equipment operators at the working face. Whenever possible, a disposal pit or trench will be excavated into the waste at the working face and the animal/animal waste will be placed in it. To protect public health and the health of the KLF Phase II employees, dead animals and offal are covered with a minimum of 2 ft of MSW or soil and compacted as soon as possible after dumping. Additionally, six inches of soil material is placed over the entire working face at the end of the working day.

#### **5.2.6 High Moisture Content & Odorous Waste**

High moisture content waste (e.g., municipal sludge) must be stabilized, solidified, or dried with absorbent by the generator prior to disposal at the KLF Phase II. All waste except expired/off-spec food products must meet liquids restriction criteria (paint filter test).

Odorous loads must be deodorized by the generator either by bagging the material or treating the load with odor control products prior to disposal at or delivery to the KLF Phase II.

Odorous / high moisture content wastes are unloaded close to the working face and then covered immediately with dry solid waste.

#### **5.2.7 Radioactive Waste**

Radioactive waste is not accepted for disposal at the KLF Phase II.

## 6 SITE MAINTENANCE AND CONTROL

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This section sets forth policies and procedures of the KLF Phase II that help to prevent and control air pollution, explosive gas, mud and dust, litter, odor, and disease vectors, in addition to maintaining the site and its roadways. The KLF Phase II operates in compliance with State (HAR §11-58.1-15 [e] and HAR§11-60.1) and Federal Clean Air Act requirements for air pollution control.

### 6.1 Access Roads

All access roadways used by KLF Phase II customers are maintained as passable, all-weather roads by surfacing with rock, gravel, or asphalt/concrete rubble. Roads are re-graded as needed to minimize depressions, ruts, and potholes, and maintain safe operating conditions. The landfill haul roads and access roads are maintained in a reasonable dust-free condition by periodic spraying from an onsite water truck throughout the day. Roadside drainage ditches and swales are cleaned or otherwise maintained on an as needed basis, to prevent erosion/damage.

Two-way access roads have a minimum width of 30 ft, and one-way roads have a minimum width of 15 ft. Roads are constructed with a maximum grade of eight percent, except for short distances where less steep grades cannot be achieved.

Temporary roads may be constructed as other than all-weather roads, provided they are not needed for maintenance of drainage facilities, emergency access or truck route for exiting the facility during wet weather.

### 6.2 Air Criteria & Gas Control

Pursuant to 40 CFR 60, Subpart WWW, the New Source Performance Standard (NSPS) for Municipal Solid Waste Landfills, promulgated on March 12, 1996, those facilities that commence construction, reconstruction, or modification after May 30, 1991, are subject to the requirements of the rule. The rule specifies that both volume and mass after a landfill modification must exceed both 2.5 million megagrams (Mg) and 2.5 million cubic meters (m<sup>3</sup>) to trigger Tier 1. With the permitting of the 2013 vertical expansion, the KLF Phase II exceeded the 2.5 million Mg design capacity criteria requiring additional analysis of non-methane organic compound (NMOC) emissions. As required by the rule, the County submitted an Amended Design Capacity report reflecting the modification to greater than 2.5 million Mg and 2.5 million m<sup>3</sup> to the DOH and United States Environmental Protection Agency (EPA) on June 2, 2014, within 90 days of the approval of the 2013 vertical expansion. The report included a Tier 1 calculation prepared in accordance with 40 CFR §60.752(b) demonstrating that the NMOC emission rate exceeded 50 Mg/yr making the facility subject to the gas collection and control requirements of the landfill NSPS.

In February 2015, an initial Landfill GCCS Design Plan (EIL 2015) was prepared per the NSPS requirements in 40 CFR §60.752(b)(2)(i). The proposed GCCS is presented in Section VIII (Closure/Post-Closure Plan) of the Operations Manual.

The KLF implements control and monitoring procedures and plans such as the KLF Odor Control Plan, Fire Prevention Plan, Mud and Dust Prevention Program, and the Perimeter Gas Monitoring Plan, to ensure compliance with State and Federal regulations regarding air criteria, the prohibition of open burning, explosive gases control, and air pollution control.

Activities conducted at the KLF Phase II in relation to air programs include:

- Management and disposal of asbestos-containing waste, in conformance with National Emission Standards for Hazardous Air Pollutants (See Asbestos Management & Disposal Plan, located in Section I – Part B, *Waste Acceptance / Hazardous Waste Exclusion Program*).
- Implementation of “Fire Control Procedures” and a Fire Prevention Plan as part of the KLF Phase II Emergency Action Plan to prevent, detect, and suppress several types of fires at the KLF Phase II (fires at the landfill working face; incoming waste load fires; landfill surface and structure fires; landfill subsurface fires; brush/buffer zone fires; and equipment fires). The open burning of solid waste is prohibited at the KLF Phase II (see Section I – Part E, *Emergency Action Plan*, of this Site Operations Manual).
- Controlling dust and odors at the site according to procedures that have been written specifically for these purposes (see Sections 6.3 and 6.4).

### **6.3 Mud and Dust Prevention Program**

KLF Phase II personnel are responsible for preventing the emission of excessive dust from the facility. Site operations personnel utilize a 4,000-gallon water truck to apply water to areas that may be potential dust problems, such as access roads, work areas, and stockpiles. Each “water run” is recorded on the KLF Daily Water Log, with the date the water truck was filled up, the driver’s name, and the amount of water used (in gallons). The volume of water and frequency of spraying is increased as needed during particularly dry or windy conditions, or during times of increased truck traffic on site.

The following precautions and operations are implemented on site to prevent the discharge of visible fugitive dust beyond the site property boundary:

- Grading and watering haul roads.
- Periodically applying a fine water spray to work areas throughout the day. More frequent applications of water are required during the windy season or when fugitive dust is observed migrating from these areas.
- Using sprayers on screening operations.
- Applying water on intermediate soil cover.

During wet weather, the KLF Phase II implements measures to minimize the tracking of mud onto public roads. As indicated in Section 6.1, wet weather pads and access routes to the MSW disposal areas may be constructed using rock, gravel, or asphalt/concrete rubble, to minimize the exposure of trucks and other vehicular traffic to excessively muddy

conditions. On site and off site roads (Kaunualii Highway in front of the KLF) are monitored for the presence of mud, debris, or litter that may have been tracked-out.

#### **6.4 Odor Control Program**

Common landfill odor sources include the wastes being delivered to the landfill and the active disposal area (working face). Other wastes have the potential for becoming odor sources as they biodegrade and decompose.

Odor impacts from landfill operations must be addressed and managed. The KLF Phase II takes a proactive approach to odor management through the implementation of the KLF Phase II Odor Control Program, which consists of the following elements:

- Identification and special handling of odorous wastes
- Effective application of daily and intermediate cover

##### **6.4.1 Management of Odorous Wastes**

Waste streams capable of creating off site odor problems require special handling to minimize potential odor problems. Some of the wastes received at the KLF Phase II are a potential source of odor upon receipt, such as sewage sludge, bulk shipments of off-specification foods and food wastes, and dead animals and offal. These wastes are among those generally handled as “special wastes” in accordance with the KLF Phase II *Waste Acceptance / Hazardous Waste Exclusion Program* (see Section I – Part B, of this Site Operations Manual). Upon receipt at the scale house, odorous loads will be directed to the office to process the Special Waste paperwork and verify that they are on the schedule. The truck will then be directed to a designated area of the landfill working face and disposed in the following manner:

- A bulldozer will excavate a trench or pit in previously placed solid waste (known to contain no odorous special wastes). The pit will be large enough to contain approximately twice the volume of the anticipated load. An alternative to the ‘pit’ is to utilize prior loads of MSW to provide sufficient cover immediately over the odorous loads.
- The odorous load will be off-loaded into the pit.
- The bulldozer will immediately cover the odorous material with the solid waste excavated to create the pit and compact it firmly.
- If necessary, an odor control agent can be sprayed at the working face to help manage odors and wind transport issues (see next section).
- At the end of the day, daily cover soil will be placed over the working face.

The KLF Phase II may require pre-treatment of odorous loads (addition of oxidizing agents/odor neutralizers) at the generator’s site to minimize odor emanation during transport and while on-site at the landfill.

Daily scale house records and the KLF Phase II Special Waste Schedule reflect the receipt of odorous loads designated for special handling.

The KLF Phase II requires advance notification for the disposal of known odorous loads. Specific hours of acceptance of odorous loads allow the KLF Phase II to ensure that there is adequate staffing to receive, process, and cover the material promptly upon receipt at the site.

#### **6.4.2 Soil Cover Material**

Odor is also controlled through the application of daily and intermediate soil cover material to MSW. As described in Section 4.6.1, a minimum of six inches of soil cover or ADC is placed over the landfill working face at the end of each day, and soil compacted by track walking the area with a bulldozer. Intermediate cover, consisting of an additional six inches, further controls odors on a long-term basis. Regular inspection and maintenance of cover integrity to identify and mitigate cracks or fissures in the cover layers also aids in controlling odor that may emanate from MSW after it is buried.

#### **6.5 Litter Control Plan**

The KLF Phase II uses various strategies to confine litter to the landfill working face area, to prevent on site litter accumulation and to prevent litter from leaving the landfill premises. Wind-blown litter is controlled through proper management of the landfill working face, the use of portable litter fences, and utilizing laborers to pick up litter. Elements of the KLF Phase II litter management program are described below.

- Managing the landfill working face to control litter entails good waste compacting practices; keeping the working face small; orientating the trucks that are dumping so their cabs are facing into the wind, thus sheltering the waste being off-loaded from becoming airborne; and placing soil cover material or ADC over the working face at the end of each day to keep litter from being picked up by wind. The working face may also be sprayed with limited amounts of water to suppress any potential flyaway waste.
- Portable litter fencing is placed down-wind from where the refuse is being off-loaded at the working face (primary fencing) and relocated as necessary based on wind changes. The fences catch and contain litter that may be picked up by the wind and otherwise carried away from the active face. Litter that is caught by the fences is picked off on a daily basis. Additional fences can be placed further down-wind (secondary fencing) to capture litter that may stray past the primary litter fences during gusty wind conditions.
- Labor personnel clean and pick litter along the main haul road and in front of the landfill, along the Kaumualii Highway to help maintain cleanliness around the facility property. If laborers need to go onto an adjacent property (not owned by the landfill owner), permission from the landowner will be obtained in advance. The collected litter is bagged and disposed of at the landfill working face.

Occasionally, special conditions such as severe gusty winds (greater than 40 mph) may require closure of the facility to protect the safety of workers and the public. In general, however, supplementary measures to control or clean-up excessive litter at the KLF during above normal winds may include the following::

- The progressive application of soil cover to the working face throughout the day (rather than waiting until the end of the day), to keep the minimum surface area of waste exposed at any given time.
- Erecting additional sections of portable litter fencing.
- Hiring extra labor personnel to pick up litter.

At the end of each day, the number of laborers hired and the quantity of litter bags that were filled up are recorded on the KLF Phase II Daily Operations Log. There is also a “comments” column on the log where KLF Phase II personnel can make daily notes of severe weather conditions, such as excessive wind.

## **6.6 Vector Control Plan**

This Vector Control Plan was for the KLF Phase II to comply with the operating criteria for MSW landfills as detailed in 40 CFR §258.22 and HAR §11-58.1-15(c), “*Disease Vector Control*”. These regulations state, “*Owners or operators of all MSWLF units must prevent or control on site populations of disease vectors using techniques appropriate for the protection of human health and the environment.*”

This plan explains existing procedures at the KLF Phase II to prevent, detect, and manage on site populations of disease vectors and minimize nuisance conditions.

An inventory of possible vector species at the KLF Phase II includes rodents, termites, flies, mosquitoes, other insects, and birds. To date, the KLF Phase II has not experienced any vector problems.

The placement of a minimum of six inches of daily cover or ADC on the MSW active working face and a minimum of twelve inches of intermediate cover on inactive portions of the KLF Phase II is essential to controlling vectors. KLF Phase II operators are trained annually to promote compliance awareness with operational practices such as proper depth and frequency of cover material placement on the landfill. Minimizing the size of the active working face is another method utilized at the KLF Phase II to reduce the likelihood of vectors feeding on MSW.

Public health and vector control concerns are addressed at the KLF Phase II through the implementation of inspections and subsequent control and abatement activities. On a monthly basis, KLF Phase II personnel inspect the facility for any signs of vectors or indications of vector attractants that may cause nuisance or disease. The integrity of the landfill cover material is also inspected as part of the KLF Phase II Vector Control Plan to verify that vectors are not an issue. If vectors are identified at the landfill, WMH will develop and implement a specific plan to control or eradicate the onsite populations. As a preventative measure, the administration and scale house buildings are routinely sprayed for rodents, termites, and insects by a licensed exterminator.

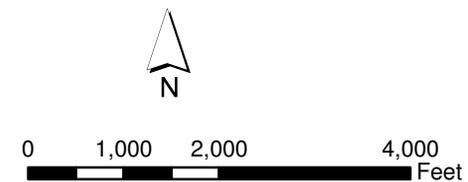
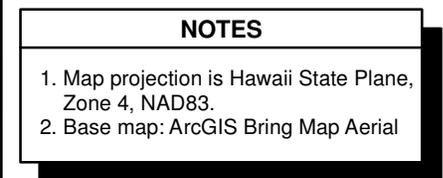
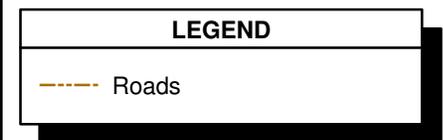
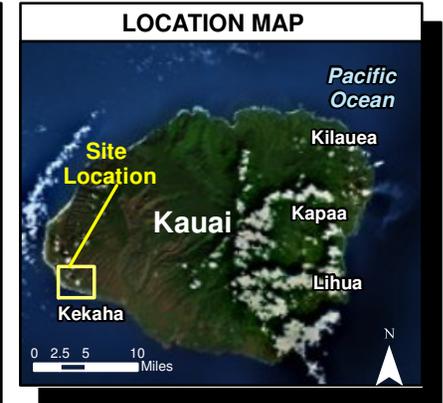
All vector control activities and inspection results are documented monthly *Vector Control Summary Form* (see Attachment B). Receipts for extermination services and the *Vector Control Summary Form* are maintained on file as part of the KLF Phase II Operating Record/Files.

## **6.7 Equipment & Vehicle Cleaning**

Operators clean the tracks/wheels of landfill equipment at the working face of the landfill at least once per day or more often if necessary typically using shovel/dry methodology. Occasionally, equipment may be washed (during disassembly or repair) with a high-pressure steam/water cleaner, within the lined portion of the landfill. Site vehicles are washed at the designated wash rack area.

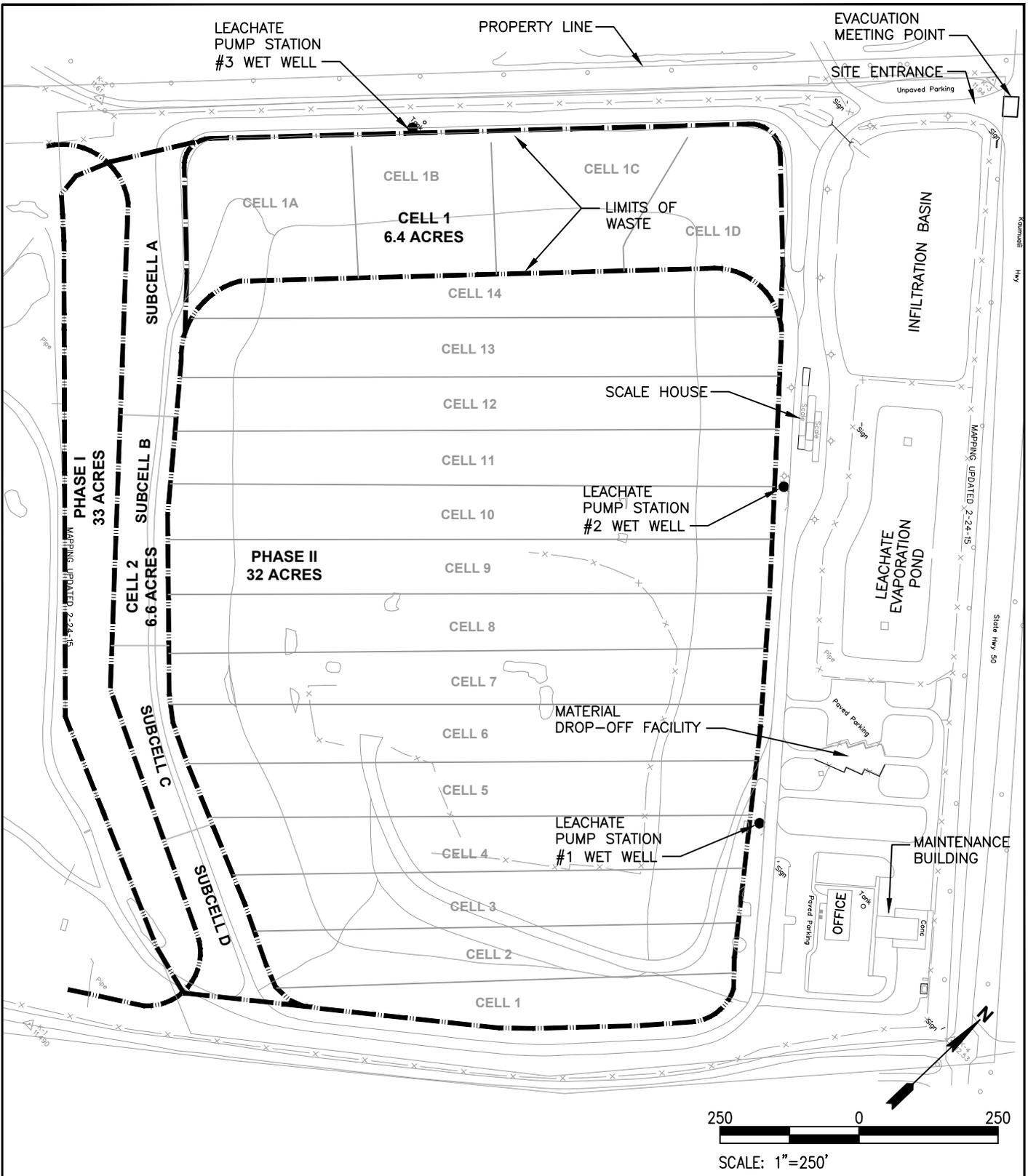
## FIGURES





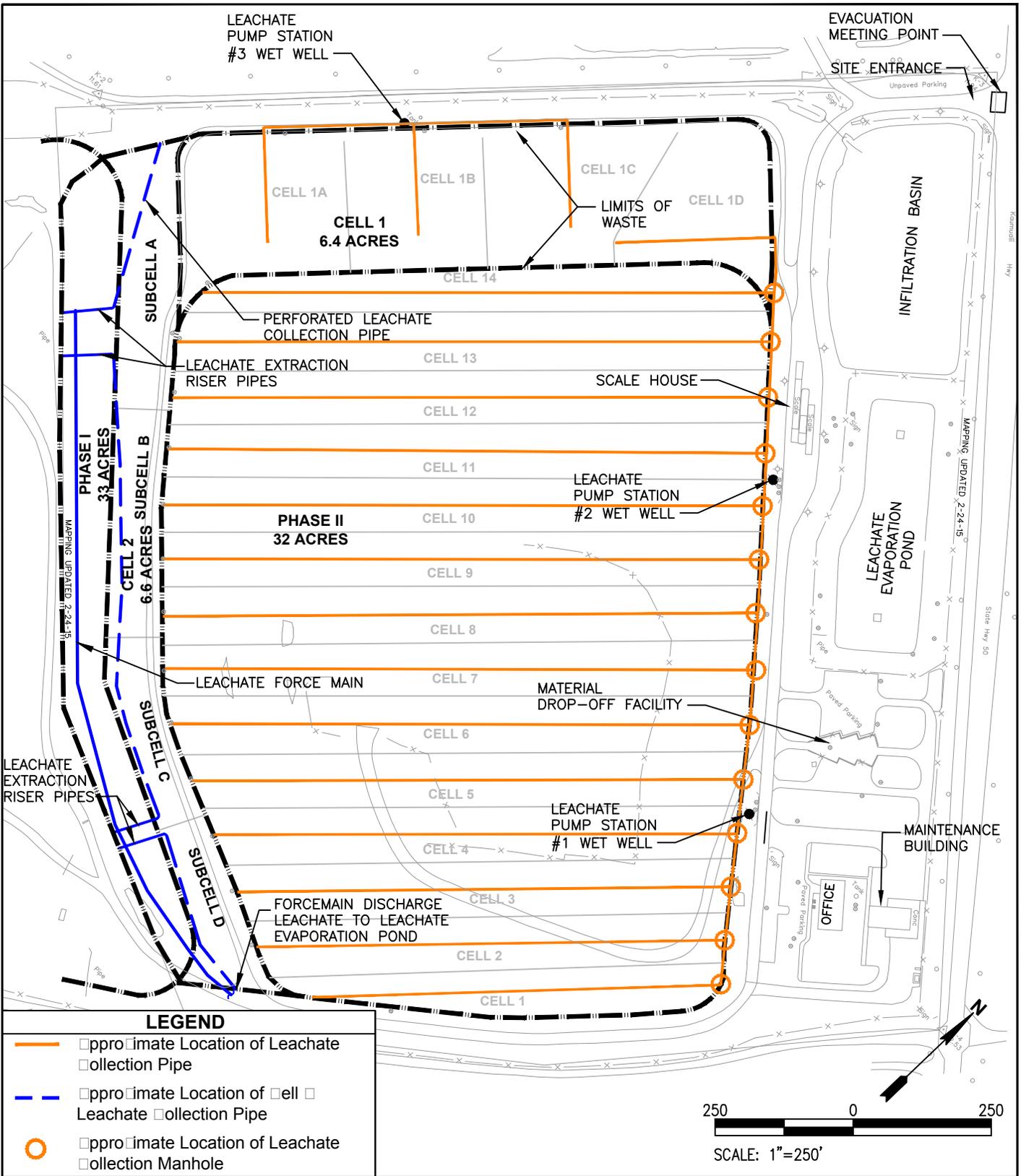
**Figure 1**  
**Site Location Map**  
**Kekaha Landfill**  
**Kauai, Hawaii**





**Figure 2**  
**Site Layout Map**  
**Kekaha Municipal Solid Waste Landfill**  
**Kekaha, Hawai'i**





**LEGEND**

- □ approximate Location of Leachate Collection Pipe
- □ approximate Location of Cell Leachate Collection Pipe
- □ approximate Location of Leachate Collection Manhole



**Figure 3**  
**LCRS System Layout**  
**Kekaha Municipal Solid Waste Landfill**  
**Kekaha, Hawai'i**







**ATTACHMENT A**

**WASTE ACCUMULATION / GENERATION WASTE LOG**







**ATTACHMENT B**

**VECTOR CONTROL SUMMARY FORM**



## KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II VECTOR CONTROL SUMMARY FORM

Inspection Date: Time:	Inspector: Title:																												
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; padding: 5px;">1. Any vectors/signs of vectors present in: (Look for nests, droppings, chew marks, tracks, etc)</th> <th style="width: 15%; padding: 5px; text-align: center;"><u>Yes</u></th> <th style="width: 15%; padding: 5px; text-align: center;"><u>No</u></th> <th style="width: 10%; padding: 5px; text-align: center;"><u>Type?</u></th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Active Working Face</td> <td style="text-align: center; padding: 5px;"><input type="checkbox"/></td> <td style="text-align: center; padding: 5px;"><input type="checkbox"/></td> <td></td> </tr> <tr> <td style="padding: 5px;">Material Drop-Off Facility</td> <td style="text-align: center; padding: 5px;"><input type="checkbox"/></td> <td style="text-align: center; padding: 5px;"><input type="checkbox"/></td> <td></td> </tr> <tr> <td style="padding: 5px;">Admin Building (interior? exterior?)</td> <td style="text-align: center; padding: 5px;"><input type="checkbox"/></td> <td style="text-align: center; padding: 5px;"><input type="checkbox"/></td> <td></td> </tr> <tr> <td style="padding: 5px;">Scale House (interior? exterior?)</td> <td style="text-align: center; padding: 5px;"><input type="checkbox"/></td> <td style="text-align: center; padding: 5px;"><input type="checkbox"/></td> <td></td> </tr> <tr> <td style="padding: 5px;">Maintenance Shop</td> <td style="text-align: center; padding: 5px;"><input type="checkbox"/></td> <td style="text-align: center; padding: 5px;"><input type="checkbox"/></td> <td></td> </tr> <tr> <td style="padding: 5px;">Other (please list)</td> <td style="text-align: center; padding: 5px;"><input type="checkbox"/></td> <td style="text-align: center; padding: 5px;"><input type="checkbox"/></td> <td></td> </tr> </tbody> </table>		1. Any vectors/signs of vectors present in: (Look for nests, droppings, chew marks, tracks, etc)	<u>Yes</u>	<u>No</u>	<u>Type?</u>	Active Working Face	<input type="checkbox"/>	<input type="checkbox"/>		Material Drop-Off Facility	<input type="checkbox"/>	<input type="checkbox"/>		Admin Building (interior? exterior?)	<input type="checkbox"/>	<input type="checkbox"/>		Scale House (interior? exterior?)	<input type="checkbox"/>	<input type="checkbox"/>		Maintenance Shop	<input type="checkbox"/>	<input type="checkbox"/>		Other (please list)	<input type="checkbox"/>	<input type="checkbox"/>	
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Scale House (interior? exterior?)	<input type="checkbox"/>	<input type="checkbox"/>																											
Maintenance Shop	<input type="checkbox"/>	<input type="checkbox"/>																											
Other (please list)	<input type="checkbox"/>	<input type="checkbox"/>																											
2. Any indication of vector <i>attractants</i> , such as food, water, exposed rubbish, shelter? <input type="checkbox"/> Yes <input type="checkbox"/> No                      If Yes, please describe.																													
3. Any vector <i>breeding sources</i> observed that might cause nuisance or disease (standing water, nests, burrows)? <input type="checkbox"/> Yes <input type="checkbox"/> No                      If Yes, please describe.																													
4. Is daily cover adequate to deter vectors? <input type="checkbox"/> Yes <input type="checkbox"/> No                      If No, please explain.																													
5. Is intermediate cover intact and adequate to deter vectors? <input type="checkbox"/> Yes <input type="checkbox"/> No                      If No, please explain.																													
6. Describe <i>vector control activities</i> conducted at WGSL this month (at the working face, in facility structures, chemical controls, etc)?																													
7. Any nuisances related to vectors/wildlife reported? <input type="checkbox"/> Yes <input type="checkbox"/> No                      If Yes, please explain.																													



**ATTACHMENT C**

**MDOF OPERATIONS PLAN**



**EXISTING MATERIALS DROP-OFF FACILITY OPERATIONS PLAN  
KEKAHA LANDFILL**

**Kekaha, Kaua'i, Hawai'i**

Prepared for

**County of Kaua'i**  
**Department of Public Works**  
4444 Rice Street  
Lihu'e, Hawai'i 96766

Prepared by

AECOM Technical Services, Inc.  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813-3698

Prepared October 2015

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## Acronyms and Abbreviations

KLF	Kekaha Landfill
LAB	lead acid battery
MDOF	Materials Drop-Off Facility
SPCC	Spill Prevention Control and Countermeasure Plan

## 1. INTRODUCTION

As required in the solid waste permit, this Materials Drop-Off Facility (MDOF) Operations Plan has been prepared on behalf of the Kekaha Landfill Facility (KLF). This plan provides operational, environmental control, and closure information pertaining to the MDOF. Table 1 contains specific topics outlined in the Solid Waste Permit for Phase II.

**Table 1: MDOF Operations Plan Checklist**

Requirements of the Kekaha Phase II Municipal Solid Waste Landfill Permit		
Special Condition V(1)	Topic	Plan Section Addressing Requirement
a.	<b>Site analysis</b>	
	Site plan	Figures 1 - 2
	Description of equipment, public access and turnaround areas	Section 2
	Maximum capacities and storage times for each operational section (self-haul drop-off area, green waste drop-off area, clean recyclables storage, white goods storage, tires storage, LAB storage, and used oil storage).	Section 2.1
b.	<b>Design requirements</b>	
	Description of operation	Section 2.1
	Description of process equipment	Section 2.2
	Description of personnel with their respective titles needed to operate the facility on a minimum basis	Section 2.4
	Identify all on-site environmental controls including vector control, stormwater management, used oil spill controls, and storage areas.	Section 3
	Identify site manager by name and describe their responsibilities	Section 2.4
c.	<b>Operations requirements</b>	
	Identify user population that will be allowed to utilize the MDOF facility for disposal. Discuss screening and review process to be used to identify legitimate users.	Section 2.3
	Include requirements for standards of acceptance for materials and recordkeeping.	Sections 2.3 and 2.1.3
	Provide information on how Freon, LABs, and used oil are to be managed.	Section 2.3
	Identify any unwanted type of residues or leachate and how they are to be managed.	Sections 2.3.4 and 3.2
d.	<b>Closure plan</b>	
	Ensure no adverse environmental impacts at the completion of the MDOF operations.	Section 4
e.	<b>Annual operations report</b>	
	The report shall detail the volume in tons, or other appropriate measure, of each recoverable material collected, processed, shipped, and disposed of. Provide quantities, in appropriate measure, of residues and leachate.	Section 5

LAB lead acid battery

### 1.1 BACKGROUND

KLF is located at 6900 D Kaumuali'i Highway approximately 1.3 miles northwest of the town of Kekaha on the island of Kaua'i. The site is owned by the County of Kaua'i Department of Public Works. The site is operated by Waste Management of Hawaii, Inc. dba Sanifill of Hawaii under permit number LF-0053-09. KLF operates primarily as a municipal solid waste landfill, accepting waste from commercial, municipal, and private residential customers. To help meet community needs, KLF accepts for recycling or processing: green waste, recyclables, tires, white goods, and used oil. Recyclables include: cardboard, newspaper, glass, aluminum cans, plastic bottles (#1 and

#2), and mixed paper. In 2004, the *Operating Plan Kekaha Landfill Phase II* and *Refrigerant Management Plan* were prepared for the KLF. Pertinent background information and information relating to the MDOF operations included in these plans is referenced in this MDOF Operations Plan. Updates and addendums to the plans supersede previous versions, therefore, all references to the plans should be considered to refer to the most current version of each plan.

## 2. MDOF OPERATIONS

The MDOF operations include drop-off areas for green waste, recyclables, mixed wastes, tires, white goods, scrap metals, and used oil (located at the maintenance shop). Recyclables include: cardboard, newspaper, glass, aluminum cans, plastic bottles (#1 and #2), and mixed paper.

### 2.1 FACILITY

The site entrance to the KLF is located at the north corner of the site. The scale house is located south east of the site entrance road. The MDOF is located southeast of the scale house as indicated on Figure 1. The layout of the MDOF is shown on Figure 1. The solid waste permit allows operation of the MDOF from 8:00 a.m. to 4:00 p.m. 7 days per week. Current KLF operation hours are 8:00 a.m. to 4:00 p.m. 7 days per week. The site is closed on the holidays as discussed in Section I Part A of the KLF Phase II Operations Manual. MDOF operating hours are subject to change at the operator's discretion. Table 2 shows MDOF capacity and maximum storage time information.

**Table 2: MDOF Storage Area Information**

Area	Storage Capacity	Maximum Storage Time
Green Waste Storage	30 ft x 30 ft x 12 ft = 400 cy	30 days
Tire Storage	70 tires	30 days (typically 1 week)
White Goods Storage	35 units	30 days
Lead Acid Battery Storage	0 prohibited waste	--
Used Oil Storage	Six 55-gallon drums	30 days
Clean Recyclables Storage	30-yard container, 4 ports, 10-yard container, magazines	30 days
Drop-Off Area (MSW)	Two 30-yard containers	30 days (emptied when full, typically twice per day)

#### 2.1.1 Access Control

Access to the KLF is controlled through a single access road into the facility. Waste hauling vehicles check in at the scale house and visitors are instructed to sign in at the office. Unauthorized access to the facility is restricted by a 6-foot chain link fence, as well as natural topography. Gates are locked when the facility is not in operation. Access control is discussed further in Section I Part A of the KLF Phase II Operations Manual.

#### 2.1.2 Traffic Control

The MDOF is laid out to provide for efficient traffic flow and to minimize cross traffic between collection vehicles and vehicles using the MDOF. Except for the green waste drop-off area, the MDOF area layout does not require customers to back up. In general, vehicles using the MDOF will enter the KLF through the main access road. Signs instruct the vehicles to proceed to the scale to be weighed, if necessary. The scale house attendant then directs the vehicles using the MDOF to the appropriate area. The vehicles then proceed to the MDOF area. After unloading, vehicles using the MDOF will proceed back to the scale to be weighed, if necessary, and then exit the KLF.

#### 2.1.3 Recordkeeping

KLF will maintain records of MDOF materials quantities and types. Spills, injuries, and other incidents will also be recorded as outlined in the Section I of the KLF Phase II Operations Manual.

#### 2.1.4 Emergency Services

Police, fire protection, and emergency care services for the Facility are available from local agencies. Two-way communication will be maintained between the drop-site attendant/spotter and the administrative office. Should an emergency arise, the attendant is normally in the area and immediate communication can be made from the emergency location to the administrative office in

order to contact the appropriate emergency responder. On-site emergency measures include applicable personnel being trained in the use of fire extinguishers and the fundamentals of fire prevention, and the posting of emergency numbers for local responders will be posted at all telephones. Emergency procedures are discussed in detail in Section I Part E of the KLF Phase II Operations Manual

## **2.2 EQUIPMENT**

The equipment used at the MDOF may vary based on need, availability, and other factors. Processing equipment is not used at the MDOF. The MDOF is used for temporary storage only. However, some landfill heavy equipment may be used as necessary to move and manage materials. All the landfill equipment, as listed in Section I Part A of the Kekaha Landfill Phase II Operations Manual, is available for use at the MDOF. Basic functions to be performed at the MDOF include managing and loading green waste materials and hauling full and empty bins and roll-off containers. The primary equipment to be used to handle MDOF materials are bins, roll-off containers, roll-off trucks, and loaders. Additional equipment may be utilized, if necessary. To provide a safe working environment for employees and visitors, mobile facility equipment operating in the MDOF areas open to the public will be equipped with noise creating backup safety signals.

In the event of an equipment breakdown, other site equipment will be used, or rental equipment can be obtained from local heavy equipment dealers. A preventive maintenance program is implemented in order to minimize equipment downtime and ensure the availability of adequate equipment to manage the waste load.

## **2.3 WASTE STREAMS**

KLF and the MDOF is open to all private citizens on the island of Kaua'i. All individuals on the island are allowed to utilize the KLF and therefore no individual identification or screening is required. Commercial customers are not allowed to use the MDOF and can be identified by their license plates. KLF reserves the right to reject or deny access to any vehicle known or suspected to be hauling unacceptable wastes. Questionable loads will be held until a final determination of waste acceptability is made by the District Manager. The monitoring procedures for identifying unacceptable wastes at the Facility are discussed in Section I Part B of the KLF Phase II Operations Manual. A listing of waste materials that may be accepted at the facility, as well as a specific list of unacceptable waste materials, is posted at the scale house and other locations of the KLF. Additionally, KLF reserves the right to deny access to any vehicle operated in an unsafe manner or that is not tarped.

All incoming waste streams pass over the scale, waste types and tonnages are recorded. All recyclable materials are also weighed as they leave KLF.

### **2.3.1 Greenwaste**

Individuals deposit greenwaste in designated roll-off containers. No processing of greenwaste is done in the MDOF area. When containers become full they are transferred to the top of the closed Phase I Landfill. The County contracts a private contractor to shred the stockpiled greenwaste and then haul 50% of the shredded material off the site. The other 50% of shredded material is left to the County for residential usage.

### **2.3.2 Recyclables**

Tires, containers of used oil, and other recyclables are dropped off by customers in designated bins and roll-off containers at the MDOF. Steel cans were added to the list of recyclable materials by the County in May 2012 (Appendix B). Recyclables placed into the drop-bin include: cardboard, newspaper, glass, aluminum cans, plastic bottles (#1 and #2), and mixed paper. Customers place white goods and scrap metal at designated drop-off areas of the MDOF where they are temporarily stored until being removed from the KLF for recycling. All white goods and scrap metals are handled and stored in a manner to prevent spills or releases of oil, lubricants, chlorofluorocarbons, or freon (see *Refrigerant Management Plan* in Appendix A for additional information), as applicable. At no

time will the quantity of white goods and metals stored at the MDOF exceed the storage capacity of the white goods storage area.

Tires are stored in roll-off containers until they are transported to an approved tire recycler. At no time will the volume of tires stored on site exceed the storage capacity of the tire storage area. The collection, storage, and recordkeeping of used tires shall be conducted in accordance with Hawaii Revised Statutes Chapter 342I, *Used Motor Vehicle Tire Recovery*.

As conditions warrant, used oil and clean recyclables are transported to designated storage areas and stored until removed from the site. The collection, storage, transport, and recordkeeping of used oil shall be conducted in accordance with Hawaii Administrative Rules §11-279, *Standards for the Management of Used Oil*. Customers with used oil for drop-off are escorted to the temporary storage drums located at the maintenance shop.

The County will either hire a contractor to collect/remove all recyclables or conduct the removal in-house. Only certified and/or permitted recyclers are used by the County.

### **2.3.3 Mixed Waste**

Mixed waste is placed by customers in bins and roll-off containers in the designated drop-off area at the MDOF. Bins and roll-off containers are transported from the drop-off area and wastes disposed of at the working face of the KLF as necessary. Bins and roll-off containers containing mixed waste will be emptied when full.

### **2.3.4 Wastes Not Accepted**

Scrap vehicles, lead acid batteries (LABs), and recyclable materials from commercial customers are not accepted at the MDOF. Other unacceptable wastes are listed in Section I Part B of the KLF Phase II Operations Manual and includes toxic materials, radioactive materials, hazardous materials as designated under 40 CFR Part 261, and others materials. Scale house attendants question each incoming customer as to the source and contents of each load. All facility personnel are trained in the identification of unacceptable wastes. Unacceptable wastes are rejected at the scale house or where identified. Occasionally, LABs are found in loads that have been deposited at site. These LABs are removed once they are discovered and temporarily stored in a covered, leak-proof container on the paved area outside the maintenance building. No storage of LABs occurs at the MDOF. Any LABs that have been discovered at the KLF are taken to a recycler by the County Supervisor on a weekly basis.

## **2.4 PERSONNEL**

Personnel from the KLF, as indicated in Section I Part A of the KLF Phase II Operations Manual, are available to assist with MDOF operations. Staffing will be maintained at a level commensurate with the amount of activity and waste volume anticipated at the MDOF. Typical personnel will include:

- Scale House Attendant – Responsible for recording the date, time, and weight and type of incoming material. Also directs individuals to the appropriate MDOF area.
- Laborer – Responsible for assisting in general site maintenance.
- Spotter – Responsible for providing direction to MDOF users. Monitors loads to prevent disposal of prohibited wastes, and prevents scavenging by MDOF users.
- Heavy and Light Equipment Operators – Responsible for the hauling of full bins and roll-off containers to the active face or appropriate storage areas.
- Landfill Supervisor – The current District Manager, John Ruiz, is a Waste Management of Hawaii, Inc. employee. The District or Operations Manager title was previously titled Site Manager. The District Manager's responsibilities include coordinating equipment and employees, maintaining records and reports, and implementing employee and safety training..

### **3. ENVIRONMENTAL CONTROLS**

Comprehensive environmental controls at KLF are discussed in Section 6 of the KLF Phase II Operations Plan. Select controls that specifically relate to the MDOF are discussed in the following paragraphs.

#### **3.1 VECTOR CONTROL**

The facility is operated to eliminate the harboring, feeding, and breeding of vectors, insects, and birds. Site personnel are trained to observe and identify the first signs of vectors. General housekeeping and cleaning practices eliminate the feeding potential for vectors, insects, and birds. Routine inspections of the MDOF for potential vector habitat will be carried out, and corrective action will be taken when needed. In the unlikely event that vectors become a problem, operations will be modified as necessary to eliminate the problem or a professional exterminator may be retained to alleviate the problem. Operations modifications may include more frequent emptying of the bins and roll-off containers, using bins and roll-off containers with covers, or installing bird-deterrent measures.

#### **3.2 STORMWATER MANAGEMENT**

Stormwater, run-on and run-off at the MDOF is controlled with site grading and concrete berms, which directs stormwater from the paved parking areas of MDOF into catch basin inlets and through oil-water separators, prior to flowing into perforated culverts within infiltration ditches. Silt fence and other controls will be used as necessary to control erosion. Stormwater that comes in contact with the mixed waste at the MDOF is treated as leachate. The roll-off containers used to collect the mixed waste are located in a depressed area that drains into the landfill's leachate collection system, and is disposed of in the leachate evaporation pond. The stormwater and leachate control systems are inspected and maintained as necessary after storm events. Figure 1 depicts the stormwater and leachate collection system at the MDOF.

#### **3.3 USED OIL SPILL CONTROL**

Used oil spills will be handled as discussed in the site Spill Prevention, Countermeasure and Control Plan (SPCC) located within Section IV of the Operations Manual.

#### **3.4 STORAGE AND DROP-OFF AREAS**

Regular good housekeeping practices will keep the MDOF and adjacent areas clear of litter. The chain link fence surrounding the entire KLF property will prevent windblown litter from leaving the KLF. Laborers will be used to collect wind-blown litter as necessary. The first line of defense against odors involves minimizing the potential for odor generation. Bins and roll-off containers will be emptied as necessary to control odors. All road and access drives of the MDOF open to the public are paved with the exception of the green waste drop-off. Dust suppression methods, which include watering, will be carried out in the green waste drop-off area as necessary. Any mud or dirt carried out of the green waste drop-off on vehicles will be dropped as the vehicles drive over the paved areas preventing the tracking of mud and dirt to public roadways. Paved areas will be cleaned as necessary.

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#### **4. CLOSURE PLAN**

The KLF closure plan is included in Section VIII of the KLF Phase II Operations Manual. Closure of the MDOF requires no special procedures. All waste and recyclables should be removed and handled as stated within this MDOF Operations Plan. Upon removal of all wastes and recyclables from the MDOF area, all removable equipment should be removed from MDOF areas. Disturbed areas should be graded to ensure drainage during post-closure and seeded and mulched if needed. No waste or waste residues will remain in the MDOF areas after closure and therefore no additional closure procedures are required.

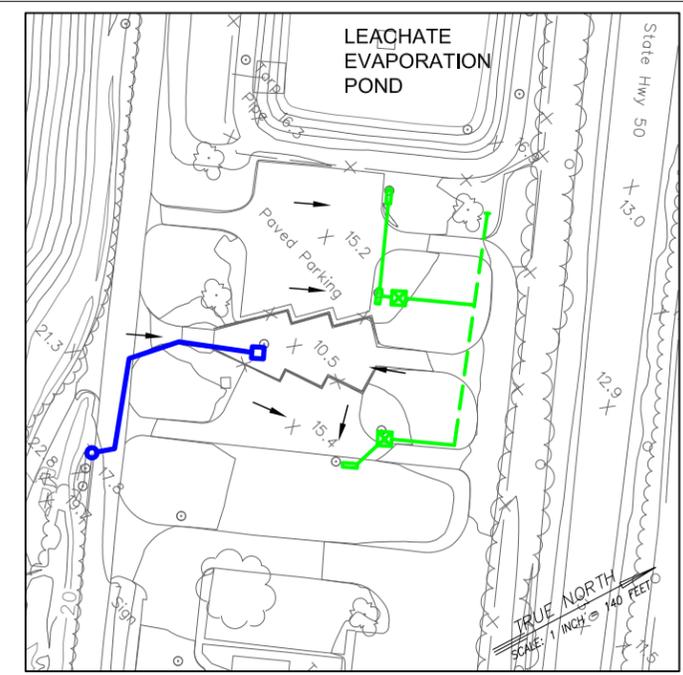
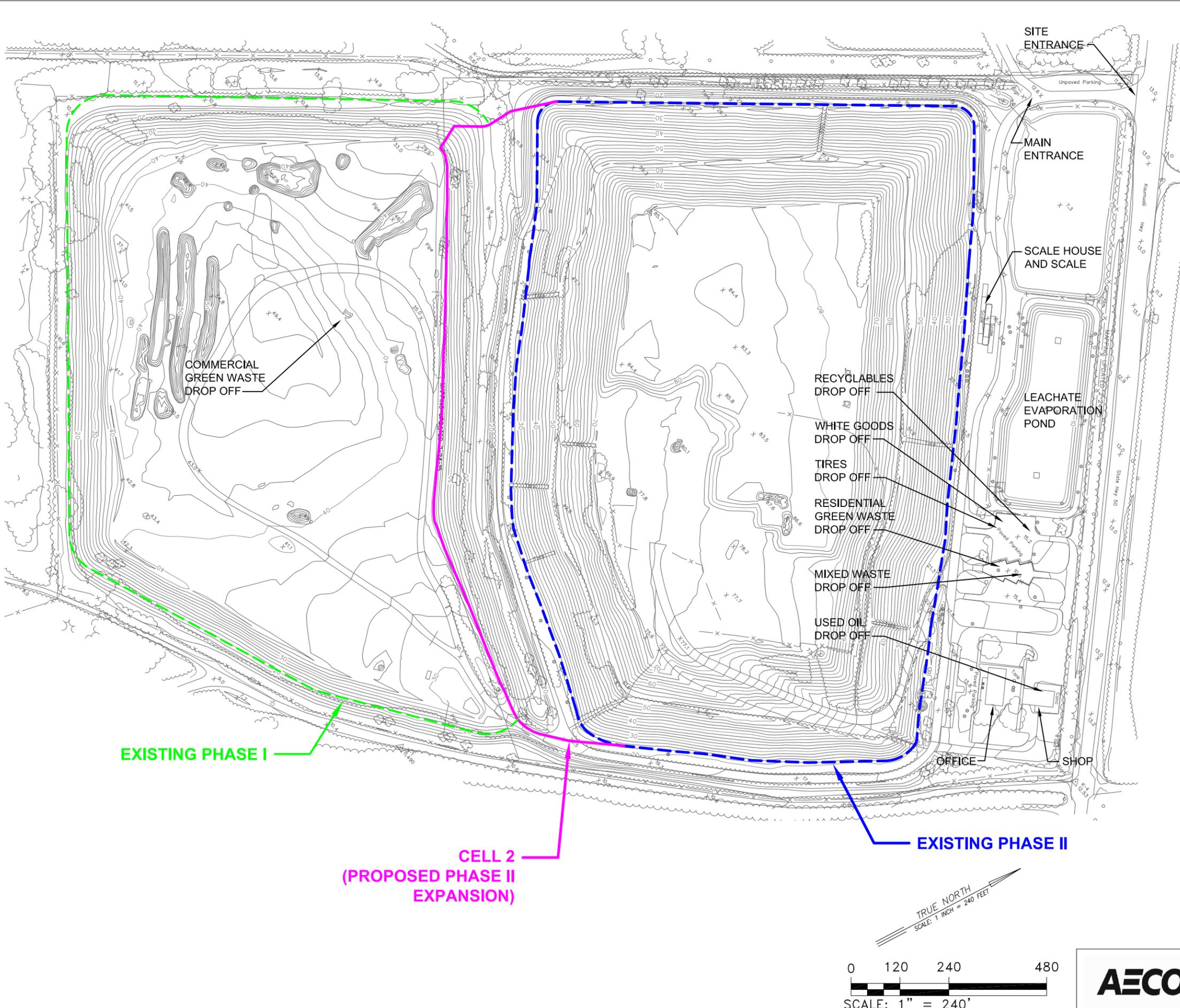
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## **5. ANNUAL OPERATIONS REPORT (AOR)**

The MDOF annual operations information will be prepared each year and will be submitted to the State of Hawaii Department of Health not later than 30 days after June 30 of each year. The MDOF operations information may be prepared in a separate report or included in the site's overall Annual Operating Report. The information will detail the volume in tons, or other appropriate measure, of each recoverable material collected, processed, shipped, and disposed of, and provide quantities, in appropriate measure, of residues and leachate.

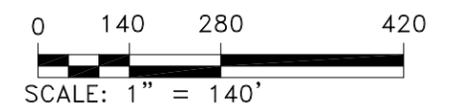


\\Ward\hawaii\Projects\Legacy\ENV\Non-Federal\County of Kauai\010197384\_KAUA-KAUA Cell 2\07 Deliverables\Task 15 Cell 2 Dwg1\_SitePlan\_06022015.dwg 10/05/15 10:17 AM nrmcd



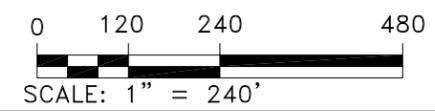
NOTE:  
 STORMWATER AND LEACHATE COLLECTION SYSTEMS  
 LOCATIONS ARE APPROXIMATE AND NOT TO SCALE

### STORMWATER AND LEACHATE SYSTEM DETAIL



LEGEND	
	LEACHATE CATCH BASIN
	LEACHATE WET WELL PUMPING STATION
	LEACHATE COLLECTION PIPE
	OIL WATER SEPARATOR
	STORMWATER CATCH BASIN
	STORMWATER INFILTRATION CULVERT
	SURFACE WATER FLOW DIRECTION

**Figure 1**  
**Existing MDOF**



Kekaha Municipal Solid Waste Landfill  
 Kekaha, Kaua'i, Hawai'i



**Appendix A**  
**Refrigerant Management Plan**



# **Refrigerant Management Plan**

**Kekaha Landfill**

**Kauai, HI**

## **Overview:**

Title VI, Stratospheric Ozone Protection, of the Clean Air Act Amendments of 1990 (Public Law 101-549), signed November 15, 1990, established among other things a production phase out schedule and yearly reduction percentages for ozone-depleting chemicals. One of the primary applications of these chemicals is refrigerant for air conditioning and refrigeration equipment in buildings, homes, supermarkets, and automobiles. This amendment requires recycling; bans the intentional venting or releasing of refrigerants during maintenance, service, repair, or disposal; restricts emission of refrigerants; and establishes strict control over their use.

## **Purpose:**

The purpose of this management plan is to insure compliance with EPA regulations including equipment certification requirements, maintenance and service practices, refrigerant reclaiming requirements, training, and record keeping on the storage, transfer, and disposal of these substances.

## **Facility Activities:**

CFC containing appliance refrigeration systems contain products which are under pressure and therefore should not be handled, transported or stored in such a manner that the refrigerant system may be damaged, potentially releasing CFC-refrigerant to atmosphere. Transport of the appliance(s) should be by flatbed truck, trailer, or other similar equipment, which would allow the appliance to be properly secured during transport.

Crushing or damaging the refrigerant system in any way, which may release CFC-refrigerant to the atmosphere is strictly prohibited.

This facility accepts appliances containing refrigerant including refrigerators, air conditioners and freezers from residential sources. Many of the items are damaged and/or do not have the compressors attached. Occasionally, an appliance is received with a refrigerant removal certification label already attached. These items are stored as well, reviewed by the refrigerant removal contractor and then sent off-site for metal recycling.

When a refrigerant containing appliance is received at the facility, the driver is directed to unload the item in the designated handling area.

**Refrigerant Removal:**

Refrigerant is not removed from items while they are stored on-site. Once there are a sufficient number of refrigerant-containing items stored on-site to warrant cost effective removal of the refrigerant, the items are transported to the Puhi Metals Recycling Center, where they are processed, which includes the removal of refrigerants. Puhi Metals Recycling Center is currently operated by Resource Recovery Solutions LLC.

**Storage and Management:**

The Refrigerant containing appliances are stored near the recycling area near the public drop area. This location is out of the way of normal traffic flows and allows for a safe storage environment. The area is included in routine site inspections and any abnormal conditions are noted and corrected. Care is taken to not damage the compressor units when moving the appliances.

**Employee Training:**

Employees are trained in the proper management of refrigerant containing appliances and are instructed to remove these items from the landfill.

**Record Keeping:**

White goods are regularly hauled from the drop-off area at the landfill to the Puhi Metals Recycling Center. The County maintains records (i.e., tonnage) of these removal events.

**Release Reporting:**

In the event of an unintentional refrigerant release from the facility, a note will be made in the special occurrence log.

**Facility Contact:** John Ruiz

# White Goods Handling Training

The information below is to help identify requirements and best management practices for managing white goods that contain Chlorofluorocarbon (CFCs such as Freon). CFC containing appliance refrigeration systems contain products which are under pressure and therefore should not be handled, transported or stored in such a manner that the refrigerant system may be damaged, potentially releasing CFC-refrigerant to atmosphere.

## ISSUE:

Title VI, Stratospheric Ozone Protection, of the Clean Air Act Amendments of 1990 (Public Law 101-549), signed November 15, 1990, established among other things a production phase out schedule and yearly reduction percentages for ozone-depleting chemicals. One of the primary applications of these chemicals is refrigerant for air conditioning and refrigeration equipment in buildings, homes, supermarkets, and automobiles. This amendment requires recycling; bans the intentional venting or releasing of refrigerants during maintenance, service, repair, or disposal; restricts emission of refrigerants; and establishes strict control over their use.

## Requirements:

1. Handle appliances with care. Crushing or damaging the refrigerant system in any way, which may release CFC-refrigerant to the atmosphere is strictly prohibited.
2. Store appliances in an upright position. Large refrigerators or freezers may be stored with the door side down to prevent someone from entering the unit.
3. Remove appliances from the landfill if inadvertently or illegally dumped at the active area. Transport to the storage area in a safe manner that prevents damage to the unit.

~~I have read~~ and understand the above:

\_\_\_\_\_  
Employee Signature

\_\_\_\_\_  
Employee Name Printed

\_\_\_\_\_  
Date

**Appendix B**  
**MDOF Correspondence**



NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



LORETTA J. FUDDY, A.C.S.W., M.P.H.  
DIRECTOR OF HEALTH

**STATE OF HAWAII**  
**DEPARTMENT OF HEALTH**  
**ENVIRONMENTAL MANAGEMENT DIVISION**  
**SOLID AND HAZARDOUS WASTE BRANCH**  
919 ALA MOANA BOULEVARD, #212  
HONOLULU, HAWAII 96814

In reply, please refer to:  
EMD/SHWB

June 21, 2012

S0619TM

**CERTIFIED MAIL NO. 7010 2780 0000 4780 8774**  
**RETURN RECEIPT REQUESTED**

Mr. Larry Dill, P.E., County Engineer  
County of Kauai  
4444 Rice Street, Suite 275  
Lihue, Hawaii 96766

**CERTIFIED MAIL NO. 7010 2780 0000 4780 8781**  
**RETURN RECEIPT REQUESTED**

Mr. John Ruiz, District Manager  
Waste Management of Hawaii, Inc.  
Kekaha MSW Landfill  
P.O. Box 1259  
Kekaha, Hawaii 96752

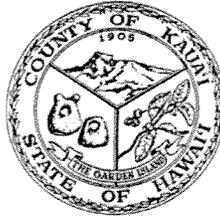
Dear Messrs. Dill and Ruiz:

**SUBJECT: Modification of Material Drop-off Facility Operations Plan**  
**Kekaha Sanitary Landfill**  
**Solid Waste Management Permit LF-0053-09**

On June 1, 2012, the Department of Health, Solid and Hazardous Waste Branch received a letter from the County of Kauai, Department of Public Works, Solid Waste Division requesting that steel food and beverage cans be added to the list of recyclable materials accepted at the Material Drop-off Facility (MDOF) located at the Kekaha Sanitary Landfill site. The letter also states that one additional 4-cubic yard container will be added for collection of these recyclables.

The Solid and Hazardous Waste Branch acknowledges and approves this change to the MDOF operation. These documents (your June 1, 2012 letter and this letter) will be inserted into and become part of the subject permit. This change should be written into the MDOF Operations Plan when the subject landfill permit application is submitted for the Cell 2 expansion.

**Bernard P. Carvalho, Jr.**  
Mayor



**Larry Dill, P.E.**  
County Engineer

**Gary K. Heu**  
Managing Director

**Lyle Tabata**  
Deputy County Engineer

**DEPARTMENT OF PUBLIC WORKS**

Solid Waste Division

**County of Kaua'i, State of Hawai'i**

4444 Rice Street, Suite 275, Lihu'e, Hawai'i 96766

TEL (808) 241-4839 FAX (808) 241-6887

May 29, 2012

Mr. Steven Chang  
Solid and Hazardous Waste Branch  
State of Hawaii Department of Health  
919 Ala Moana Blvd., Suite 212  
Honolulu, HI 96814

*SUBJECT: Request to Revise Material Drop-off Facility Operations Under  
Permit NO. LF-0053-09*

Dear Mr. Chang,

This letter is to request the following revisions to the material drop-off facility operations described in Part III – Special Conditions of the subject permit:

1. Add steel cans to the list of clean recyclables accepted.
2. Add one 4 cubic yard container to item 3f.

Your approval of these revisions would be greatly appreciated. Should you have any questions, please call Allison Fraley at (808) 241-4837.

Sincerely,

  
TROY FANIGAWA, P.E.  
ESME

Concur:

  
LARRY DILL, P.E.  
County Engineer

**SECTION III**

**LEACHATE MANAGEMENT PLAN**



**LEACHATE MANAGEMENT PLAN  
KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II**

**KEKAHA, KAUA‘I**



**PREPARED BY  
WASTE MANAGEMENT OF HAWAII, INC.  
REVISED AUGUST 2016**



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## ACRONYMS AND ABBREVIATIONS

%	percent
amsl	above mean sea level
BMP	Best management practices
CFR	Code of Federal Regulations
DOH	Department of Health, State of Hawaii
ft	feet or foot
GCL	geosynthetic clay liner
HAR	Hawaii Administrative Rules
HDPE	High density polyethylene
KLF	Kekaha Sanitary Landfill – Phase II
LEP	Leachate Evaporation Pond
LCRS	leachate collection and removal system
MDOF	materials drop-off facility
MSW	municipal solid waste
PGL	Protection Granular Layer
PPE	Personal Protective Equipment
WMH	Waste Management of Hawaii, Inc.

## **1.0 INTRODUCTION**

Waste Management of Hawaii, Inc. (WMH) has prepared this Leachate Management Plan to establish standard operating and maintenance procedures for leachate generated at the Kekaha Sanitary Landfill – Phase II (KLF).

Pursuant to Resource Conservation and Recovery Act Subtitle D regulations 40 Code of Federal Regulations (CFR) §258.40, and Hawaii Administrative Rules (HAR) Title 11, Chapter 58.1 municipal solid waste (MSW) landfills are to be constructed:

- *§258.40 (a)(2) “With a composite liner and a leachate collection system that is designed and constructed to maintain less than 30-cm depth of leachate over the liner.”*

### **1.1 Responsibilities**

The KLF District Manager has overall responsibility for implementation of this plan and all operational activities related to leachate management. The District Manager supervises and interfaces with outside contractors and treatment facilities, schedules the necessary tanker trucks required to manage leachate, and ensures that observed deficiencies are corrected and documented in a timely manner.

The Waste Management (WM) Environmental Professional works with the District Manager to ensure that leachate levels in the wet wells are maintained and kept in compliance with permit and regulatory requirements. They coordinate the monitoring, sampling, and analytical testing of leachate and ensure that the required reports are submitted to the DOH. The Environmental Protection Manager is the point of contact for regulatory agencies and handles permit compliance issues and notifications to the DOH, as necessary.

### **1.2 Supporting Documentation**

This Leachate Management Plan is part of the KLF Site Operations Manual and should be used as the primary document for leachate management at the facility. There are other documents that support this Plan, which include, but are not limited to the following:

- As-built drawings
- Cell 2 Engineering Report drawings (AECOM 2015)
- Groundwater and Leachate Monitoring Plan
- Leachate pump specifications and operation manual

## **2.0 GENERAL SITE INFORMATION**

### **2.1 Site Description**

The KLF is a permitted MSW landfill for the disposal of non-hazardous solid wastes. The KLF property covers an area of approximately 98 acres. The KLF is located near the southwest coast of the island of Kaua`i, approximately 1.5 miles northwest of the town of Kekaha, and approximately 2,000 feet (ft) from the Pacific Ocean shoreline. The KLF is bounded by Kaumuali`i Highway to the northeast, an unpaved access road and agricultural land to the southeast, aquaculture facilities to the northwest, and the KLF Phase I area to the southwest. The KLF is hydraulically upgradient of the KLF Phase I, which is a closed and unlined MSW landfill. No established natural streams or lakes exist within or near the facility. Streams on the inland edge of the coastal plain are diverted to the sugarcane plantation irrigation system (R.M. Towill Corporation 1993). The site location and topography are illustrated on Figure 1.

The current permitted waste footprint, which covers approximately 38.5 acres, is roughly square and includes the Phase II disposal cells and Cell 1 (Figure 2). The permitted waste footprint for Phase II is approximately 32.1 acres and is subdivided into 14 smaller waste disposal cells each about 2 acres (approximately 100 ft wide and 800 ft to 1,100 ft long). The permitted waste footprint for the Cell 1 expansion is approximately 6.4 acres and is subdivided into four (4) smaller waste disposal cells each about one (1) acre (approximately 200 ft wide and 200 ft to 280 ft long).

The Cell 2 expansion of Phase II will increase the landfill horizontally to cover approximately 6.6 acres and is estimated to provide an additional 947,500 cubic yards of gross airspace. The Cell 2 area waste footprint will also be divided into four (4) smaller disposal cells. The expanded area will be located between KLF Phase I and Phase II.

The landfill office, scale house, maintenance building, leachate evaporation pond (LEP), and infiltration basin are located along the northeast property line. A materials drop-off facility (MDOF) is located between the LEP and the office. The MDOF provides public drop-offs of green waste, recyclables, MSW, tires and white goods. A used oil drop-off is located in the maintenance building. The site layout is shown on Figure 2.

### **3.0 LEACHATE GENERATION**

Leachate is generated when water percolates through or purges out of disposed refuse. This percolation can occur when precipitation infiltrates directly into the waste, or when moisture in the refuse (whether present when landfilled or generated after landfilling as a product of bio-decomposition) filters or leaches out. Leachate generation is minimized by using the following best management practices (BMPs):

- Maintaining positive drainage on top of the landfill to minimize infiltration. Runoff from covered areas of the landfill is directed away from the active cells. Precipitation that falls on the active face is managed there and not directed off the landfill.
- Utilize geosynthetic tarps in areas where waste and intermediate soil cover has already been placed. The tarps prevent rainfall and storm water from infiltrating the waste cells, and reduce the potential for erosion.
- Maintain surface water drainage around the perimeter of the landfill to prevent surface water run-on into the active disposal area.

## **4.0 LEACHATE COLLECTION AND REMOVAL SYSTEM**

All disposal areas at KLF are equipped with a bottom and side slope composite liner and leachate collection and removal system (LCRS) meeting Federal (Subtitle D equivalent) and State of Hawaii requirements (HAR 11-58.1-14). A description of the liner systems that are in place at the KLF are detailed in Volume I – Section II (*KLF Operations Plan – Section 3.0 Landfill Construction*) of this Site Operations Manual

The LCRS consists of a drainage gravel layer on the cell floor, trenches constructed within the liner system (containing drainage gravel & perforated high density polyethylene [HDPE] pipes), leachate collection manholes, pump stations (e.g. Wet Wells), automatic sump pumps, discharge pipes, pump sensors and controls, and an evaporation pond. The current extraction program in place at the KLF maintains the leachate levels in compliance with federal (Subtitle D) and state regulations, which require that leachate not be allowed to accumulate on the landfill bottom liner to a depth of more than 1-foot, not including leachate contained in the collection sumps. When the leachate level in a wet well reaches a pre-determined height, the pump will automatically start, and pump leachate out of the wet well until the level has dropped to a set height. A force main transfers the leachate from the wet well to the LEP. The LEP occupies 2-acres on the northeast side of the landfill and has a capacity of approximately 3,600,000 gallons.

### **4.1 Leachate Collection**

Phase II was divided into 14 subcells, each graded at a slope of 3 percent (%) toward a central trench for leachate collection. The central trenches are sloped at 0.5% and drain towards two-wet wells (Wet Well-1 and Wet Well-2) which are located outside the lined cell perimeter. Cell 1 consists of three subcells which drain towards central trench that drain to a wet well (Wet Well-3) which is located outside the lined cell perimeter. When the wet wells reach the “pump start” level (set below the compliance elevation), the leachate is pumped through underground pipes to the LEP.

The proposed Cell 2 LCRS will be constructed in a similar manner to Cell 1; however, the central drains in each of the four subcells will drain towards a sump, rather than a wet well, located within the limits-of-waste in each subcell. Leachate in each sump will be pumped through a side slope riser pipe into a double-contained HDPE force main, which flows to the LEP. The major components of the KLF LCRS are shown on Figure 3.

### **4.2 Leachate Maintenance Levels**

The KLF actively extracts leachate from the collection system. The current extraction program at the KLF maintains the site’s leachate levels in compliance (below the maximum allowable levels) with federal and state regulations, which require that leachate not accumulate on the landfill bottom liner to a depth of more than 1 ft, not including that contained in the wet wells. See **Table 4-1** for leachate compliance elevations.

**Table 4-1: Leachate Compliance Elevations**

<b>Leachate Sump</b>	<b>Lowest Cell Invert Elevation (ft amsl)</b>	<b>Compliance Elevation (ft amsl)</b>
Wet Well-1	6.82	7.82
Wet Well-2	6.82	7.82
Wet Well-3	10.50	11.50

ft            feet  
amsl        above mean sea level

**4.2.1 Leachate Sump Pump Systems**

Automatic, variable speed, leachate pumping systems, and instrumentation (automatic pumps, flow meters, sensor float switch, and pressure transducer) are installed at each wet well. Each leachate pump system was designed and installed by EPG Companies, Inc. This instrumentation automatically starts, stops, and modulates pump speeds to efficiently and reliably pump variable flow rates. The pump systems utilize electric submersible leachate pumps, a sensor float switch, and a submersible electronic pressure transducer. The pressure transducer is used to monitor the leachate levels (in inches) in the wet wells. The pump controls are configured to pump the leachate level down to within 6 inches of the wet well bottom without any loss of performance or damage to the pump. The pumping systems automatically maintain a specified flow rate based on the leachate levels in the wet wells up to the maximum capacity of the pump. Each leachate pump system has the ability to display alarms and shutdowns, which are indicated by a red flashing light located on top of the control panel enclosure.

The sensor float switch measures liquid levels and transmit signals to a pump controller. Leachate levels in the wet wells and side slope riser are controlled by the use of pressure transducers set for specific elevations to trigger pump on, pump off, and high-level alarm, based on minimum leachate head requirements. The controls for the leachate pump are housed in a control panel near each leachate sump riser.

Leachate levels in each wet well are checked at least monthly. During periods of heavy rain, levels in each wet well are checked on a daily basis. These checks are documented at least weekly in the KLF Facility Leachate log (Appendix A). Any levels that exceed compliance levels are reported to the State of Hawaii Department of Health (DOH) within 24 hours.

An outside electrical contractor handles any repairs or maintenance activities that need to be performed on the LCRS or associated equipment.

#### 4.2.2 Pump Settings

The leachate level in the wet wells will rise until it reaches the “pump on” level, which will start the pump. The pump will then continue to run until the “pump off” level has been reached. The pump start and stop levels are presented in Table 4-2.

**Table 4-2: Leachate Sump Pump Levels**

<b>Leachate Sump</b>	<b>Pump Start Level (ft amsl)</b>	<b>Pump Stop Level (ft amsl)</b>
Wet Well-1	5.25 ft	3.50 ft
Wet Well-2	5.50 ft	3.75 ft
Wet Well-3	7.00 ft	4.19 ft

ft            Feet  
amsl        above mean sea level

#### 5.0 LEACHATE EVAPORATION POND

The LEP occupies 2-acres on the northeast side of the landfill and has a capacity of approximately 3,699,000 gallons. The operation liner of the LEP consists of the following materials, listed from bottom to top:

- Prepared sub base grade
- 60-mil HDPE geomembrane (textured on both sides)
- Geosynthetic clay liner (GCL) composite consisting of bentonite powder/granules encapsulated between a carrier non-woven geotextile and a cover of woven geotextile, needle punched for additional strength
- 60-mil HDPE geomembrane (textured on both sides)
- GCL composite consisting of bentonite powder/granules encapsulated between a carrier non-woven geotextile and a cover of woven geotextile, needle punched for additional strength
- 60-mil HDPE geomembrane (textured on both sides)
- 16 oz/yd<sup>2</sup> non-woven cushion geotextile
- 12-inch thick granular operations layer (leachate collection)
- 6 oz/yd<sup>2</sup> non-woven separator geotextile
- 2-inch thick protection granular layer (PGL)

The operation liner does not extend up the side slopes of the LEP, however, a geoweb filled with granular materials covers the side slopes of the LEP.

The KLF maintains a log of the status of the LCRS, at least once per week. The log includes the date and volume of leachate pumped into the LEP. Leachate volumes are measured by a flowmeter installed in the leachate pond inlet line. When the flowmeter is not operational,

volumetric measurements are calculated based on the size of the wet well and the depth of leachate in the wet well before and after pumping.

### **5.1 LEP Inspection/Maintenance**

All activities associated with the LEP should be completed in accordance with the site-specific health and safety plan or any specific project health and safety plan for work associated near and with the LEP. This includes all monitoring, permits, and personal protective equipment (PPE).

### **5.2 Access into the LEP**

Access into the LEP should be primarily by foot. For safety purposes and whenever possible, the ingress into the LEP should occur when liquid levels are below the top of the PGL and from one of the four LEP corners. Slopes are gentler in the corners than the side slopes. If entrance to the LEP is required with a visible liquid level, activities should be coordinated with the site safety officer before commencing work.

If access is required for light duty equipment, such as a rubber tracked skid steer, the equipment should be lifted/lowered into place by an excavator or similar piece of equipment to avoid vehicle traffic on the LEP sidewalls. No equipment will be operated on the LEP side slopes and the base. Equipment should avoid quick and tight turns over the indicator geotextile located directly over the PGL. Access for equipment proposed for any maintenance and repair activities will be coordinated with the design engineer.

### **5.3 Inspections**

Inspections of the LEP will be conducted quarterly to identify damaged components, erosion, and other malfunctions that could prevent proper functioning of the LEP. Components to be inspected include the following:

- Force main outlet and metering system
- Side slope geo-cell system/granular fill
- 2-inch granular protection layer
- Observational geotextile layer (non-woven geotextile separating the protection granular layer and the granular operations layer)
- Floats, float supports, float level switch, junction box, and wires

Components that are not regularly accessible (e.g., 2-inch thick PGL, and the observational geotextile layer) due to site conditions or as a result of other maintenance activities may be inspected at reduced intervals. Appropriate repair and maintenance options will be evaluated and maintenance activities performed as necessary.

The leachate level in the evaporation pond will be checked at least weekly and after significant environmental events (i.e., large storms, hurricanes, earthquakes, etc.). During

periods of heavy rain, levels will be checked at least once per day. The leachate level in the evaporation pond shall not exceed a 6 ft depth, leaving about 2 ft of freeboard.

#### **5.4 Soil, Silt, and Debris Removal**

Soil, silt, and debris can potentially collect in the LEP. Soil can collect from wind events and settle in the pond. Silt can enter the LEP through conveyance of leachate to the pond. Debris, such as litter, leaves, or other matter can be blown into the LEP.

For removal of silt and soil on the indicator geotextile, flat shovels and brooms should be used to manually remove material from the geotextile surface. Caution should be taken to avoid damaging the geotextile. If soil is dried and adhering to the geotextile, the soil can be moistened as needed to assist in removal and to avoid damage to the geotextile. Bulk removal of soil can be accomplished through hand buckets, light equipment, or by direct shoveling to an excavator bucket extended from outside the LEP limits.

A final walk over of the indicator geotextile should be performed following soil, silt, and/or debris removal to determine that no damage to the geotextile has occurred and it remains continuous.

#### **5.5 Geotextile Repair**

If damage occurs to the indicator geotextile, the type and size of damage and associated repair technique should be documented in site files. For all repairs, a smaller piece of similar geotextile should be sewed to geotextile surrounding the damaged area. If sewing is not available, heat lustering a patch is also acceptable; however, it should be verified that no burn holes or damage to the patch or surrounding geotextile occurred. Repairs should be extended approximately 1 foot past the damage edge.

### **6.0 LEACHATE MONITORING AND SAMPLING**

Leachate is sampled on a semiannual basis at the KLF, in conjunction with the site's groundwater monitoring program. KLF groundwater and leachate monitoring activities are conducted pursuant to the *KLF Groundwater and Leachate Monitoring Plan* (located in Section VI of this Site Operations Manual), which complies with CFR, Solid Waste Disposal Facility Criteria (and its revisions) in 40 CFR Part 258 (Subtitle D) and HAR Title 11, Chapter 58.1.

The KLF Groundwater and Leachate Monitoring Plan (Section IV) describes the leachate monitoring system, including, but not limited to: leachate monitoring locations, monitoring parameters, data evaluation methods, and sampling and analytical procedures.

## 7.0 REFERENCES

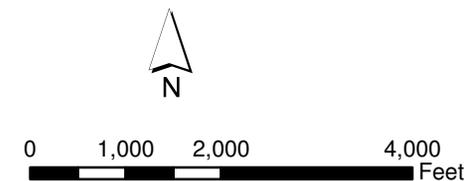
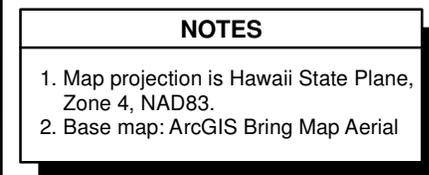
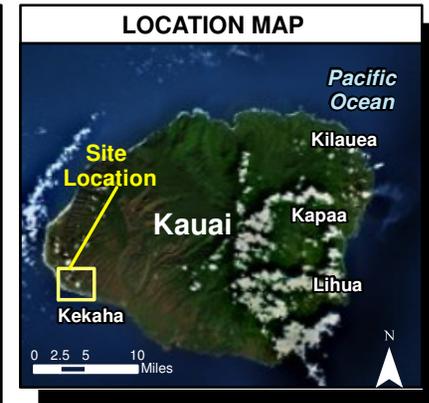
AECOM, 2015. Engineering Report *Kekaha Sanitary Landfill Phase II, Cell 2 Lateral Expansion, Kekaha, Kaua'i, Hawai'i*. September.

R. M. Towill Corporation, 1993, *Revised Environmental Impact Statement, Kekaha Sanitary Landfill Expansion Project*. Report prepared for the County of Kauai, Department of Public Works. December.



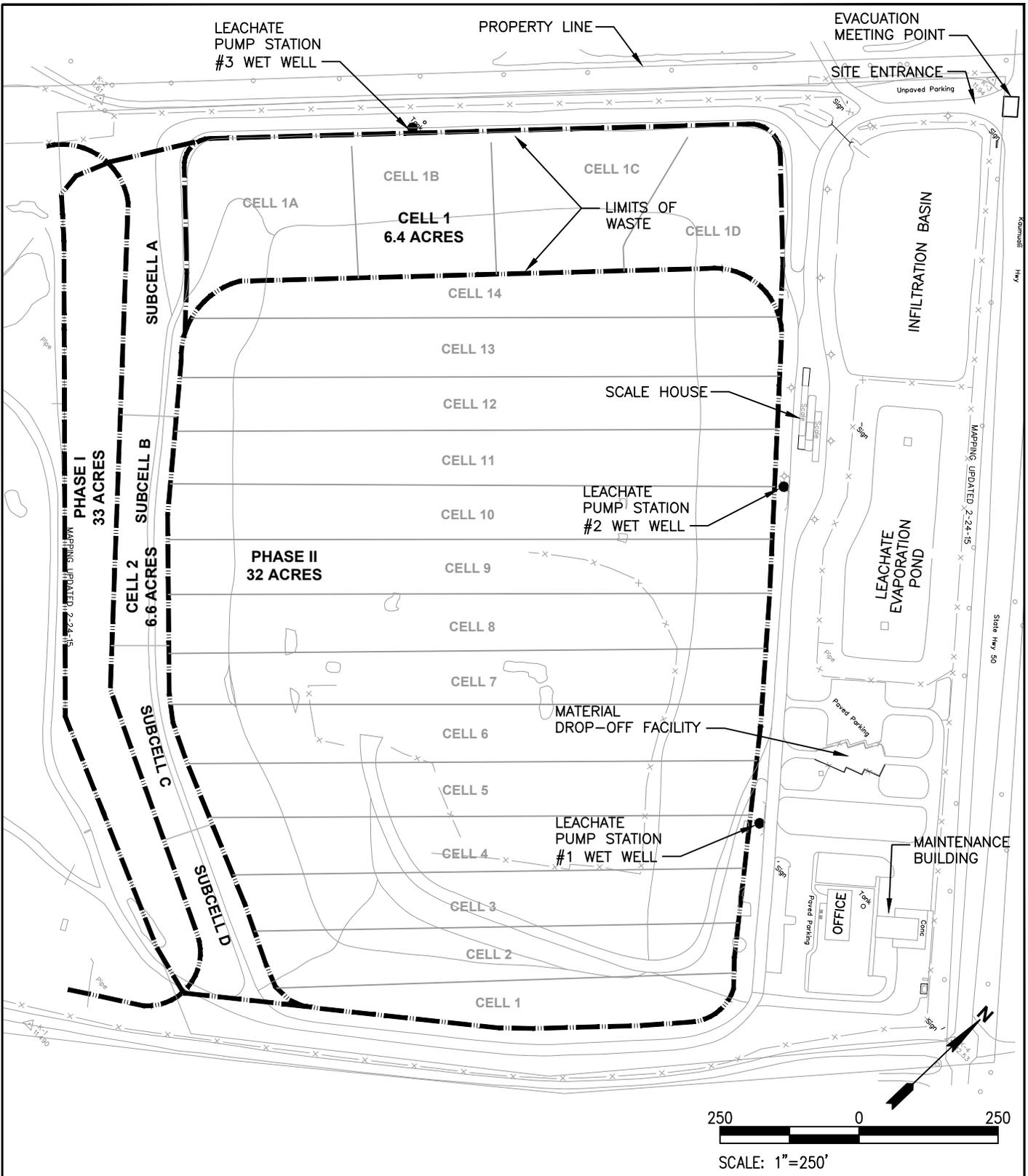
## FIGURES





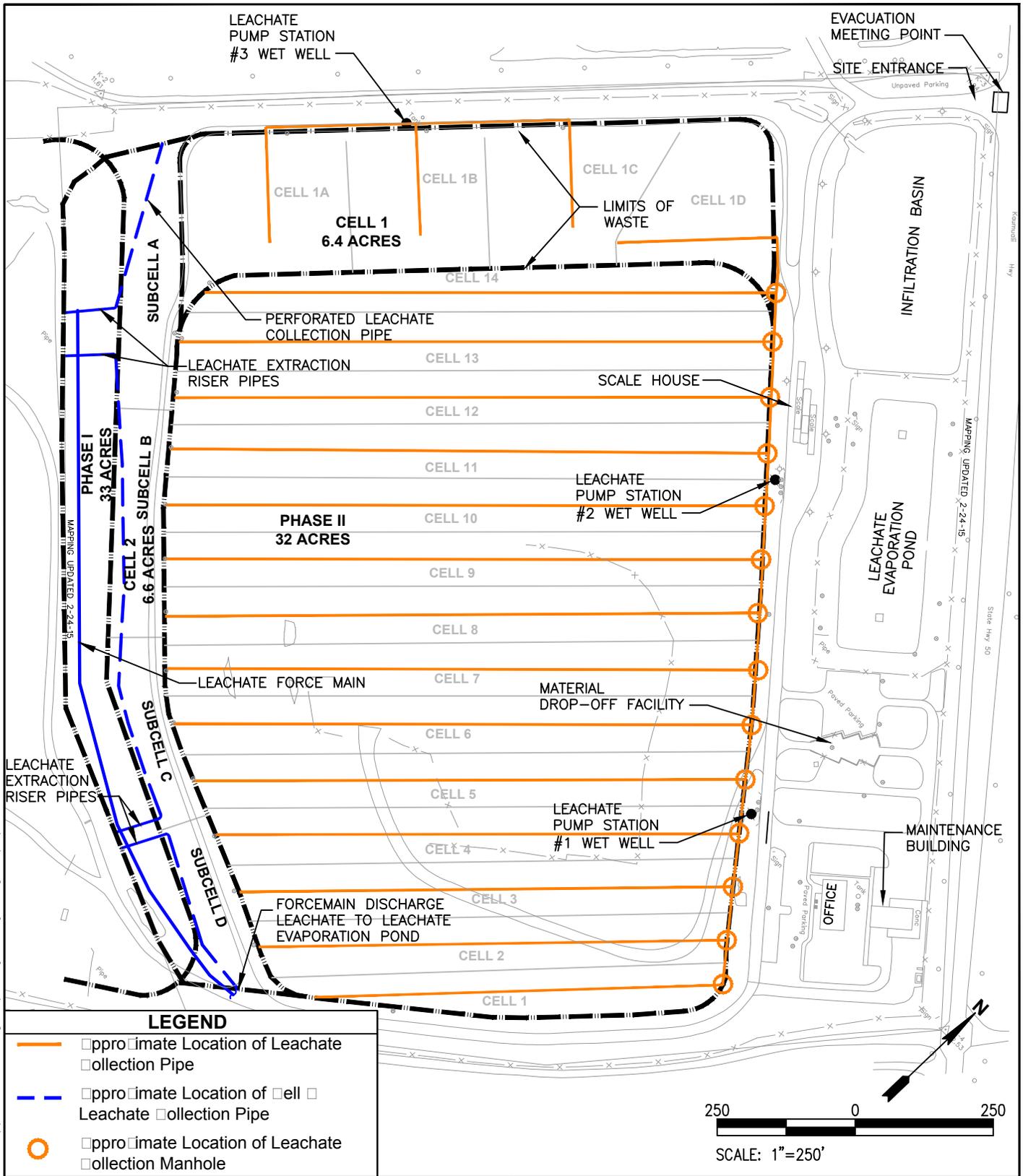
**Figure 1**  
**Site Location Map**  
**Kekaha Landfill**  
**Kauai, Hawaii**





**Figure 2**  
**Site Layout Map**  
**Kekaha Municipal Solid Waste Landfill**  
**Kekaha, Hawai'i**





**LEGEND**

- □ppro□imate Location of Leachate Collection Pipe
- □ppro□imate Location of Cell Leachate Collection Pipe
- □ppro□imate Location of Leachate Collection Manhole



**Figure 3**  
**LCRS System Layout**  
**Kekaha Municipal Solid Waste Landfill**  
**Kekaha, Hawai'i**



**SECTION IV**

***SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN (SPCC)***



# **SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN**

**Waste Management of Hawaii, Inc.**

Kekaha Sanitary Landfill Phase II  
6900-D Kaumuali'i Highway  
Kekaha, Kaua'i, Hawaii 96752  
Phone: (808) 337-1416

**Revised: July 2016**



**GENERAL INFORMATION**

**Facility Name:** Kekaha Sanitary Landfill Phase II

**Facility Address:** 6900-D Kaunauli Highway, Kekaha, Kaua'i, Hawai'i 96752

**Facility Phone Number:** (808) 337-1416

**Designated Person Responsible for Spill Prevention:** John Ruiz

**Types of Operations:** Municipal Solid Waste Landfill

**Date of Last Plan Review:** March 2016

**EMERGENCY NOTIFICATION [40 CFR 112.7(a)(3)(vi)]**

**FACILITY CONTACT**

Name:	John Ruiz	Office Number:	(808) 337-1416
Title:	District Manager	Cell Number:	(808) 645-1290

**ENVIRONMENTAL CONTACT**

Name:	Tina Alder	Office Number:	(808) 668-2985
Title:	Environmental Protection Specialist	Cell Number:	(785) 554-1994

**SPILL RESPONSE CONTRACTOR**

Unitek Solvent Services, Inc.	(808) 831-3076
-------------------------------	----------------

**AGENCY CONTACTS**

National Response Center:	(800) 424-8802
---------------------------	----------------

EPA Region 9:	(866) 372-9378
---------------	----------------

To report an environmental emergency:	(800) 300-2193
---------------------------------------	----------------

State of Hawai'i Department of Health

Hazard Evaluation and Emergency Response Office	(808) 586-4249
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After Hours:	(808) 247-2191
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## 1.0 GENERAL APPLICABILITY [40 CFR 112.1]

This Spill Prevention, Control, and Countermeasure (SPCC) Plan has been prepared for the Kekaha Sanitary Landfill Phase II (KSLF Phase II) facility, pursuant to Federal Regulations promulgated in 1973 and revised most recently January 2009 [Code of Federal Regulations (CFR), Title 40, Chapter I, Subchapter D, Part 112 – Oil Pollution Prevention]. The objective of this SPCC Plan is to describe the measures to be employed to prevent the discharge of oil from non-transportation related onshore facilities into or upon the navigable waters of the United States or adjoining shorelines.

For the purpose of this SPCC Plan, the following are defined in 40 CFR 112.2:

- “Oil” means oil of any kind or in any form, including, but not limited to: fats, oils, or greases of animal, fish, or marine mammal origin; vegetable oils, including oils from seeds, nuts, fruits, or kernels; and, other oils and greases, including petroleum, fuel oil, sludge, synthetic oils, mineral oils, oil refuse, or oil mixed with wastes other than dredged spoil.
- “Discharge” includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping of oil.
- “Navigable Waters” of the United States means “navigable waters” as defined in section 502(7) of the Federal Water Pollution Control Act, (FWPCA) (Pub. L. 92-500) also known as the Clean Water Act (CWA), and includes:
  - All navigable waters of the United States, as defined in judicial decisions prior to the passage of the 1972 FWPCA (Pub. L. 92-500) also known as the CWA, and tributaries of such waters as:
    - Interstate waters, including interstate wetland
    - Intrastate lakes, rivers, and streams (including intermittent streams) which are utilized by interstate travelers for recreational or other purposes; and mudflats, sand flats, and wetlands, the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce
    - Intrastate lakes, rivers, and streams from which fish or shellfish are taken and sold in interstate commerce
    - Waters of the United States, including the territorial seas
    - All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide. (40 CFR 110.2)
- “Oil-filled Operational Equipment” means equipment that includes an oil storage container (or multiple containers) in which the oil is present solely to support the function of the apparatus or the device. Oil-filled operational equipment is not considered a bulk storage container, and does not include oil-filled manufacturing equipment (flow-through process). Examples of oil-filled operational equipment include, but are not limited to, hydraulic systems, lubricating systems (e.g., those for pumps, compressors and other rotating equipment, including pump jack lubrication systems), gear boxes, machining coolant systems, heat transfer systems, transformers, circuit breakers, electrical switches, and other systems containing oil solely to enable the operation of the device.
- “Mobile Tank” is a bulk storage container onboard a vehicle or being towed that is designed or used solely to store and transport fuel for transfer into or from an aircraft, motor vehicle, locomotive vessel, ground service equipment, or other oil storage container.

The SPCC Plan regulations apply to any owner or operator of a non-transportation related onshore and offshore facility engaged in drilling, producing, gathering, storing, processing, refining,

transferring, distributing, using, or consuming oil and oil products, which due to its location, could reasonably be expected to discharge oil in quantities that may be harmful as described in Part 110 into or upon navigable waters or adjoining shorelines.

Harmful quantities include discharges of oil that:

- Violate applicable water quality standards
- Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines

More specifically, the SPCC Plan regulations apply to:

- All facilities that have an above ground aggregate storage capacity exceeding 1,320 gallons of oil.
- All containers with volumes less than **55 gallons and motive power containers (i.e. fuel and hydraulic tanks on moving vehicles)** are exempt. This does not include tanker trucks that are used as mobile refuelers.
- All facilities that have a completely buried storage capacity greater than 42,000 gallons of oil, excluding containers that are “permanently closed.”

Table 1, below, cross references the requirements of 40 CFR 112 with the Sections of the SPCC Plan which address them.

**Table 1: SPCC Plan Cross-Reference**

Provision	Plan Section
112.3(d)	2.0 Professional Engineer Certification
112.3(e)	5.0 Location of SPCC Plan
112.5	4.0. SPCC Plan Amendment
112.7	5.0 Management Approval and Designated Person
112.7	1.0 Table 1: SPCC Plan Cross-Reference
112.7(a)(3)	6.2-6.7 Facility Information Figure 1 and Figure 2A: Facility Maps
112.7(a)(4)	6.8 Discharge Notification
112.7(a)(5)	6.5 Discharge Response
112.7(b)	6.10 Potential Discharge Volumes and Direction of Flow
112.7(c)	6.11 Containment and Diversionary Structures
112.7(d)	Not applicable
112.7(e)	6.12 Inspections, Tests, and Records
112.7(f)	6.13 Personnel, Training and Discharge Prevention Procedures 9.0 Record of Annual Discharge Prevention Briefings and Training
112.7(g)	6.13 Security
112.7(h)	6.14 Tank Truck Loading/Unloading Rack Requirements
112.7(i)	6.15 Field Constructed Aboveground Storage Tank
112.7(j)	6.17 Conformance With Applicable Standards 6.18 State Specific Requirements
112.8(b)	7.1 Facility Drainage
112.8(c)(1)	7.2.1 Construction
112.8(c)(2)	7.2.2 Secondary Containment

<b>Provision</b>	<b>Plan Section</b>
112.8(c)(3)	7.1 Drainage of Diked Areas
112.8(c)(4)	7.2.4 Corrosion Protection
112.8(c)(5)	7.2.5 Partially Buried and Bunkered Storage Tanks
112.8(c)(6)	7.2.6 Inspections and Tests 10.0 Annual SPCC Plan Applicability Review Checklist Appendix A: Monthly and Annual Inspection Forms
112.8(c)(7)	7.2.7 Heating Coils
112.8(c)(8)	7.2.8 Overfill Prevention Systems
112.8(c)(9)	7.2.9 Effluent Treatment Facilities
112.8(c)(10)	7.2.10 Visible Discharges
112.8(c)(11)	7.2.11 Mobile and Portable Containers
112.8(d)	7.3 Transfer Operations, Pumping and In-Plant Processes
112.20(e)	8.0 Certification of Substantial Harm Determination

\* Only selected excerpts of relevant rule text are provided. For a complete list of SPCC requirements, refer to the full text of 40 CFR 112.



## 2.0 PROFESSIONAL ENGINEER CERTIFICATION [40 CFR 112.3 (d)]

By means of this Certification/Re-Certification, I attest that I am familiar with the requirements of provisions of 40 CFR 112, that I or my designated agent have visited and examined the facility, that this SPCC Plan has been prepared in accordance with good engineering practices, including consideration of applicable industry standards, and with the requirements of 40 CFR 112, that procedures for required inspections and testing have been established and that the Plan is adequate for the facility.

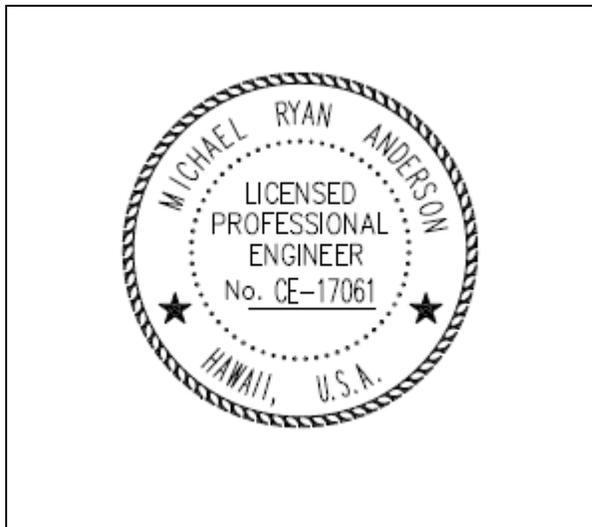
X 

July 26, 2016

Engineer: Michael Anderson, PE  
Registration Number: 17061  
State: Hawaii

Date

Seal





### 3.0 WRITTEN REPORTS [40 CFR 112.4]

A written report is required to be sent to the Region 9 Administrator of the United States Environmental Protection Agency (EPA Region 9) and the appropriate state agencies in charge of oil pollution control activities, State of Hawaii Department of Health (DOH) Hazard Evaluation and Emergency Response Office (HEER), within 30 days of any spill event.

Reportable spill events are defined by multiple sections of the Act:

- **40 CFR 112.4(a)** – The following amounts of oil that, if reaching navigable waters or adjoining shoreline, are reportable under 40 CFR 110.
  - A discharge of over 1,000 U.S. gallons of oil occurs in a single spill.
  - It is the second spill event occurring within any 12-month period of more than 42 U.S. gallons of oil.
- **40 CFR 110.3** – Discharge of oil in such quantities as “may be harmful” pursuant to section 311(b)(4) of the Act.
- **IMPORTANT NOTE:** State Reporting Requirements are more stringent, see below.

For purposes of **40 CFR 311(b)(4)** of the Act—discharges of oil in such quantities that the Administrator has determined may be harmful to the public health or welfare or the environment of the United States include discharges of oil that:

  - Violate applicable water quality standards, local, state, or federal.
  - Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.
- **40 CFR 110.1** – *Sheen* means an iridescent appearance on the surface of water.

The written report is to contain the following information (a Spill Report Form is provided in Section 8.0 of this Plan):

- Name of the facility
- Name(s) of the person reporting
- Location of the facility
- Maximum storage or handling capacity of the facility and normal daily throughput
- Corrective action and countermeasures taken, including a description of equipment repairs and replacements
- An adequate description of the facility including maps, flow diagrams, and topographical maps as necessary
- The cause of such discharge as described in 40 CFR 112.1(b), including a failure analysis of the system or subsystem in which the failure occurred
- Additional preventive measures taken or contemplated to minimize the possibility of recurrence
- Such other information as the Regional Administrator may reasonably require pertinent to the Plan or discharge

Hawai'i Administrative Rules (HAR) §11-451 imposes additional requirements on a written report. In addition to the above, reportable quantities are defined as follows: (1) Any amount of oil which, when released into the environment, causes a sheen to appear on surface water, or any navigable waters of the State; (2) Discharge of more than 25 gallons of oil in a single spill event; (3) Any amount of oil that is less than 25 gallons, but which is not contained and remediated within 72 hours. State requirements also dictate written notification within 30-days (HAR §11-451-7[e]).

Section 13.0, below, includes a written report form. Table 2, below, summarizes the historical oil discharges reported at the site.

**Table 2: Oil Discharge History**

Description of Discharge	Corrective Actions Taken	Plan for Preventing Recurrence
According to facility personnel, no major spill events have occurred since operations at the site began in 1993.		

#### 4.0 SPCC PLAN AMENDMENT [40 CFR 112.5(b)]

Amendments to this SPCC Plan will be prepared within six months following any change, and implemented as soon as possible following any technical amendment, but **no later than 6 months from the date of the amendment**. A review and evaluation of this SPCC Plan also should be conducted at least once every five (5) years by the manager or their designee. The development of a Cycle Task for an annual review is recommended. As a result of this review and evaluation, KSLF Phase II will amend the SPCC Plan within six months of the review to include more effective prevention and control technology if:

- Such technology will significantly reduce the likelihood of a spill event from the facility.
- Such technology has been field-proven at the time of the review.

In accordance with 40 CFR 112.5(a), KSLF Phase II periodically reviews and evaluates this SPCC Plan for any change in the facility design, construction, operation, or maintenance that materially affects the facility's potential for an oil discharge, including, but not limited to:

- Commissioning or decommissioning of containers
- Replacement, reconstruction, or movement of containers
- Reconstruction, replacement, or installation of piping systems
- Construction or demolition that might alter secondary containment structures
- Changes of product or service
- Revision of standard operation or maintenance procedures

Amendments to the Plan made to address changes of this nature are referred to as technical amendments, and must be certified by a Professional Engineer (PE). Non-technical amendments can be done, (and must be documented in this section), by the facility owner and/or operator. Non-technical amendments include the following:

- Change in the name or contact information (i.e., telephone numbers) of individuals responsible for the implementation of this Plan
- Change in the name or contact information of spill response or cleanup contractors

Any technical amendment to the SPCC Plan will be certified by a PE in accordance with 40 CFR 112.3(d). Completion of the review and evaluation is documented in Section 11.0.



## 5.0 MANAGEMENT APPROVAL [40 CFR 112.7]

This SPCC Plan establishes preparedness, prevention, planning, spill response, and spill notification procedures as set forth in applicable state and federal regulations. This Plan has been compiled by an agent of and reviewed and certified by a professional engineer (internal or third party) following the sequence specified in 40 CFR 112. Any future updates that require the Plan to deviate from that sequence will include a cross reference in the Plan.

As specified in 40 CFR 112.3(e), a copy of this Plan will be maintained at the facility and made available upon request for on-site review by the Regional Administrator of the EPA during normal business hours. If the facility is attended less than 4 hours a day the plan may be kept at the nearest field office.

This facility is committed to the prevention of discharges of oil to navigable waters and the environment and maintains the highest standards for spill prevention control and countermeasures through regular review, updating, and implementation of the SPCC Plan. This Plan has the full approval of management at a level of authority to commit the necessary resources to fully implement the Plan.

John Ruiz, WMH District Manager

Signature \_\_\_\_\_

Date \_\_\_\_\_

### Plan Distribution

Copies of the Spill Prevention, Control and Countermeasures Plan are kept on file by Waste Management at the following locations:

- John Ruiz, WMH District Manager's Office, KSLF Phase II



## **6.0 GENERAL REQUIREMENTS [40 CFR 112.7]**

There are no additional facilities or procedures, methods, or equipment not yet fully operational identified in the SPCC Plan that require details of installation and operational start-up. KSLF Phase II is in conformance with section 112.7(a)(1).

### **6.1 COMPLIANCE WITH APPLICABLE REQUIREMENTS [40 CFR 112.7(a)(2)]**

This SPCC Plan is in conformance with all applicable requirements of 40 CFR Part 112, except for minor deviations, as allowed by section 112.7(a)(2) of the regulation. The deviations, and the equivalent environmental protection provided, are described below:

- 40 CFR 112.8(b)(3) requires designing the facility drainage systems from un-diked areas with a potential for a discharge (such as where piping is located outside containment walls or where tank truck discharges may occur outside the loading area) to flow into ponds, lagoons, or catchment basins designed to retain oil or return it to the facility.

Mobiles 1 & 2 (aka. Portable #2) contains single-walled tanks that are mounted on the respective refueling/servicing trucks. During operational hours, the mobile refueling/servicing truck is temporarily staged throughout the facility, while during non-operational hours the truck is parked within the limits of the lined landfill. The operational and emergency oil storage capacity of the landfill liner system is sufficient to handle the maximum quantity of oil expected to be discharged in un-diked areas from overfills or transfer. The bermed wash rack and landfill liner system, in combination with monitoring of all product transfers, provides environmental protection equivalent to the requirements under 112.8(b)(3).

- 40 CFR 112.8(c)(6) - Smaller oil storage containers and drums are not integrity tested (per the Steel Tank Institute (STI) standard); instead, they are stored off the ground on spill containment pallets and visually inspected on a regular basis. This is further discussed in Section 6.18 of this Plan.

EPA has issued guidance stating that "for well-designed shop-built containers with a shell capacity of 30,000 gallons or under," a program of visual inspections for the container(s) may provide equivalent environmental protection. In accordance with that guideline, the oil storage containers and drums at the facility are not integrity tested; instead, the facility has implemented a program of visual inspection for these containers and drums, to ensure that any leaks are readily detected.

During the site visit, the containers and drums appeared to be clean and well-maintained, and no signs of deterioration or leaks were observed. The tanks and drums will be maintained clean so that any bottom leaks can be readily observed, and the exterior of the tanks and drums will be maintained clean and in good condition so that any shell leaks can be readily detected. If cracks develop in the concrete floor of the containment area, they will be repaired within one (1) week of detection.

If the visual inspections indicate signs of deterioration or leaks of a tank or drum, then the tank or drum will either be replaced or integrity tested, in accordance with STI SP001, to verify the appropriateness of continuing the visual inspection program. As discussed in Section 6.4, spill response equipment is available in the maintenance shop in close proximity to fuel tanks, and an Oil Contingency Plan has been implemented at the facility.

- 40 CFR 112.8(d)(5) requires warning all vehicles entering the facility to be sure that no vehicle will endanger aboveground piping or other oil transfer operations. As an environmental equivalence to the driver warning requirement in 112.8(d)(5), alternative methods of protecting equipment from the possibility of a collision such as installing fences, barriers, curbing or other physical obstacles are employed.

Aboveground piping runs from the diesel fuel AST#1, to day tank and pump, and to an emergency generator engine. As an environmental equivalence to the driver warning requirement in 112.8(d)(5), the diesel fuel AST#1, emergency generator, and aboveground piping connecting the AST to the emergency generator are all surrounded by concrete-filled steel traffic bollards to prevent damage from vehicle traffic. Temporary physical obstacles and monitoring by trained staff will be used to protect equipment from the possibility of a collision during any other temporary oil transfer operations.

## **6.2 FACILITY INFORMATION [40 CFR 112.7(a)(3)]**

### Facility Owner, Address and Telephone:

County of Kaua'i  
Department of Public Works – Solid Waste Division  
4444 Rice Street, Mo'ikeha Building, Suite 275  
Lihu'e, Hawai'i 96766  
Phone: (808) 241-6880

**Contact:** Troy Tanigawa, Environmental Services Management Engineer

### Facility Operator, Address and Telephone:

Waste Management of Hawaii, Inc.  
Kekaha Sanitary Landfill Phase II  
6900-D Kaumuali'i Highway  
Kekaha, Kaua'i, Hawai'i 96752  
Phone: (808) 337-1416

**Contact:** John Ruiz, WMH District Manager

### **6.2.1 Location of Facility**

The Kekaha Sanitary Landfill (KSLF) is located near the southwest coast of the Island of Kaua'i, approximately 1.5 miles northwest of the Town of Kekaha, and approximately 2,000 feet (ft) from the Pacific Ocean shoreline. The Phase II facility is bounded by Kaumuali'i Highway to the northeast, an unpaved access road and agricultural land to the southeast, aquaculture facilities to the northwest, and the KSLF Phase I area to the southwest. A Site Location Map of the area is provided as Figure 1 and detailed SPCC specific site maps are included as Figure 2A.

### **6.2.2 General Description of Facility**

KSLF Phase II is a municipal solid waste (MSW) landfill, permitted by DOH for disposal of non-hazardous solid wastes. KSLF Phase II is owned by the County of Kaua'i and operated by Waste Management of Hawaii, Inc. (WMH). KSLF Phase II is located at 6900-D Kaumuali'i Highway Kaua'i, Hawai'i 96752.

The current permitted waste footprint, which covers approximately 38.5 acres, is roughly square and includes the Phase II and Cell 1 expansion disposal cells (see Figure 2A). The permitted waste footprint for Phase II is approximately 32.1 acres and is subdivided into 14 two-acre waste disposal cells (approximately 100 feet by 800 feet to 1,100 feet). The permitted waste footprint for the Cell 1 expansion is approximately 6.4 acres and is subdivided into 4 one-acre waste disposal cells (approximately 200 feet by 200 feet to 280 feet).

The site includes a landfill office, scale house, wash rack area, maintenance shop, leachate evaporation pond, and infiltration basin which are located along the northeast property line. A

materials drop-off facility (MDOF) is located between the leachate evaporation pond and the landfill office. The MDOF provides public drop-offs (green waste, recyclables, tires, and white goods, etc.). A used oil drop-off is located within the maintenance shop. The site layout is shown on Figure 2A & 2B.

The KSLF is open 7 days per week from 8:00 a.m. to 4:00 p.m., except for the following holidays: New Year's Day, Martin Luther King Junior Day, President's Day, Prince Kuhio Day, Good Friday, Memorial Day, King Kamehameha Day, Independence Day, Admission Day, Labor Day, Veteran's Day, General Election Day, Thanksgiving Day, and Christmas Day.

The landfill is not located in or near a wetland, and the facility is outside any designated 100-year floodplain. All site drainage flows to on-site infiltration ditches, and no offsite drainage occurs.

The KSLF Phase II stores and uses petroleum products such as diesel fuel, lubricating oils, and waste oil. This SPCC Plan specifically addresses the fuel and oil storage and use facilities that exist at the KSLF Phase II:

- Maintenance shop and equipment fueling areas
- Stationary aboveground storage tank (AST)
- Mobile refueling service truck
- Other containers (e.g., 55-gallon drums)

This SPCC Plan has been updated to reflect changes to KSLF Phase II facilities that occurred since the last SPCC Plan Revision dated March 2016.

Figure 2B shows the location and contents of each fixed oil storage container and the storage area where mobile or portable containers are located, transfer areas, and connecting piping. The diagrams may also show secondary containment, storm drains inlets and surface waters, direction of flow in the event of a discharge, location of spill response equipment, and location of valves or drainage controls.

### **6.2.3 Topography and Surface Water Flow**

The site's topography around the maintenance/equipment fueling area generally slopes to the northeast. Should secondary containment systems (curbing and berm) for the maintenance / equipment fueling area be breached, storm water could drain via sheet flow to the shoulder drainage swale along Kaumuali'i Highway. However, considering the potential volume of rainwater and the high permeability of the sandy on-site soils, it is likely that the rainwater would infiltrate the ground surface before flowing offsite. Tank locations and storm water drainage patterns in the vicinity of AST#1 are shown on the (Figure 2A).

### **6.2.4 General Description of Petroleum Storage Areas [112.7(a)(3)(i)]**

Table 3 details the various types of oil products stored at the facility. Oil storage areas are listed and described by location, container type, contents, storage device, oil amount and whether it is an above or a belowground container. For purposes of this inventory, only containers which have a capacity of 55-gallons and greater are listed. Refer to Figure 2B for locations of oil handling activities.

Mobile refueling service trucks are used for daily fueling and servicing of landfill equipment. When not in use, the mobile refueling service truck will be parked within the limits of the lined landfill.

**Table 3: Petroleum Products – Service Truck and Aboveground Storage Tank**

Tank ID	Tank Size (gal)	Tank Type	Contents	Transfer Mechanism	Secondary Containment	Overfill/Spill Protection
Mobile 1	300 <sup>1</sup>	Steel Single-Wall Horizontal	Diesel Fuel	Pneumatic Pump	MSW Cell and/or Spill Kits	Visual Inspections/Attended Transfers
Mobile 2 (aka. Portable #2)	100 <sup>3</sup>	Steel Single-Wall Horizontal	Diesel Fuel	Pneumatic Pump	MSW Cell and/or Spill Kits	Visual Inspections/Attended Transfers
AST#1	2,000	Double-Walled Horizontal	Diesel Fuel	Fuel Pump	Containment structure (Dual wall)	Visual Inspections, Visual Gauge, Attended Transfers, and tertiary containment dike structure (1,475 gallon)
Drum Area	55 * (22) <sup>2</sup>	Single Walled Drum	Misc. Hydrocarbons	Manual	Spill Pallets & Garage	Spill Kits

Note: (1) The mobile truck contains one inactive (out-of-use) 235-gallon Hydraulic Oil Tank.  
 (2) ten (10) of the drums are owned by the County and twelve (12) are owned by WM  
 (3) used for short term transfers only, generally the tank is kept empty.

**Total Oil Storage: 3,610**

All small containers and 55-gallon drums are stored inside the maintenance shop on spill control pallets or other devices that provide secondary containment. A spill kit containing materials to properly absorb spills (absorbent pads, socks, pillows, and bags) is located in the maintenance shop and between the backup generator and AST#1 (2,000 gallon diesel fuel).

The maximum potential quantities of liquid that could reasonably be released in a single incident are:

- 300 gallons (mobile truck-mounted tank capacity)
- 100 gallons (mobile truck-mounted tank capacity)
- 2,000 gallons (maximum double-walled AST capacity), assuming the containment was breached)
- 55 gallons (maintenance shop)

Any third-party (contractor) tanks that may be located on-site are subject to the KSLF Phase II SPCC rules. Kekaha Phase II staff will notify contractors that they are subject to and must have/provide Kekaha Phase II staff with the following:

- Secondary containment at all times for any tank
- Documentation of training
- Adequate spill response materials at the location of the tank
- A copy of their SPCC Plan/Spill Response Plan

**6.3 DISCHARGE PREVENTION MEASURES [40 CFR 112.7(a)(3)(ii)]**

This section discusses procedures for routine handling of oil products at the facility, including loading, unloading, and fuel transfers. These activities occur primarily at the maintenance shop area and areas over the landfill liner system. Drums are stored in the maintenance shop area. In general, the system of structural and non-structural control measures consist of spill containment structures,

operating procedures that are specifically designed to minimize potential for a release of oil, training of personnel, facility security measures, routine inspections and record keeping, and regular SPCC Plan review (Review and Evaluation Log is presented in Section 11.0).

### **Fuel Storage in Stationary AST**

The AST#1, a stationary, double-walled, 2,000-gallon capacity tank used to store diesel fuel is filled by contractors from tanker trucks. Prior to transferring fuel, it is determined whether adequate storage is available to receive the entire contents of the compartment on the delivery vehicle. The 2,000-gallon AST is equipped with a visual gauge, and ports are available for manual gauging. If the facility's storage tank cannot receive the entire contents, the surplus portion of the shipment is not transferred. Additionally, trained personnel are present during the filling of the diesel fuel tank to monitor the transfer and ensure overfilling does not occur.

### **Fuel Storage in Mobile/ Portable Tanks**

The Mobiles 1 & 2 2 (aka. Portable #2) diesel fuel tank are mounted onto mobile refueling service trucks. The tanks are manually gauged before filling. Transfer operations occur as needed, and the fuel is off-loaded from the tank in small quantities to on-site landfill equipment. Trained personnel are present during transfers from tank to monitor against overfilling.

### **Drum Storage in the Maintenance Shop Area**

Drums of various oils (e.g., gear, motor, and hydraulic) are stored inside the covered maintenance shop. All drums inside the shop are stored on spill containment pallets capable of containing the full contents of a 55-gallon drum. The County of Kaua'i accepts waste motor oil at the facility from individual homeowners. Waste oil is dropped off by homeowners and transferred via a drum funnel into 55-gallon drums by County of Kaua'i personnel. When the drums are full they are removed from the facility by an outside vendor. Additionally, drums of new gear, motor, and hydraulic oil are brought in full by vendors, for use at the site. Oil is manually removed from the drums by use of spigots or similar device, in small quantities as needed.

## **6.4 DISCHARGE AND DRAINAGE CONTROLS [40 CFR 112.7(a)(3)(iii)]**

This section discusses discharge and drainage control such as secondary containment around oil storage containers and other structures, equipment, and procedures for the control of a discharge. Oil storage containment activities occur primarily at the stationary diesel fuel AST, the mobile refueling service truck parking area, and the drum storage area at the maintenance shop.

The AST, associated containment structure, and the mobile refueling service truck with its two tanks are the only exterior storage units of oil and are checked weekly for storm water that has collected or for any leaks from the tanks. Any accumulation of oils or other liquid in the containment areas or spill pallets in the maintenance shop would be pumped out into another container, and properly disposed of.

### **Fuel Storage in Stationary AST**

The 2,000-gallon capacity AST secondary containment structure that can contain 100 percent of the tank's rated capacity and can fully support the loaded fuel tank and pumping system. In the event of a moderate oil spill (tank leak, overfill, etc.) there is a tertiary containment system, which consists of a low concrete dike built around the perimeter of the tank. This containment system is capable of holding approximately 1,475 gallons (i.e., roughly 75 percent of the tank capacity). The tertiary containment system would contain the spill until detection and spill response actions are initiated.

A spill kit is located adjacent to the backup generator. An outside contractor will be called in to control and clean up spills greater than 50 gallons. Additionally, an oil contingency plan is in place (Section 16 of the record keeping binder) such that spills are quickly responded to and cleaned up.

### **Fuel Storage in Mobile Tanks**

Mobile Tank 1 & Mobile Tank 2 (aka. Portable #2) are mounted on a mobile refueling service truck. While refueling on the MSW landfill areas the transfer procedures used are drip pans and attended transfers; as well as the landfill liner system. In the event of an oil spill from one the tank, the landfill liner system would contain the spill until detection and spill response actions are initiated. When Mobile 1 is not in use, it is parked over the landfill liner system, while Mobile 2 (aka. Portable #2) is maintained empty and parked near the wash pad that equipped with an oil water separator. A spill kit for minor spills is located on/near the mobile refueling service truck.

### **Drum Storage in Maintenance Shop Area**

The maintenance shop area contains 55-gallon drums and other smaller containers containing various oils. Drums are stored on spill pallets capable of containing a minimum of 55 gallons each. A spill kit is located within the maintenance shop area to clean up minor spills. An outside contractor would be called in to control and clean up larger spills.

## **6.5 SPILL RESPONSE AND COUNTERMEASURES [40 CFR 112.7(a)(3)(iv)]**

Upon discovery of an oil spill, the person making the discovery should immediately notify the WMH District Manager. Any and all response equipment and manpower at the facility's disposal will be used as needed to contain the spill and prevent oil from discharging offsite or into a navigable waterway. Personnel will consult with the District Manager to determine if outside spill response contractors are required. If management determines that outside resources are necessary, Spill Response Contractors, listed in the front of this report, may be utilized.

Any discharge will be contained and cleaned up using appropriate spill response equipment which may include shovels, pumps, and absorbent materials (pads, booms, oil-dry, etc.). Response equipment (i.e., spill kits) is located in the maintenance shop area as indicated on the site map and near the backup generator. Response equipment locations will be identified to all facility personnel upon employment and during SPCC training. The supply of response equipment will be replenished as needed. Copies of material safety data sheets (MSDS) for all petroleum products and other relevant material are located at the facility.

## **6.6 RECOVERY AND DISPOSAL OF MATERIAL SPILLED [40 CFR 112.7(a)(3)(v)]**

All material will be recovered into appropriate containers such as 55-gallon drums, or if the size of the spill warrants, into leak-proof roll-off container(s). When containers are filled after a cleanup, the containers will be secured and the container appropriately labeled identifying the substance(s), the date of the spill/clean up, and the location. Waste material generated during cleanup activities will be characterized in accordance with federal and state regulations. The spill residual will be characterized and disposed of by a licensed waste handler or disposed of on-site if appropriate.

## **6.7 EMERGENCY CONTACT LIST [40 CFR 112.7(a)(3)(vi)]**

The Emergency Contact List includes emergency contact names and phone numbers for facility personnel, division environmental personnel, and appropriate agencies, and is included in the front of this SPCC Plan. A Spill Response Contractor List including phone numbers is also included in the front of this SPCC Plan.

## 6.8 SPILL REPORTING PROCEDURES [40 CFR 112.7(a)(4)]

Any spill with an estimated volume of greater than 10 gallons should be reported to the WMH District Manager. Records of each spill event should be documented using the *Spill Investigation and Spill Documentation Forms* in Sections 8.0. This information will facilitate the proper reporting of a discharge to the appropriate individuals and agencies.

Any spill that results in the discharge of oil, petroleum based product, or hazardous material into navigable or contiguous waters must **immediately** be reported to the District Manager and to the agencies listed below. **The National Response Center should be contacted first.**

**National Response Center:** (800) 424-8802

EPA Region 9 Number: (866) EPA-WEST or (866) 372-9378  
**To report an environmental emergency** (800) 300-2193

State of Hawai'i Department of Health  
Hazard Evaluation and Emergency Response Office (808) 586-4249  
After Hours: (808) 247-2191

This information is also provided in the Emergency Contact List in the front of this report. For written reporting requirements, refer to Section 3.0 of this Plan.

WMH Environmental Reporting System shall also be completed on-line using CYCLE on VISOR (WM intranet) as soon as practicable but not more than 48 hours after discovery for agency reportable quantity (RQ) releases entering offsite surface waters, directly or indirectly (e.g. visible oil sheens) or a state reportable release requiring corrective action.

## 6.9 SPILL RESPONSE PROCEDURES [40 CFR 112.7(a)(5)]

KSLF Phase II personnel are properly trained to immediately respond to oil spills. Only trained personnel shall perform cleanup activities. Spill response contractors will be responsible for cleanup activities as a result of spills or leaks when the facility does not have the necessary training, equipment, or materials to clean up the spill.

KSLF Phase II's standard approach toward "incidental release," as defined in 29 CFR 1910.120, spill response is as follows:

- Assess hazards:
  - Assess the quantity of substance spilled and integrity of containment.
  - Stop operations if necessary.
  - Secure the area.
  - Determine if the spill could potentially impact waterways or leave the site.
- Close open valves and deactivate pumps contributing to the discharge.
- Immediately notify supervisory personnel (person responsible for spill prevention).
- Use all equipment and manpower at plant's disposal to minimize the amount of oil discharged and to prevent it from entering any navigable waterways.
- Ensure proper PPE is used during cleanup activities (consult facility's PPE plan for more information).

- Once the discharge is stopped and contained, use absorbent materials to absorb the spilled oil. The oil-soaked material must be disposed of according to federal, state, and local regulations. (For a spill greater than 10 gallons, notify the WMH District Manager.
- If spill is **reportable** (i.e., greater than 25 gallons on land or a sheen on water), immediately notify authorities listed on Emergency Contact List in the front of this SPCC Plan.
- In the event a spill reaches a waterway:
  - Notify the National Response Center and local and state spill response agencies.
  - Notify spill response contractor if necessary.
  - Stop the source of the spill immediately.
  - Shut down all equipment and ignition sources in the area.
  - Deploy booms, damming materials, and absorbents to contain the spill.
  - Restore habitat if necessary.
  - Decontaminate the affected area, equipment, and surfaces that have contacted the spilled material.
- Complete Spill Investigation and Spill Documentation Forms (Sections 12.0 and 13.0)

#### 6.10 SPILL/RELEASE SCENARIOS [40 CFR 112.7(b)]

Based on how and where oil and other petroleum products are used and stored at this facility, Table 4 describes potential types of spill/release scenarios; estimated release volumes, based on the volume of the largest oil tank in the area; and the predicted spill rate.

**Table 4: Potential Spill Scenarios**

Potential type Failure	Spill Flow Direction	Maximum Volume	Spill Rate
Leak in Mobile 1, Diesel Fuel	Diesel Fuel would infiltrate into underlying soils and MSW or into the oil water separator.	Ounces to 300 gallons	Minutes to hours
Rupture in Mobile 1, Diesel Fuel	Diesel Fuel would infiltrate into underlying soils and MSW or into the oil water separator.	300 gallons	Seconds to minutes
Leak in Mobile 2 (aka. Portable #2), Diesel Fuel	Diesel Fuel would infiltrate into underlying soils and MSW or into the oil water separator.	Ounces to 100 gallons	Minutes to hours
Rupture in Mobile 2 (aka. Portable #2), Diesel Fuel	Diesel Fuel would infiltrate into underlying soils and MSW or into the oil water separator.	100 gallons	Seconds to minutes
Leak in AST1, Diesel Fuel	Diesel Fuel would spill into secondary containment.	Ounces to 2,000 gallons	Minutes to hours
Rupture in AST#1, Diesel Fuel	Diesel Fuel would spill into secondary containment.	2,000 gallons	Seconds to minutes
Breach in secondary containment system for AST#1, Diesel Fuel	Diesel Fuel would be contained by the tertiary containment system (up to 1,475 gallons), then would migrate onto the facility ground surface.	Ounces to 2,000 gallons	Seconds to hours
Leak in 55-gallon Drum, Oil	Oil would leak into the spill containment pallet and would be cleaned up.	Ounces to 55-gallons	Minutes to hours
Rupture in 55-gallon Drum, Oil	Oil would spill into the spill containment pallet and would be cleaned up.	55 gallons	Seconds to minutes
Spillage during attended transfers (i.e. transfer hose leak/failure)	Petroleum products would flow onto the adjacent ground surface and infiltrate into the soil.	Gallons up to capacity of source tank	Up to 50 gallons/minute

## **6.11 CONTAINMENT AND DIVERSIONARY STRUCTURES [40 CFR 112.7(c)]**

Appropriate containment and/or diversionary structures or equipment to prevent a discharge as described in 40 CFR 112.1(b) has been provided for this facility. The entire containment systems, including walls and floor, are capable of containing oil and are constructed so that any discharge from a primary containment system, such as a tank, will not escape the containment system before cleanup occurs.

Approved prevention systems include:

- Dikes, berms, or retaining walls sufficiently impervious to contain oil
- Curbing or drip pans
- Sumps and collection systems
- Culverts, gutters, or other drainage systems
- Weirs, booms, or other barriers
- Spill diversion ponds
- Retention ponds
- Sorbent materials

Systems utilized at KSLF Phase II are described below.

### **6.11.1 Dikes, Berms, or Retaining Walls Sufficiently Impervious to Contain Spilled Oil [112.7(c)(1)(i)]**

A concrete dike surrounds the 2,000-gallon, double-walled AST acting as a partial tertiary containment system, able to contain up to 1,475 gallons.

An earthen perimeter berm around the AST#1 fueling area will prevent and/or slow down potential spills from draining offsite.

The site is a permitted MSW landfill, and all of the Phase II landfill cells have bottom-liners. The mobile refueling service trucks when containing fuel are stored within the lined area of the landfill; therefore, secondary containment for the mobile tank(s) is provided by the landfill liner.

### **6.11.2 Curbing [112.7(c)(1)(ii)]**

The tertiary containment system consists of a dike around the perimeter of the 2,000-gallon, double-walled AST and can contain 1,475 gallons.

### **6.11.3 Culverts, Gutters, or Other Drainage Systems [112.7(c)(1)(iii)]**

No culverts, gutters or drainage systems are used at the site other than those intended to manage storm water. Storm water does not discharge from the facility and is managed on-site by infiltration.

Along the western, southern and eastern boundaries of the site, an infiltration ditch is in place to receive storm water runoff from the landfill surfaces. On the northern boundary (facing the highway), runoff is directed to the infiltration basin via sheet flow and shallow swales. A drainage ditch is present immediately north of the site outside the perimeter fence, along the highway.

### **6.11.4 Weirs, Booms, and Other Barriers [112.7(c)(1)(iv)]**

No weirs, booms, or other barriers are used or stored at the site.

#### **6.11.5 Spill Diversion Ponds [112.7(c)(1)(v)]**

No spill diversion ponds exist at the site.

#### **6.11.6 Retention Ponds [112.7(c)(1)(vi)]**

No retention ponds exist at the site.

#### **6.11.7 Sorbent Materials [112.7(c)(1)(vii)]**

Sorbent materials (absorbent pads, socks, and pillows) and hand tools are stored onsite to assist in containing small spills. Spill cleanup materials are supplied and kept in the maintenance area near the AST at all times.

### **6.12 INSPECTIONS, TESTS, AND RECORDS [40 CFR 112.7(e)]**

A December 5, 2008 amendment to the SPCC regulations includes integrity testing requirements. A facility owner or operator is required to:

- Test/inspect each aboveground container for integrity on a regular schedule and whenever material repairs are made.
- Determine, in accordance with industry standards, the appropriate qualifications of personnel performing tests and inspections and the frequency and type of testing and inspections, which take into account container size, configuration, and design.

Inspections and integrity testing are conducted in accordance with good engineering practices, as described in more detail below.

As stated above, visual inspections and/or integrity testing of bulk storage tanks at the facility must be conducted in accordance with applicable industry standards. The applicable industry standard for shop-built containers is the STI Standard SP001. All of the shop-built containers at this facility will be inspected and integrity tested (if applicable) in accordance with this standard. Records of visual inspections and integrity tests (if applicable); as well as problems and any corrective actions taken, will be kept in Sections 8 and 9 of the record-keeping binder, for a minimum of three (3) years.

#### **Visual Inspections**

All oil storage tanks and containers at the facility must be visually inspected on a monthly and annual basis, and documented on the forms included in Section 9 of the record-keeping binder. These checklists incorporate the requirements of STI SP001. In accordance with SP001, the individual at the facility who is responsible for oil spill prevention (or a designated representative) must conduct the visual inspections. Documentation of the inspections, and any corrective actions taken as a result of the inspections, are maintained in Section 9 of the record-keeping binder and will be kept for at least three (3) years. Additionally, facility employees visually inspect the status of facility equipment for signs of spills or other issues during the course of their normal workday.

The oil storage containers and facility shall be visually surveyed to discover conditions, if any, which indicate problems that could contribute to an oil leak or spill. It is appropriate to include the inspection with other activities performed by assigned personnel when they are in the tank storage area or at product transfer areas. As indicated on the inspection checklists, the following inspection procedures are followed:

- For all oil storage tanks and containers, inspect the containment area, tank shell, supports, and foundation for structural integrity.

- Check all associated piping for dripping, loose joints, damage to supports, and pipe deflection.
- Inspect all pumps, valves, hoses, and piping for cracks, leaks, and abnormal wear.
- For double-walled tanks, inspect the interstice for the presence of fuel, an indication of leaks in the primary tank.
- Inspect all containment bins for excess accumulation of water and the presence of oil (accumulations of oil must be promptly removed).
- Inspect the area surrounding the containment areas for signs of oil spills and stained soil.
- Inspect the containment area drain valve (if one is present) to assure the integrity and utility of the valve and locking device.
- Correct any deficiencies that are identified as soon as possible.

Attention should be directed to emergency shutdowns, high-level alarms, tank monitoring equipment, and communication systems to verify proper operating capabilities.

Problems are to be reported to the individual designated at the facility who is responsible for oil spill prevention (i.e., District Manager). Corrective action must be taken as soon as possible.

#### **Daily Inspection:**

A WM employee or qualified representative performs a complete walk-through of the facility each day. This daily visual inspection involves: examine perimeter fences for unauthorized entry and locked gates, testing leak alarms, looking for tank/piping damage or leakage, stained or discolored pavement, or excessive accumulation of water in the storm drain.

#### **Monthly Inspection:**

The checklist provided within this plan is used for monthly inspections by authorized facilities maintenance personnel. The monthly inspections are consistent with Steel Tank Institute (STI) Standard SP-001. All problems regarding tanks, piping, containment, or response equipment must immediately be reported to the Facility Manager. Visible oil leaks from tank walls, piping, or other components must be repaired as soon as possible to prevent a larger spill or a discharge to navigable waters, adjoining shorelines, storm drains, or the environment. Pooled oil is removed immediately upon discovery.

Written monthly inspection records are signed by the inspector or supervisor and maintained for a period of three (3) years.

#### **Annual Inspection:**

Facility personnel perform a more thorough inspection of facility equipment on an annual basis. This annual inspection complements the monthly inspection described above and is performed in each year using either the checklist provided in Appendix C of this Plan or an equivalent. The annual inspection may be performed after a large storm event in order to verify the imperviousness and/or proper functioning of drainage control systems but is normally performed in conjunction with annual preventative maintenance. Written annual inspection records are signed by the inspector or supervisor and maintained in a labeled binder in FM12 for a period of three (3) years. Annual inspections are consistent with the STI Standard SP-001.

#### **Periodic Integrity Testing:**

Periodic Inspections are conducted by the owner's inspectors using inspection form procedures that

follow the *Standard for the Inspection of Aboveground Storage Tanks*, SP-001 manual. Since no ASTs at this facility exceed 5,001 gallons (STI: Category#1), a formal outside inspection is not required, but the operator may commission such an inspection should an internal periodic AST inspection warrant such action. In addition, drums are not considered a bulk storage tank and are not subject to the STI guidance for inspections of bulk storage tanks and are to be visually inspected routinely, per the facility oil storage inspections.

### **6.13 SPILL PREVENTION TRAINING [40 CFR 112.7(f)]**

Upon beginning employment, all oil handling personnel are instructed by management in: the operation and maintenance of equipment to prevent discharges; discharge procedure protocols; applicable pollution control laws, rules, and regulations; general facility operations; and, the contents of the facility SPCC Plan. Existing employees will receive training within three months of the issuance of this amended Plan.

The WMH District Manager is responsible for spill prevention training at this facility.

Management will provide annual spill prevention briefings for all oil handling personnel to ensure adequate understanding of the SPCC Plan. These briefings highlight any past spill events or failures and recently developed precautionary measures. Training includes inspection methods, oil spill prevention, containment, and retrieval methods. The Spill Prevention Briefing Log is available in Section 9.0. Records of spill prevention training are kept in Section 4 of the record-keeping binder located at the landfill office, and will be kept for at least three (3) years.

Topics discussed during all training sessions will include the following:

- Operation and maintenance of equipment to prevent oil discharges
- Discharge procedure protocols
- Applicable pollution control laws, rules, and regulations
- General facility operations
- Contents of the SPCC Plan
- SPCC Plan procedures
- Locations of spill and fire control equipment
- Inspection and record keeping procedures

In addition to training required in the SPCC regulations, *Awareness Training for Response to Incidental Releases* will be conducted. Incidental Release as defined in the *Emergency Response* definition under 29 CFR 1910.120 (a)(3) means, "Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel are not considered to be emergency responses within the scope of this [HAZWOPER] standard."

Employees who are anticipated to participate in any incidental release response and all other employees regularly working with or around oils that are likely to witness or discover an oil spill will be given awareness training.

Some employees may be required to respond to a spill of oil as follows:

- Employees may stop a leak at the source only if a spill would be considered an "incidental release" under 29 CFR 1910.120 and only if the spill is located in the employees' work area.

- Employees may contain a spill that is incidental in the employees' work area.
- Employees will call for help.
- Employees may cleanup the spilled oil if the spill could be considered an "incidental release" and only if the spill is located in an employees' work area.

Employees who will participate in emergency response to a hazardous materials release at the facility will be given training corresponding to their role within the facility emergency response program.

#### **6.14 SECURITY [40 CFR 112.7(g)]**

Oil handling, processing, and storage areas are required to be secure with controlled access to prevent vandalism and prevent unauthorized access. Methods utilized at KSLF Phase II are presented below.

##### **6.14.1 Fencing and Gates [112.7(g)(1)]**

The KSLF Phase II has gated access to exit roads, perimeter fencing, and other natural barriers to deter access. This security meets the criteria set forth by 40 CFR 112.7.g.1 to deter vandals and unwanted entry into the site. The fence limits access to the site from adjacent roadways, highways, and neighboring properties. The security gates are kept locked at night and when the facility is closed.

##### **6.14.2 Flow and Drain Valve Locks [112.7(g)(2)]**

No flow or drain valve locks are used on-site.

##### **6.14.3 Pump Control Locks [112.7(g)(3)]**

No pump control locks are used on-site.

##### **6.14.4 Out-of-Service Piping Secured [112.7(g)(4)]**

There is no out-of-service piping at the site.

##### **6.14.5 Facility Lighting [112.7(g)(5)]**

Security lights are located around the office/administration building, and portable lights are available on-site, if needed, for night work. During hours of darkness, non-operating personnel would not be in the vicinity unless accompanied by operating personnel with vehicles and lighting. Additional lighting is provided by vehicles on site, as needed. Lighting of coastal facilities at night on the island of Kaua'i is limited due to endangered species concerns.

##### **6.14.6 Security for Oil Flow Devices**

During the workday, all oil flow devices are under the direct control of KSLF Phase II personnel. The storage tanks and internal equipment are under the direct control of facility personnel during operation and standby status. When the facility is shut down for the day, all equipment will remain within the locked facility area.

##### **6.14.7 Security for Oil Starter Devices**

For the KSLF Phase II facility, only the diesel fuel AST is fitted with an oil starter pumping device. The diesel fuel station fuel pump is fitted with a locking mechanism. The KSLF Phase II facility secures and locks the fuel pump dispenser handle when not in use. At this time, all other pumps are hand-powered.

#### **6.14.8 Security for Loading/Unloading Devices**

During the workday, all oil loading and unloading devices are under the direct control of KSLF Phase II personnel. The storage tanks and internal equipment are under the direct control of facility personnel during operation and standby status. When the facility is shut down for the day, all equipment will remain within the locked facility area.

#### **6.15 TANK TRUCK LOADING/UNLOADING RACK REQUIREMENTS [40 CFR 112.7(h)]**

Offsite contract delivery tanker trucks periodically fill the diesel storage tank (Tank 1). Deliveries typically occur on a weekly basis, consistent with the site's fuel consumption of approximately 750 gallons per week, and the need to maintain approximately 1,000 gallons of diesel fuel in the tank for potential emergency generator use. Tanker trucks that deliver diesel fuel are typically single-cylinder tankers with 3,000 gallon capacities. Transfer of the diesel fuel to the AST occurs on an asphalt pad adjacent to the tank. The AST is located in a remote, low-traffic area of the site with limited potential for contact from other site vehicles. All transfers are attended by trained personnel.

##### **6.15.1 Loading/Unloading Area Drainage Containment System [112.7(h)(1)]**

Under the EPA Settlement Agreement with the American Petroleum Institute and Marathon Oil Company, this section is not applicable to a facility, such as this one, that does not have a truck loading/unloading rack. The EPA notices related to this settlement have not yet been published in the Federal Register. If changes are required to this SPCC Plan as a result of these notices, it will be revised within six months of publication of the notices.

##### **6.15.2 Prevention of Vehicles Moving Before Disconnected [112.7(h)(2)]**

Delivery vehicle operators are trained by their employers in the use of the unloading equipment associated with his/her truck, and are responsible for its proper use in accordance with U.S. Department of Transportation regulations. Contractors are required to have the following items at all times:

- Secondary containment for any tank
- Adequate spill response materials at the location of the tank

Vendors/delivery vehicle operators are required to provide WMH with copies of:

- Documentation of training for a company's operators
- A copy of the vendor's SPCC Plan/Spill Response Plan (or equivalent)

##### **6.15.3 Inspection of Vehicle to Prevent Leakage in Transit [112.7(h)(3)]**

The fuel delivery truck operator is responsible for assuring that all fittings are tightly closed in order to prevent leakage from the vehicle. Tank filling is performed at the tank fill-port by qualified vendors.

During the transfer to the AST, the following procedures shall be followed to protect against overfilling of the storage tank:

- A fuel vendor is dispatched to the facility based upon product inventory information obtained from the electronic monitoring system or based upon available, periodic fuel delivery.
- Prior to filling the tank, the tanker truck operator verifies fuel/oil needs based upon electronic level and manual gauge readings to confirm adequate capacity.
- The fuel tanker truck operator is present the entire time the AST is being filled. During tank loading and unloading operations, the tanker truck operator is required to be out of the truck

to monitor the operations. The operator is also involved in connecting and disconnecting the fuel transfer lines, so an interlocking warning system is not necessary to prevent departure before complete disconnection of transfer lines.

- Before the fuel tanker truck operator leaves the site, he/she is required to examine the lower-most drain in addition to their outlets for any sign of leakage. When necessary, outlets are adjusted to prevent leakage while in transit.
- In the event that the diesel fuel AST is overfilled, an automatic shut-off valve would halt additional pumping. The fuel delivery tanker truck operator will ensure that all appropriate valves and connections are secured once fueling is complete.
- Transferring diesel fuel from the AST to the landfill equipment is also conducted on the asphalt pad. Site vehicles/equipment are fueled directly from this tank only when the mobile refueling service truck(s) is unavailable.

#### **6.16 FIELD CONSTRUCTED ABOVEGROUND STORAGE TANKS [40 CFR 112.7(i)]**

There are no field-constructed ASTs at this facility.

#### **6.17 QUALIFIED OIL-FILLED OPERATIONAL EQUIPMENT [40 CFR 112.7(k)]**

Oil-filled operational equipment means equipment that includes an oil storage container (or multiple containers) in which the oil is present solely to support the function of the apparatus or the device. Oil-filled operational equipment is not considered a bulk storage container, and does not include oil-filled manufacturing equipment (flow through process). No oil-filled operational equipment is presently in use at KSLF Phase II.

#### **6.18 CONFORMANCE WITH APPLICABLE STANDARDS [40 CFR 112.7(j)]**

This SPCC Plan is in conformance with all applicable requirements of 40 CFR Part 112, except for minor deviations, as allowed by section 112.7(a)(2) of the regulation. The deviations, and the equivalent environmental protection provided, are described below.

[112.8(c)(6)] Smaller oil storage containers and drums are not integrity tested; instead, they are stored off the ground or on impermeable liners or in secondary containment areas and visually inspected on a regular basis. This is further discussed in Section 6.12 of this Plan.

Drainage of all un-diked areas with a potential for an oil discharge does not flow into a pond, lagoon, or catch basin designed to retain oil or return it to the facility. The original site drainage design did not consider the location of oil storage facilities. As discussed in Section 6.3, spill response equipment is available at the facility in close proximity to the petroleum tanks.

#### **6.19 STATE SPECIFIC REQUIREMENTS [40 CFR 112.7(j)]**

This plan has been prepared in accordance with State of Hawaii and local rules. The Hawaii Department of Health (DOH), Environmental Health Administration, Hazard Evaluation and Emergency Response Office (HEER), has primary responsibility for regulation of oil and petroleum spill prevention activities in Hawaii.

The State of Hawaii has included oil in the Hawaii Emergency Planning and Right-to-Know Act (HEPCRA). The reportable quantities limits are defined in Chapter 11-451, Hawaii Administrative Rules, entitled "State Contingency Plan" adopted August 2, 1995. Chapter 11-451-5 designates oil as a hazardous substance. Chapter 11-451-6 (b)(5) defines the reportable quantity for releases of oil:

- (A) Any amount of oil which when released into the environment causes a sheen to appear on surface water, or any navigable water of the State;
- (B) Any free product that appears on ground water;
- (C) Any amount of oil released to the environment greater than 25 gallons; and
- (D) Any amount of oil released to the environment which is less than 25 gallons, but which is not contained and remediated within 72 hours.

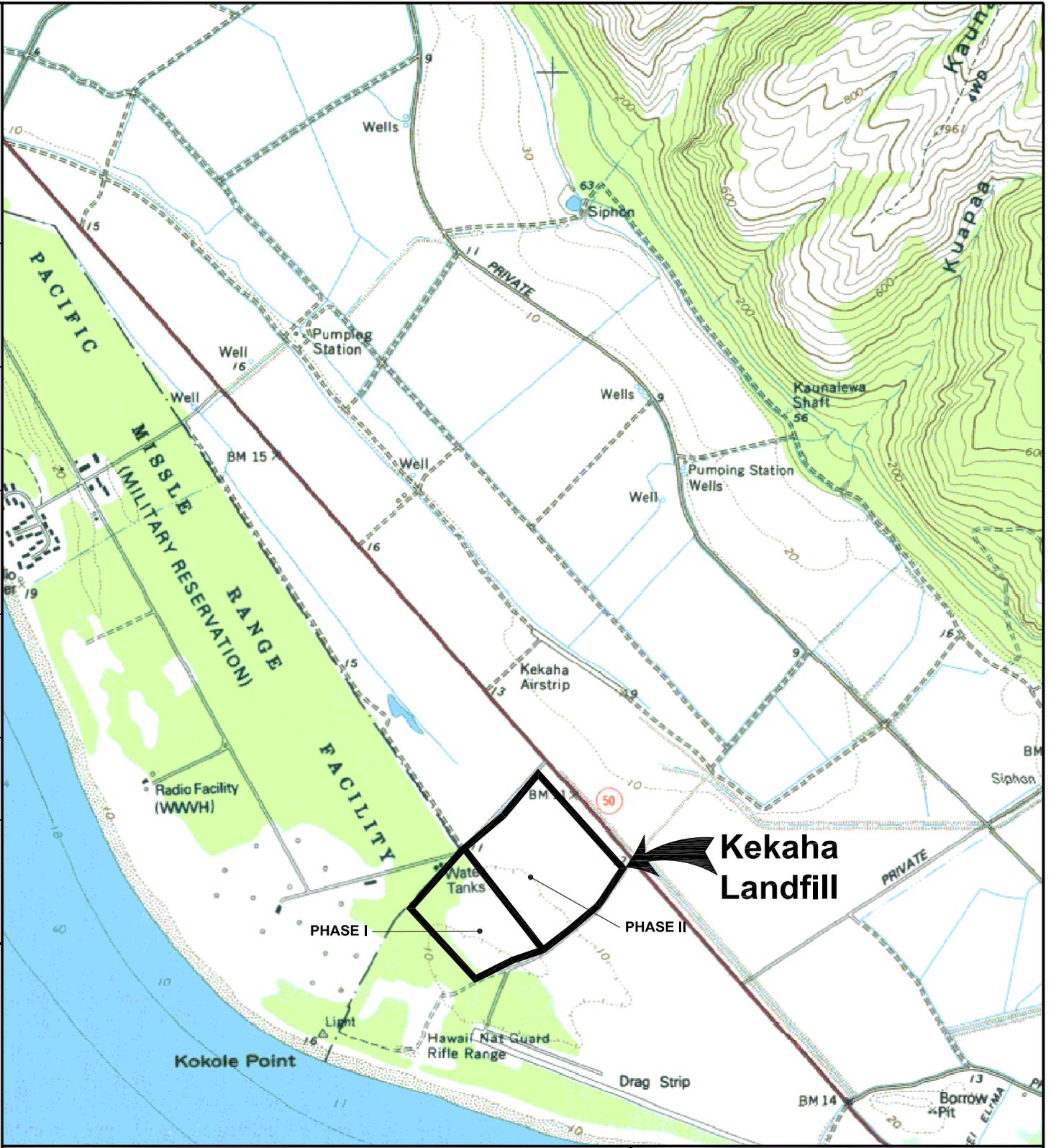
Facilities subject to SPCC Plan and Facility Response Plan (FRP) requirements also fall directly under the jurisdiction of the EPA Region 9 Oil Spill Prevention and Response Program.

#### **6.19.1 Contingency Plan**

The petroleum ASTs at this facility are maintained in full compliance with applicable federal regulations. Hawaii State regulations define oil as a hazardous substance subject to notification requirements under HAR §11-451-5.

HAR §11-451-6(5) defines reportable quantities, as any amount of oil that when released causes a sheen on surface water, or any navigable water of the State; any free product that appears on ground water; any amount of oil released greater than 25 gallons; and any amount of oil less than 25 gallons that is not contained and remedied within 72 hours requires immediate verbal reporting, followed by written notification within 30 days per HAR §11-451-7.

PROJECT NUMBER 631213741  
 APPROVED BY MM  
 CHECKED BY MM  
 DRAWN BY JJ  
 DESIGNED BY N/A  
 DATE 7/11/16  
 OFFICE Sacramento, CA



**NOTE:**

1. SOURCE OF IMAGE IS USGS 7 1/2 MINUTE KEKAHA QUADRANGLE, KAUAI, HAWAII..



CB&I Environmental & Infrastructure, Inc.

WASTE MANAGEMENT OF HAWAII, INC.

FIGURE 1  
 SITE LOCATION/TOPOGRAPHY

6900 KAUMUALI'I HIGHWAY  
 KEKAHA, HAWAII



Plot Date/Time: Jul 11, 2016 - 1:35pm

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	PROJECT NUMBER
Sacramento, CA	7/7/16	N/A	JJ	MM	MM	631213741



**NOTES:**

1. MOBILE #1 IS PARKED ON THE LINED LANDFILL DURING NON-OPERATIONAL HOURS.
2. AERIAL IMAGERY SUPPLIED BY GOOGLEearth, IMAGE DATE 12/16/2013.



CB&I Environmental and Infrastructure, Inc.

WASTE MANAGEMENT OF HAWAII, INC.

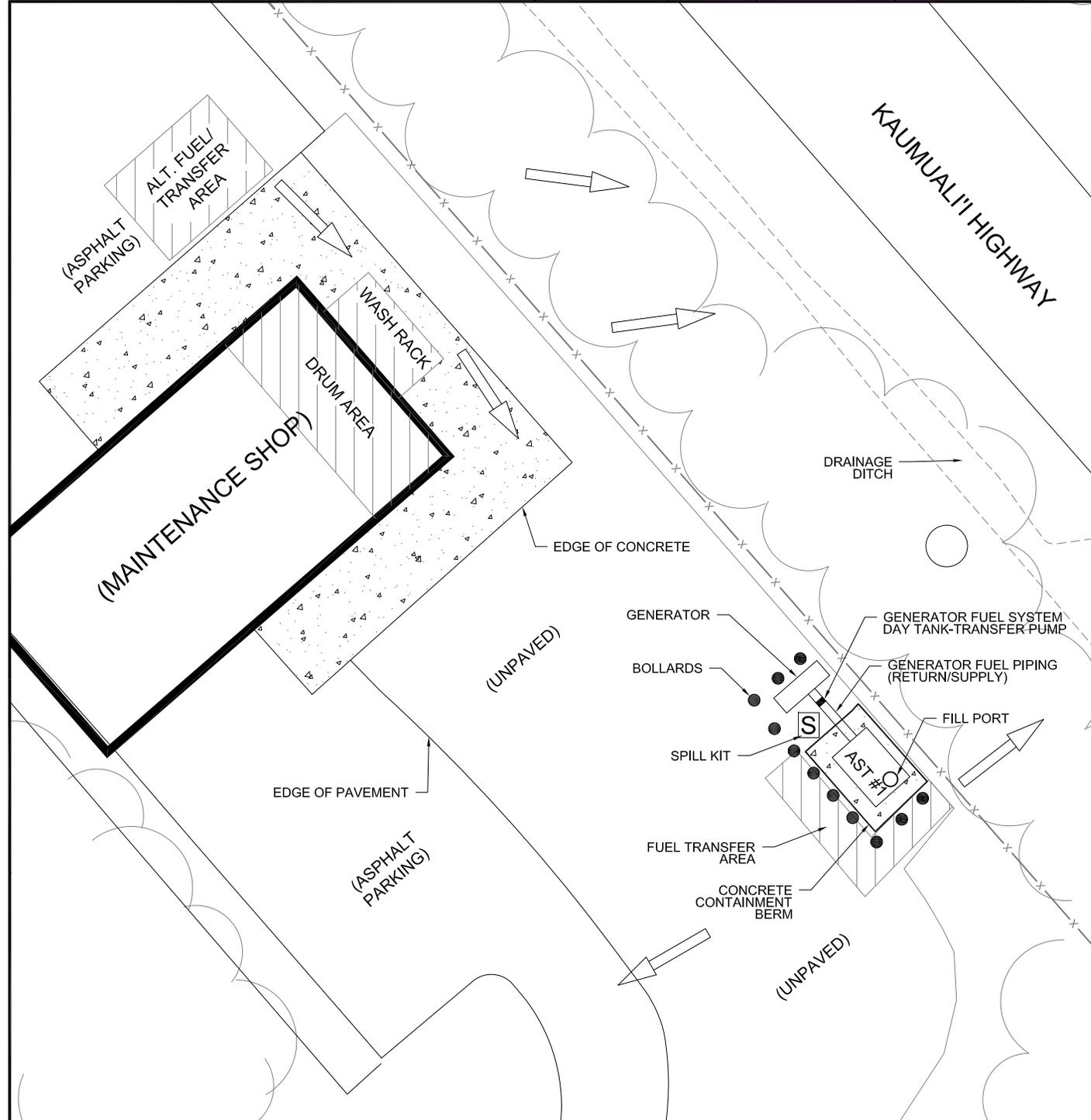
**FIGURE 2A  
SITE MAP**

6900 KAUMUALI'I HIGHWAY  
KEKAHA, HAWAII



Plot Date/Time: Jul 14, 2016 - 9:22am

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	PROJECT NUMBER
Sacramento, CA	7/14/16	N/A	JJ	MM	MM	631213741

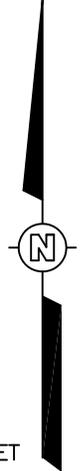


**NOTES:**

1. WASH RACK HAS 600-GAL CAPACITY OIL/WATER SEPARATOR.
2. AST #1 IS 2,000-GAL DIESEL.
3. GENERATOR EQUIPPED WITH A 25-GAL DAY TANK AND FUEL TRANSFER PUMP.
4. CONCRETE CONTAINMENT BERM SURROUNDS AST #1; (1,475 GALLONS).
5. MAINTENANCE SHOP DRUM AREA CONTAINS:
  - a. (8) 55-GAL DRUMS, COUNTY OWNED
  - b. (12) 55-GAL DRUMS, WM OWNED
  - c. MISC. HYDROCARBONS

**LEGEND:**

- FENCE 
- DRAINAGE DITCH 
- FLOW DIRECTION 



CB&I Environmental and Infrastructure, Inc.

WASTE MANAGEMENT OF HAWAII, INC.

**FIGURE 2B**  
**OIL STORAGE AREAS**  
6900 KAUMUALI'I HIGHWAY  
KEKAHA, HAWAII



## **7.0 SPECIFIC REQUIREMENTS [40 CFR 112.8]**

In accordance with 40 CFR 112.8(a), this facility has met the general requirements for this SPCC Plan listed under 40 CFR 112.7 and the specific discharge prevention and containment procedures listed in 40 CFR 112.8.

### **7.1 FACILITY DRAINAGE [40 CFR 112.8(b)]**

Surface water management for the facility is designed for a 25-year return frequency, 24-hour duration rainfall event. The 25-year, 24-hour storm event at Kekaha is 8 inches (Harding Lawson Associates 1993). KSLF Phase II includes diversion berms at the perimeter of the landfill top deck and side slopes that direct surface water to down-drains. Each down-drain conveys water to a culvert or swale, which then conveys the surface water to either infiltration ditches along the perimeter of the landfill, or the infiltration basin located near the main entrance to the site. Drainage in the area of the fueling tank generally flows in a northeastern direction into the southern shoulder of the Kaumuali'i Highway, and then drains towards the east. An earthen perimeter berm has been placed around the fueling area to contain any potential spills from draining off site.

### **7.2 BULK STORAGE CONTAINERS [40 CFR 112.8(c)]**

An on-site review of oil storage and handling areas was performed at KSLF Phase II. This review identified three outdoor bulk oil storage containers (locations noted on Figure 2B). This section discusses the conformance of these containers with federal guidelines.

Any visible discharge resulting in a loss of oil from the containers, including but not limited to seams, gaskets, piping, pumps, valves, rivets, and bolts is promptly corrected. Any accumulations of oil in the containment areas are promptly removed. Uncontaminated rainwater will not be pumped or discharged from the containment bins into an open watercourse, lake, or pond.

No areas with a potential for discharge that are not in containment or do not have a dike system (such as haul roads, pipes, valves, dispensers, etc.) have been identified. There are no effluent treatment systems at this facility.

As defined in 40 CFR 112.2, oil-filled electrical equipment, operating, or manufacturing equipment are not bulk storage containers. There is no equipment of this type present or in use at KSLF Phase II.

There are no partially buried or bunkered oil storage tanks at this facility. Any buried oil storage tanks that are installed in the future will be protected from corrosion by coatings or cathodic protection that is compatible with local soil conditions. No bulk oil containers at the facility are equipped with internal heating coils. No field-constructed aboveground storage tanks are located at the facility.

Each bulk storage container installation is engineered or updated in accordance with good engineering practice to avoid discharge. Before filling any tank a KSLF Phase II employee verifies with the fuel vendor the level of the tank and the amount to be unloaded.

#### **7.2.1 Construction [112.8(c)(1)]**

The bulk storage containers and the secondary containment systems at the site are compatible with all grades of gasoline, distillates, and lubricant oils. A copy of MSDSs for stored oils are located on-site.

#### **7.2.2 Secondary Containment [112.8(c)(2)]**

40 CFR 112.8(c)(2) requires constructing all bulk storage tank installations (except mobile refuelers and other non-transportation-related tank trucks) so a secondary means of containment is provided

for the entire capacity of the largest single container and sufficient freeboard to contain precipitation. Diked areas must be sufficiently impervious to contain discharged oil. Dikes, containment curbs, and pits are commonly employed for this purpose. An alternative system consisting of a drainage trench enclosure may also be used so that any discharge will terminate and be safely confined in a facility catchment basin or holding pond.

Federal Register Vol. 74, No 218 states *"In the December 2008 amendments, EPA extended the exemption from the sized secondary containment requirements provided to mobile refuelers in the December 2006 amendments (71 FR 77266, December 26, 2006) to non-transportation-related tank trucks at a facility subject to the SPCC rule. Other non-transportation related tanker trucks may be transferring non-fuel oils (i.e., transformer oils, lubrication oils, or certain AFVOs) and operate similarly to mobile refuelers; therefore, they may not be able to comply with the sized secondary containment requirements. Specifically, EPA amended §§112.6(a)(3)(ii), 112.8(c)(2), 112.8(c)(11), 112.12(c)(2), and 112.12(c)(11) to include the phrase "except mobile refuelers and other nontransportation-related tank trucks." Such non-transportation-related tank trucks include those used to store and transport fuel, crude oil, condensate, non-petroleum, or other oils for transfer to or from bulk storage containers; for example, a truck used to refill oil-filled equipment at an electrical substation or a pump truck at an oil production facility. Under this approach, the general secondary containment requirements at §112.7(c) still apply"*.

AST#1 is a double-walled tank that can contain 100 percent of the tank's rated capacity and can fully support the loaded fuel tank and pumping system. In addition to this concrete structure, there is a tertiary containment system that consists of a low concrete dike built around the perimeter of the tank; this containment system is capable of holding 1,475 gallons. The entire fueling area is protected from accidental traffic collisions by bollards, spaced at approximately 6-foot intervals.

A Mobile 1 refueling service truck when not in use is parked within the limits of the lined landfill, while Mobile 2 (aka. Portable #2) is maintained empty and parked within close proximity to the wash pad. The drainage system in the bermed wash rack that is connected to an OWS. The operational and emergency oil storage capacity of the landfill liner system is sufficient to handle the quantity of oil expected to be discharged in un-diked areas from overfills or transfer. The bermed wash rack and landfill liner system, along with monitoring all product transfers, provides environmental protection equivalent to the requirements under 112.8(b)(3).

Miscellaneous containers storing various oil products are also located at the facility. Typically, these containers are 55-gallon drums located in or around the maintenance/equipment fueling area. These containers are stored on spill control pallets (plastic "poly-spill" secondary containment pallets). Should secondary containment be breached, oil product would spill onto the ground surface where it would be contained and cleaned-up with sorbent materials.

### **7.2.3 Drainage of Diked Areas [112.8(c)(3)]**

AST#1 has a tertiary containment system consisting of a dike. Spills within diked area will be cleaned up with absorbent material. The bypass valve for the diked area is kept sealed closed. Accumulated rainwater is drained; if opening the valve is required, the rainwater must be inspected to ensure it will not cause a discharge as described in §112.1(b) or applicable state regulations. The opening, drainage and resealing of the valve will be conducted under the direction of responsible supervision (District Manager or his delegate). Records of these events must be documented on the *Record of Containment Dike Drainage* form in Section 14.0 of this plan and maintained at the facility for at least three (3) years.

### **7.2.4 Corrosion Protection [112.8(c)(4)]**

This section is not applicable, as there are no buried tanks at the site.

### 7.2.5 Partially Buried and Bunkered Storage Tanks [112.8(c)(5)]

This section is not applicable as there are no partially buried or bunkered storage tanks at the site.

### 7.2.6 Inspections and Tests [112.8(c)(6)]

As required by the SPCC rule, WM performs the inspections, tests, and evaluations listed in the following table. Table 5 summarizes the various types of inspections and tests performed at the facility. The inspections and tests are described later in this section, and in the respective sections that describe different parts of the facility.

It is recommended that periodic inspections be conducted of exposed fiberglass piping, rubber, and other material that may deteriorate when exposed to ultraviolet light and weathering be inspected for deterioration.

**Table 5: Inspection and Testing Program**

Facility Component	Action	Frequency/Circumstances
Aboveground Tanks and associated piping	Combine visual inspection with another non-destructive tank integrity testing technique. Inspect outside of container for signs of deterioration and discharges.	Follow a regular schedule a. Daily undocumented visual facility inspections b. Monthly documented inspections for tanks
AST supports and foundation	Inspect container's supports and foundations.	Following a regular schedule (monthly, annual, and during scheduled inspections) and whenever material repairs are made.
Liquid level sensing devices, electronic (overfill)	Test for proper operation.	Annually
Liquid level sensing devices, positive shut down (overfill)	Test for proper operation. Document initial testing.	Annually
All aboveground valves, piping, and appurtenances	Assess general condition of items, such as flange joints, expansion joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces.	Monthly
Underground piping	No buried underground oil piping is located onsite.	n/a

Visual inspections of ASTs by facility personnel are performed according to the procedure described in this SPCC Plan. Leaks from tank seams, gaskets, and bolts are promptly corrected. Records of inspections and tests are signed by the inspector and kept at the facility for at least three (3) years.

The scope and schedule of certified inspections and tests performed on the facility's AST are specified in Steel Tank Institute (STI) Standard SP-001. The external inspections, as specified in the standard, would be conducted by a certified tank inspector to assess the integrity of the tank for continued oil storage, or per the recommendations of the tank manufacturer.

In regard to the proceeding sections: *Continuous Release Detection Method (CRDM)* – means of detecting liquid through inherent design. It is passive. Liquid releases are visually detected by facility operators.

- ✓ Release Detection Barrier (RPB)
- ✓ Secondary Containment (AST – double wall tank)
- ✓ Elevated AST

*Release Prevention Barrier (RPB)* - A liquid-containment barrier installed **underneath** an aboveground storage tank that is sufficiently impervious to the liquid being stored. Its purpose is to divert a product release toward an area where it can be easily detected and to prevent liquid from contaminating the environment. Release prevention barriers are composed of materials that are compatible with the liquid being stored in the aboveground storage tank and that meet proper engineering standards. Examples include DW tanks, steel, concrete, elastometric liners or other suitable materials that meet the criteria described above.

#### Inspections

- ✓ Periodic Inspections are to be conducted by owner's inspectors.
- ✓ Formal External Inspections are to be performed by certified inspectors.

#### Tank damaged or corroded

- ✓ To be determined by a certified STI tank inspector.

At a minimum, the following tank components shall be inspected (as applicable)

- ✓ Primary tank
- ✓ Secondary tank
- ✓ Tank supports
- ✓ Tank anchors
- ✓ Tank foundation and external supports
- ✓ Tank gauges and alarms
- ✓ Insulation covering
- ✓ Tank appurtenances
- ✓ Normal vents
- ✓ Emergency vents
- ✓ Release prevention barriers
- ✓ Spill control systems
- ✓ OWS

#### Record keeping

- ✓ Retain each AST record for the life of the AST.
- ✓ Retain each monthly inspection checklist for at least 36 months.
- ✓ Retain each annual inspection checklist for at least 36 months.
- ✓ Retain all certified inspection reports for the life of the AST.

#### Standards for AST inspections

##### STI SP001 shop fabricated ASTs

- ✓ < 50,000 gallons
- ✓ Limited to max shell height of 50' and a max diameter of 30'.
- ✓ An AST without a nameplate < 50,000 gallons plus max height 50' and max diameter of 30'.

AST inspection categories

- ✓ Cat 1 = AST with spill control and CRDM
- ✓ Cat 2 = AST with spill control and no CRDM
- ✓ Cat 3 = AST without spill control and CRDM

Four types of inspections

- ✓ P = Periodic AST inspection
- ✓ E = Formal external inspection by a certified AST inspector
- ✓ I = Formal internal inspection by a certified AST inspector
- ✓ L = Leak test by owner

**Table 6: STI Standard for Bulk Storage Containers Inspections and Tests**

Gal	Cat 1	Cat 2	Cat 3
0-1100	P	P	P,E & L (10)
1101-5000	P	P,E & L (10)	P,E & L (5) I (10) or P,L (2),E (5)
5001-30000	P,E (20)	P,E (10) ,I (20) or P,E (5),L (10)	P,E & L (5) I (10) or P,L (1), E (5)
30001-50000	P,E (20)	P,E & L (5), I (15)	P,E & L (5), I (10)

**Table 7: Scope and Frequency of Bulk Storage Containers Inspections and Tests**

AST #	Approx. Quantity (Gallons)	Double or Single Walled	STI Category	STI Inspection Required
1	2,000	DW	1	P = Periodic AST inspection
2	300	SW	1	P = Periodic AST inspection
3	100	SW	1	P = Periodic AST inspection
Oil Filled Equipment	n/a			
Drums	Not a bulk storage tank and not subject to the STI guidance for inspections of bulk storage tanks. Visually inspected routinely, per the facility oil storage inspections.			
Transformers	n/a			

**7.2.7 Heating Coils [112.8(c)(7)]**

This section is not applicable because the AST is not equipped with internal heating coils.

**7.2.8 Overfill Prevention System [112.8(c)(8)]**

Overfill prevention devices are required for all bulk tanks. Approved devices include:

- High liquid level alarms with an audible or visual signal at a constantly attended operation or surveillance station. In smaller facilities an audible air vent may suffice.
- High liquid level pump cutoff devices set to stop flow at a predetermined container content level.

- Direct audible or code signal communication between the container gauge and the pumping station.
- A fast response system for determining the liquid level of each bulk storage container such as digital computers, telepulse, or direct vision gauges. If you use this alternative, a person must be present to monitor gauges and the overall filling of bulk storage containers.

AST#1 at the facility is equipped with a direct vision gauge and spill bucket. All tanks require continuous presence of personnel to monitor filling operations for overfill protection. Venting capacity is suitable for the fill and withdrawal rates. General secondary containment is provided in the event of overfills, as described in this Plan.

Facility personnel are present throughout the filling operations to monitor the product level in the tanks. Liquid level sensing devices must be regularly tested to ensure proper operation.

### **7.2.9 Effluent Treatment Facilities [112.8(c)(9)]**

This section is not applicable as there are no regulated, routine plant effluent discharges to navigable waters.

### **7.2.10 Visible Discharges [112.8(c)(10)]**

Tanks and equipment with visible oil leaks or deficiencies that could result in a leak are repaired or replaced as soon as practicable. Any oil accumulation or stained soils in the area are promptly remediated and materials used during clean-up are properly disposed of in accordance with good engineering practices.

### **7.2.11 Mobile and Portable Containers [112.8(c)(11)]**

The mobile refueling trucks are equipped with fuel tanks (Mobiles 1 & 2) and are used for daily refueling of landfill equipment.

All oil tanks used at this facility are constructed of steel, in accordance with industry specifications as described previously. The design and construction of all bulk storage containers are compatible with the characteristics of the oil product they contain, and with temperature and pressure conditions.

## **7.3 FACILITY TRANSFER OPERATIONS [40 CFR 112.8(d)]**

Transfer operations at this facility include:

- The transfer of diesel fuel from third party vendor tanker trucks into the double-walled AST located near the maintenance shop.
- The transfer of diesel fuel from the AST to fill machinery and the mobile service trucks are conducted via pneumatic suction pumps to dispenser hoses.
- The transfer of used oil from portable used oil drain pans via drum funnels into 55-gallon used oil drums in the maintenance shop.
- The filling of facility trucks and equipment using the diesel fuel dispenser at the AST. The suction pump uses a rubber dispenser hose.
- The filling of facility trucks and equipment using the diesel fuel dispenser on the mobile refueling service truck(s). The tank-mounted suction pump uses a rubber dispenser hose.

### **7.3.1 Buried Piping Protection [112.8(d)(1)]**

This section is not applicable as there is no buried piping at the site.

### **7.3.2 Out-of-Service Piping [112.8(d)(2)]**

This section is not applicable as there is no out-of-service piping at the site.

### **7.3.3 Pipe Supports [112.8(d)(3)]**

This section is not applicable as there are no pipe supports used at the site.

### **7.3.4 Inspection of Aboveground Valves, Piping, and Appurtenances [112.8(d)(4)]**

All aboveground piping and valves are examined monthly to assess their condition. Inspection includes aboveground valves, piping, appurtenances, expansion joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces. Observations are noted on the monthly inspection checklist provided in this Plan.

### **7.3.5 Overhead Pipe Clearance [112.8(d)(5)]**

All of the aboveground piping is located within areas that are not accessible to vehicular traffic (e.g., inside building, protected by vehicle barrier posts). Brightly painted bollards are placed where needed to prevent vehicular collisions with equipment.



## 8.0 CERTIFICATION OF THE APPLICABILITY OF THE SUBSTANTIAL HARM CRITERIA [40 CFR 112.20(e)]

The intent of this form is determine if the facility for which this SPCC Plan is written must prepare a Facility Response Plan as defined by 40 CFR 112.20.

**Facility Name:** Kekaha Sanitary Landfill Phase II

**Facility Address:** 6900-D Kaumuali'i Highway, Kekaha, Kaua'i, Hawai'i 96752

1. Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?  
 YES  NO
2. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest above ground oil storage tank plus sufficient freeboard to allow for precipitation within any above ground storage tank area?  
 YES  NO
3. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula in Attachment C-III to this appendix or a comparable formula) such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments? For further description of fish and wildlife and sensitive environments see Appendices I, II, and III to DOC/NOAA's "Guidance for Facility and Vessel Response Plans: Fish and Wildlife and Sensitive Environments" (see appendix E to this part, section 10, for availability) and the applicable Area Contingency Plan.  
 YES  NO
4. Does the facility have a total oil storage capacity of greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula in Attachment C-III to this appendix or a comparable formula) such that a discharge from the facility would shut down a public drinking water intake?  
 YES  NO
5. Does the facility have a total oil storage capacity of greater than or equal to 1 million gallons and has the facility experienced a reportable spill in an amount greater than or equal to 10,000 gallons within the last 5 years?  
 YES  NO

### Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate, and complete.

Signature \_\_\_\_\_

Name (type or print) John Ruiz

Title District Manager



**9.0 SPILL PREVENTION BRIEFING LOG**

**KEKAHA SANITARY LANDFILL PHASE II SPILL PREVENTION BRIEFING LOG**

Date of Briefing: \_\_\_\_\_

Briefing Conducted by: \_\_\_\_\_

In accordance with 40 CFR 112.7(f), and in order to ensure adequate understanding of the SPCC Plan for this facility, spill prevention briefings must be conducted at least once per year for all oil-handling personnel, and should include at least the topics listed below. Use this form to document attendance at the spill prevention briefing.

The following topics were discussed at the meeting (check all that apply):

- SPCC Plan, including the contact list and telephone numbers, and including potential spill flow routes and strategic barricading points
- Facility operations, especially those pertaining to oil storage and handling
- Applicable pollution control laws, rules and regulations
- Spill events or failures at this or other sites
- Operation and maintenance of equipment to prevent oil spills
- Spill response and reporting procedures
- Other \_\_\_\_\_

Facility personnel in attendance:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Completed copies of this briefing log shall be kept with the SPCC Plan for a minimum of 3 years.



## 10.0 ANNUAL SPCC PLAN APPLICABILITY REVIEW CHECKLIST

Kekaha Sanitary Landfill Phase II

Page 1 of 3

**Date Reviewed:** \_\_\_\_\_ **Reviewed by:** \_\_\_\_\_

**Date Last Reviewed:** \_\_\_\_\_

On an annual basis, review the following items to evaluate if they are still accurate for your facility. If there is a change in the facility design, construction, operation, or maintenance that materially affects the potential for a discharge from the facility, you must prepare an amendment to this SPCC Plan within six months of the change, and implement the amendment as soon as possible, but not later than six months following preparation of the amendment [40 CFR 112.5(a)].

Examples of changes that may require amendment of the SPCC Plan include, but are not limited to:

- Commissioning or decommissioning of containers or tanks
- Replacement, reconstruction, or movement of containers or tanks
- Reconstruction, replacement, or installation of piping systems
- Construction or demolition that alter secondary containment structures
- Changes of product or service
- Revision of standard operation of maintenance procedures at the facility

### ADMINISTRATIVE

#### Are the following documents available for use at the facility?

**Yes      No      NA**

\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ SPCC Plan

\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ Oil Spill Contingency Plan

#### Are the site-specific sections of the above reports accurate?

**Yes      No      NA**

\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ Area Descriptions

\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ Oil Storage

\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ Have facility/tank inspection checklists been completed and filed?

\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ Are spill response numbers posted?

#### Have employees received appropriate training/briefings including:

**Yes      No      NA**

\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ SPCC Plan Briefings (Oil handling personnel)

ANNUAL SPCC PLAN APPLICABILITY REVIEW CHECKLIST (CONTINUED)  
Kekaha Sanitary Landfill Phase II  
Page 2 of 3

**SPILL RESPONSE EQUIPMENT**

**Yes      No      NA**

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    Is spill response equipment available as indicated in the SPCC Plan?

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    Is all spill response equipment in good working order?

**Additional equipment/materials that are needed?**

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**GENERAL**

**Yes      No      NA**

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    Are all areas free of unnecessary clutter?

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    Are small oil containers kept in flammable lockers or other acceptable locations?

**DRUM STORAGE AND HANDLING AREAS**

**Yes      No      NA**

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    Are containers free of signs of leakage, rust, or other deterioration?

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    Are containers kept closed when not in use?

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    Are containers stored off the floor/ground, in containment areas?

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    Are drip pans provided under spigots?

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    Are spigots and valves free of leaks?

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    Are containers labeled?

**CONTAINMENT BERMS/STRUCTURES**

**Yes      No      NA**

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    Are containment areas free of debris and liquid accumulations?

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    Are containment/drainage structures intact, and free of cracks, breaches, etc.?

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    If present, are drainage valves secured?

ANNUAL SPCC PLAN APPLICABILITY REVIEW CHECKLIST (CONTINUED)  
Kekaha Sanitary Landfill Phase II  
Page 3 of 3

**ABOVEGROUND STORAGE TANKS**

**Yes      No      NA**

\_\_\_\_\_ Are fuel hoses, pumps and valves drained and properly secured when not in use?

\_\_\_\_\_ Are valves, flanges, and gauges free of signs of leakage?

\_\_\_\_\_ Is monitoring equipment operational?

**WASTE OIL STORAGE AREA**

**Yes      No      NA**

\_\_\_\_\_ Are all waste oil storage areas maintained in a neat and tidy fashion?

\_\_\_\_\_ Are all drums and other hazardous substance containers located within designated areas?

\_\_\_\_\_ Are all containers properly marked and dated?

**DRAINAGE**

**Yes      No      NA**

\_\_\_\_\_ Are drainage ditches and culverts free of debris, trash, etc?

\_\_\_\_\_ Are storm drain outlets adequately protected from erosion?

**Remarks (Describe other problems or potential problems that may pose a hazard)**

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**Completed copies of this form shall be kept with the SPCC Plan for a minimum of 3 years.**



### 11.0 SPCC PLAN REVIEW AND EVALUATION LOG

The table below logs the review and evaluation of the SPCC Plan and documents amendments and/or P.E. certification that has been required.

**"I have completed my review and evaluation of the SPCC Plan for the *Kekaha Sanitary Landfill Phase II* on the date indicated, and as a result, will or will not amend the Plan as indicated below".**

Reviewer Signature	Reviewer Name	Date	Plan Amended?		Nature of Changes Made	P.E. Cert Required?		Date Certified
			Yes	No		Yes	No	
1	Eddie Pettit	10/2015	Yes	No		Yes	No	10/2015
2	Tina Alder	03/2016	Yes	No		Yes	No	03/2016
3	Tina Alder	07/2016	Yes	No		Yes	No	07/2016
4			Yes	No		Yes	No	
5			Yes	No		Yes	No	
6			Yes	No		Yes	No	
7			Yes	No		Yes	No	
8			Yes	No		Yes	No	

Each time an amendment to this plan occurs, a new Management Approval signoff in Section 5.0 needs to be completed.



## 12.0 SPILL INVESTIGATION FORM

### WASTE MANAGEMENT SPILL INVESTIGATION FORM

1. When did the Incident occur? Date: \_\_\_\_\_ Time: \_\_\_\_\_

2. Where did the Incident occur? \_\_\_\_\_  
\_\_\_\_\_

3. How did the Incident occur (Describe the Cause)? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Under whose control was the material (chemical, petroleum, ash) at the time of the Incident?

Name: \_\_\_\_\_

Mailing Address and Street: \_\_\_\_\_

Town: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Telephone: \_\_\_\_\_

5. What was spilled or discharged? Give an exact description of each of the materials involved in the incident, including chemical names, percent concentrations, trade names, etc.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

If the Chemicals are Extremely Hazardous substances or CERCLA hazardous substances they must be identified as such and include the reportable quantity (RQ). Please attach a Material Safety Data Sheet (MSDS) for each chemical involved.

6. What were the quantities (chemicals, petroleum, cooling water, lime, ash etc.) that were released, spilled or discharged to each environmental medium (air, surface water, soil, groundwater)?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. Did any of the chemical or petroleum travel beyond the property line? [Note: materials that enter the groundwater are considered to have gone beyond the property line.]

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. What actions were taken to respond to and contain the release, spill or discharge?

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9. What actions are being taken to prevent reoccurrence of an incident of this type?

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10. Was the Incident verbally reported to Management?

(Contact EHS Manager, 25 gallons or more)

Contacted/Title: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_

11. Who reported the incident?

Name/Title: \_\_\_\_\_

Mailing Address and Street: \_\_\_\_\_

Town: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Telephone: \_\_\_\_\_

12. Were there any injuries as a result of the Incident? If so, list the names of exposed individuals, their addresses, and phone numbers and describe their injuries. (Attach Additional Sheets if Necessary)

Name: \_\_\_\_\_

Mailing Address and Street: \_\_\_\_\_

Town: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Telephone: \_\_\_\_\_

13. What is the appropriate advice regarding medical attention necessary for exposed individuals?

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14. Are there known or anticipated health risks, acute or chronic, associated with the release of this chemical or medical advice that should be communicated?

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15. Was the incident completely cleaned up by the time this report was submitted?

If not, what are the anticipated remedial actions and their duration?

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16. Completed by:

---

Signature

Title

Date



### 13.0 SPILL DOCUMENTATION

(Date: \_\_\_\_\_)

#### FACILITY (DIVISION) ORIGINATING REPORT

Name: \_\_\_\_\_ Waste Management of Hawaii, Inc. \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_

Contact: \_\_\_\_\_

Other Responsible Persons: \_\_\_\_\_

#### INCIDENT DESCRIPTION

Location where spill occurred and cause: \_\_\_\_\_  
(address) Include description of area, i.e. industrial park, subdivision, etc.)

Weather Conditions: \_\_\_\_\_  
(Temperature, Windy, Sunny, Rain, Snow, etc.)

SPILL Date Began: \_\_\_\_\_ Date Ended: \_\_\_\_\_

Time Began: \_\_\_\_\_ a.m./p.m. Time Ended: \_\_\_\_\_ a.m./p.m.

CLEANUP Date Began: \_\_\_\_\_ Date Ended: \_\_\_\_\_

Time Began: \_\_\_\_\_ a.m./p.m. Time Ended: \_\_\_\_\_ a.m./p.m.

Material Spilled/Released: \_\_\_\_\_

Amount(s) Spilled/Released: \_\_\_\_\_

Spill/Release onto: \_\_\_\_\_  
(Type of soil (sand, clay, etc.))

Soil     asphalt     concrete     other (describe)

Ability of the spill to spread: \_\_\_\_\_  
(Where did spill end up and how fast did it flow?)

Distance to closest water body: \_\_\_\_\_

Distance to: drains, sewers, ditches. \_\_\_\_\_

Agencies on site of spill: \_\_\_\_\_

(Police, Fire, etc.)

Contact name and number.

Spill/Release: Potential exposure to water wells, plants, animals, humans, sensitive environments.

**NOTIFICATIONS** (must Notify Emergency Government and DNR)

Agency	Phone Number	Contact Name	Date and Time
DOH-HEER Office	808/586-4249		
DOH-After Hours	808/247-2191		
National Response Center	800/424-8802		
EPA Region 9	800/300-2193		

Instruction given by agencies: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Evidence of contamination, visual & odor (describe): \_\_\_\_\_

\_\_\_\_\_

Impacts on the environment: \_\_\_\_\_

Corrective action taken: \_\_\_\_\_

Volume and Disposal of waste generated by spill: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed/Typed Name

\_\_\_\_\_  
Title

## INSTRUCTIONS FOR COMPLETION OF SPILL REPORT DOCUMENTATION

Facility Originating Report - Identify the division including physical address (**not** Post Office Box).

Other Parties/Persons Responsible for Discharge - (Example) If a collision ruptures a fuel tank, name of driver of other vehicle.

Incident Description – Describe incident.

Location and Cause - Identify address of spill, description of area where spill occurred. Description to include zoning, distance to residences, etc. Identify cause of spill (hose ruptured, etc.)

Weather Conditions - Summary of temperature, wind direction and speed, precipitation, any other weather conditions of importance. Include any weather issues until spill clean-up is completed.

Spill - Approximate time spill started, duration of spill.

Cleanup - Approximate time clean-up began, how long it takes to complete clean-up.

Material Spilled and Amount - What was spilled and physical state (solid, liquid). The physical, chemical, hazardous and toxicological characteristics of the substance spilled (off MSDS).

Amount Spilled/Released - Volume of substance spilled, and amount of absorbent used to clean up.

Spilled - Identify what spill came in contact with. If soil, identify soil type.

Ability of Spill to Spread - Is the weather (rain) washing the spill into a larger area? Is the surface sloping which is spreading the spill, wind blowing scattering material over greater distance? Where did spill end up going and how fast did it flow? Did other actions effect spill, i.e. fire hose washing contaminant?

Distance to closest water body - Is there a stream, river, pond or lake in close proximity, potential for contamination, identify distance?

Distance to drains, sewers, ditches - Is there a ditch or drain in close proximity to the spill. Identify distance to drain, ditch, etc.?

Agencies on site - If any agency responded (police and fire) list: contact and phone number and attach copy of any report issued by agency.

Spill/Release Potential Exposure to Water Wells, Plants, etc. - Are there any areas of special concern by the spill, such as wetlands, environmental corridors, trout streams, wildlife management areas, water wells, endangered plants, animals, etc? If so, identify and contact Regional EMD.

Notifications - DOH must be notified when a spill occurs. NRC must be notified if a reportable quantity of a hazardous material is spilled. The only hazardous material we routinely haul is friable asbestos. Be sure to document time and date contacts were made.

Instructions Given by Agencies - When the spill was reported, was any information provided by the agencies on to how to manage, collect or remediate the spill?

Evidence of Contamination - The spill normally has an odor and visual appearance. Was the spill able to be removed? Any indicators of contamination remain after remedial activity.

Impacts on the Environment - Has cleanup been successful in removing any contaminants which would affect the environment?

Volume and Disposal of Waste Generated by Spill - Identify volume of residue and disposal of waste. Attach copies of manifest documenting disposal.

Corrective action taken - What was done to clean up the spill? Explain any unusual items of clean up operation.

Signature - Signed by person supervising clean-up.







## 15.0 COMPLIANCE PLAN/SCHEDULE

### COMPLIANCE PLAN/SCHEDULE FOR THE SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN

Kekaha Sanitary Landfill Phase II  
6900-D Kaumuali'i Highway  
Kaua'i, Hawai'i 96752  
Phone: (808) 337-1416

The following action items have been identified at the facility as needing to be addressed in order to fully comply with the applicable requirements of 40 CFR Part 112, et seq., as currently promulgated and interpreted by U.S. Environmental Protection Agency (EPA):

No action items have been identified at the facility as needing to be addressed in order to fully comply with the applicable requirements of 40 CFR Part 112, et seq., as currently promulgated and interpreted by U.S. Environmental Protection Agency (EPA). The SPCC regulations regarding 5-year Plan reviews requiring changes be made within six months of the completion of this amended Plan are therefore not applicable.

Signature:  \_\_\_\_\_ Date: July 26, 2016  
Michael Anderson, PE

I certify that I am familiar with the action items identified in this Compliance Plan/Schedule, and agree to implement them as soon as possible, but not later than six months following the completion of this 5-year Plan review.

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



**Appendix A  
Inspection Forms**



**MONTHLY AST INSPECTION CHECKLIST**  
**WASTE MANAGEMENT OF HAWAII, INC., KEKAHA SANITARY LANDFILL**

Inspection Area	No Action Needed	Observations	Description/Action Taken	Initial / Date
	(Check)			After Action Completed
<b>BULK STORAGE TANKS</b>				
<b>AST #1</b> <ul style="list-style-type: none"> <li>2,000 gallon Diesel</li> </ul>	<input type="checkbox"/>	1.1 1.2 1.3 1.4 2.1 3.1 3.2 3.3 4.1		
<b>MOBILE TANKS</b>				
<b>Mobile 1</b> <ul style="list-style-type: none"> <li>300<sup>1</sup> gallons Diesel – AST #2</li> </ul> <sup>1</sup> The mobile truck contains one inactive (out-of-use) 235-gallon Hydraulic Oil Tank; ensure compliance.	<input type="checkbox"/>	1.1 1.2 1.3 1.4 4.1		
<b>Mobile 2 (aka. Portable #2)</b> <ul style="list-style-type: none"> <li>100 gallons Diesel – AST #3</li> </ul>	<input type="checkbox"/>	1.1 1.2 1.3 1.4 4.1		
<b>DRUMS</b>				
<b>Drum Area: Maintenance Shop</b> <ul style="list-style-type: none"> <li>55* (22)<sup>2</sup> gallon Misc. Hydrocarbons</li> </ul> <sup>2</sup> Ten (10) of the drums are owned by the County and twelve (12) are owned by WM	<input type="checkbox"/>	1.1 1.2 1.3 1.4 2.1 3.1 3.2 3.3 4.1		

Inspector's Name \_\_\_\_\_

Date \_\_\_\_\_

Time \_\_\_\_\_

Inspector's Signature \_\_\_\_\_



**ANNUAL AST INSPECTION CHECKLIST**  
**WASTE MANAGEMENT OF HAWAII, INC., KEKAHA SANITARY LANDFILL**

Inspection Area	No Action Needed	Observations	Description/Action Taken	Initial / Date
	(Check)			After Action Completed
<b>BULK STORAGE TANKS</b>				
<b>AST #1</b> <ul style="list-style-type: none"> <li>• 2,000 gallon Diesel</li> </ul>	<input type="checkbox"/>	1.1 1.2 2.1 2.2 2.3 2.4 2.5 4.1 5.1 5.2 6.1 7.1 7.2 7.3 8.1 8.2 10.1 10.2 10.3 11.1 11.2		
<b>MOBILE TANKS</b>				
<b>Mobile 1</b> <ul style="list-style-type: none"> <li>• 300<sup>1</sup> gallons Diesel – AST #2</li> </ul> <sup>1</sup> The mobile truck contains one inactive (out-of-use) 235-gallon Hydraulic Oil Tank.	<input type="checkbox"/>	1.1 1.2 2.1 2.2 2.3 2.4 2.5 4.1 5.1 5.2 6.1 7.1 7.2 7.3 8.1 8.2 10.1 10.2 10.3		
<b>Mobile 2 (aka. Portable #2)</b> <ul style="list-style-type: none"> <li>• 100 gallons Diesel – AST #3</li> </ul>	<input type="checkbox"/>	1.1 1.2 2.1 2.2 2.3 2.4 2.5 4.1 5.1 5.2 6.1 7.1 7.2 7.3 8.1 8.2 10.1 10.2 10.3		

Inspector's Name \_\_\_\_\_

Date \_\_\_\_\_

Time \_\_\_\_\_

Inspector's Signature \_\_\_\_\_

# ANNUAL AST INSPECTION CHECKLIST

## WASTE MANAGEMENT OF HAWAII, INC., KEKAHA SANITARY LANDFILL

**Inspection Guidance:**

- For equipment not included in this standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a certified inspector. It shall be performed by an owner's inspector who is familiar with the site and can identify changes and developing problems.
- Inspect the AST shell and associated piping, valves, and pumps including inspection of the coating for Paint Failure.
- Inspect:
  1. Earthen containment structures including examination for holes, washout, and cracking in addition to liner degradation and tank settling.
  2. Concrete containment structures and tank foundations/supports including examination for holes, washout, settling, paint failure, in addition to examination for corrosion and leakage.
  3. Steel containment structures and tank foundations/supports including examination for washout, settling, cracking, and for paint failure, in addition to examination for corrosion and leakage.
- Inspection of cathodic protection system, if applicable, includes the wire connections for galvanic systems and visual inspection of the operational components (power switch, meters, and alarms) of impressed current systems.
- Remove promptly upon discovery standing water or liquid in the primary tank, secondary containment area, interstice, or spill container. Before discharge to the environment, inspect the liquid for regulated products or other contaminants and disposed of it properly.
- In order to comply with EPA SPCC (Spill Prevention, Control and Countermeasure) rules, a facility must regularly test liquid level sensing devices to ensure proper operation (40 CFR 112.8(c)(8)(v)).
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a certified inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for 36 months.
- Complete this checklist on an annual basis supplemental to the owner monthly-performed inspection checklists.
- **Note: If a change has occurred to the tank system or containment that may affect the SPCC plan, the condition should be evaluated against the current plan requirement by a Professional Engineer knowledgeable in SPCC development and implementation.**

**Legend:**

Item	Status	Comment
<b>1.0 Tank Containment</b>		
1.1 Containment structure in satisfactory condition?	Yes    No*	
1.2 Drainage pipes/valves fit for continued service	Yes    No*    N/A	
<b>2.0 Tank Foundation and Supports</b>		
2.1 Evidence of tank settlement or foundation washout?	Yes*    No	
2.2 Cracking or spalling of concrete pad or ring wall?	Yes*    No	
2.3 Tank supports in satisfactory condition?	Yes    No*	
2.4 Water able to drain away from tank?	Yes    No*	
2.5 Grounding strap secured and in good condition?	Yes    No*	

**ANNUAL AST INSPECTION CHECKLIST**  
**WASTE MANAGEMENT OF HAWAII, INC., KEKAHA SANITARY LANDFILL**

<b>3.0 Cathodic Protection</b>			
3.1 CP system functional?	Yes	No*	N/A
3.2 Rectifier Reading:			
<b>4.0 Tank External Coating</b>			
4.1 Evidence of paint failure?	Yes*	No	
<b>5.0 Tank Shell/Heads</b>			
5.1 Noticeable shell/head distortions, buckling, denting or bulging?	Yes*	No	
5.2 Evidence of shell/head corrosion or cracking?	Yes*	No	
<b>6.0 Tank Manways, Piping and Equipment within Secondary Containment</b>			
6.1 Flanged connection bolts tight and fully engaged with no sign of wear or corrosion?	Yes	No*	
<b>7.0 Tank Roof</b>			
7.1 Standing water on roof?	Yes*	No	
7.2 Evidence of coating cracking, crazing, peeling, blistering?	Yes*	No	
7.3 Holes in roof?	Yes*	No	
<b>8.0 Venting</b>			
8.1 Vents free of obstructions?	Yes	No*	
8.2 Emergency vent operable? Lift as required?	Yes	No*	
<b>9.0 Insulated Tanks</b>			
9.1 Insulation missing?	Yes*	No	
9.2 Are there noticeable areas of moisture on the insulation?	Yes*	No	
9.3 Mold on insulation?	Yes*	No	
9.4 Insulation exhibiting damage?	Yes*	No	
9.5 Is the insulation sufficiently protected from water intrusion?	Yes	No*	



**SECTION V**

**SURFACE WATER MANAGEMENT PLAN**



**SURFACE WATER MANAGEMENT PLAN**  
**KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II**  
**KEKAHA, KAUA'I**



**WASTE MANAGEMENT OF HAWAII, INC.**  
**JUNE 2016**



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## ACRONYMS AND ABBREVIATIONS

BMP	Best Management Practices
CWA	Clean Water Branch, Department of Health
DOH	Department of Health, State of Hawaii
DPW	Department of Public Works
ft	feet
HAR	Hawaii Administrative Rules
KLF	Kekaha Municipal Solid Waste Landfill – Phase II
MDOF	Materials drop-off facility
msl	mean sea level
MSW	Municipal Solid Waste
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
SHWB	Solid Hazardous Waste Branch, Department of Health
SPCC	Spill Prevention, Control, and Countermeasure
SWMP	Surface Water Management Plan
U.S.	United States
WMH	Waste Management of Hawaii, Inc.

# **1. INTRODUCTION**

The Surface Water Management Plan (SWMP) was prepared for Kekaha Municipal Solid Waste Landfill – Phase II (KLF) which is located at 6900-D Kaunaloa Highway, Kekaha, Hawaii. The landfill is owned by the County of Kauai and operated by the County of Kauai and Waste Management of Hawaii, Inc. (WMH).

The SWMP was prepared in accordance with Hawaii Administrative Rules (HAR) Title 11, Chapter 58.1-15, and Special Condition Section E of the Solid Waste Management Permit No. LF-0052-13, dated March 5, 2014, issued by the State of Hawaii Department of Health (DOH) Solid and Hazardous Waste Branch (SHWB).

## **1.1 Purpose of Surface Water Management Plan**

The purpose of the SWMP is:

- To describe the design basis and storm used to estimate surface water run-on and run-off at the landfill.
- To describe the surface water features to direct and manage surface water run-on and run-off at the landfill.
- To describe how run-off from the active portion of the landfill will be handled so as not to cause a discharge of pollutants into waters of the United States (U.S.), including wetlands that violates any requirements of the Clean Water Act (CWA), including, but not limited to, the National Pollutant Discharge Elimination System (NPDES) requirements, pursuant to section 402.

Other requirements in the Solid Waste Management Permit are:

- Control site run-off from a 24-hour storm, 25-year design storm.
- Minimize soil erosion and exposure of waste due to soil erosion.
- Prevent discharge of pollutants into waters of the U.S., and comply with the requirements of the federal CWA or statewide water quality management plan.
- Prevent storm water from coming into contact with geosynthetic clay liner in the landfill and evaporation pond; and
- Manage storm water that comes in contact with solid waste as leachate.

## **1.2 Solid Waste Regulations**

Solid Waste Regulations HAR 11-58.1-15(g) provides requirements to ensure adequate control of storm water events at landfills. The regulation requirements for run-on or run-off control systems and surface water management are listed below.

### **1.2.1 Requirements for run-on or run-off control systems**

Owners or operators of all municipal solid waste (MSW) landfill units must design, construct, and maintain the following:

- A run-on control system to prevent flow onto the active portion of the landfill during the peak discharge from a 24-hour, 25-year storm.
- A run-off control system from the active portion of the Landfill to collect and control at least the water volume resulting from a 24-hour, 25-year storm.
- Run-off from the active portion of the landfill unit must be handled in accordance with surface water requirements.

For reference, the 24-hour, 25-year total precipitation storm at the KLF is about 7.4 inches as determined by point precipitation frequency estimates from the National Oceanic and Atmospheric Administration (NOAA) Atlas No. 14 precipitation frequency data server (<http://hdsc.nws.noaa.gov>).

### **1.2.2 Requirements for surface water management**

MSW landfill units shall not:

- Cause a discharge of pollutants into waters of the U.S., including wetlands, that violates any requirement of the CWA, including, but not limited to, the NPDES requirements, pursuant to Section 402 of the CWA.
- Cause the discharge of a non-point source of pollution to waters of the U.S., including wetlands, that violates any requirement of an area-wide or state-wide water quality management plan that has been approved under Sections 208 or 319 of the CWA, as amended.

### **1.2.3 National Pollutant Discharge Elimination System**

A NPDES General Permit at the KLF is not required as there is no discharge of storm water from the facility. The DOH determined that the NPDES determination only applies to the surface water requirements of HAR 11-58.1-15(h). As such, a SWMP is still required for the facility.

### **1.2.4 Spill Prevention, Control, and Countermeasures Plan**

A Spill Prevention, Control, and Countermeasures (SPCC) Plan was developed for the landfill by (CB&I 2016) and is included in the Site Operations Manual (WMH 2014). The SPCC Plan complies with Title 40 Code of Federal Regulations Part 112 and addresses measures for prevention and control of fuel and oil related spills.

## **2. SITE INFORMATION**

### **2.1 Site Description**

The KLF is located near the southwest coast of the island of Kaua'i, approximately 1.5 miles northwest of the town of Kekaha, and approximately 2,000 feet (ft) from the Pacific Ocean shoreline. The KLF (Phase II) is bounded to the northeast by Kaumuali'i Highway, an unpaved access road and agricultural land to the southeast, aquaculture facilities to the northwest, and the KLF Phase I area to the southwest. The site location and topography are shown on Figure .

The current permitted waste footprint, covers approximately 38.4 acres, is roughly rectangular, and includes the Phase II and Cell 1 expansion disposal cells (see Figure ). Phase II consists of approximately 32 acres subdivided into 14 smaller waste disposal sub-cells each about two acres, and the Cell 1 expansion, 6.4 acres subdivided into 4 smaller waste disposal sub-cells each about one acre.

The proposed Cell 2 lateral expansion will increase the KLF (Phase II) horizontally. The Cell 2 area waste footprint is approximately 6.6 acres and is divided into 4 smaller waste disposal sub-cells. The expanded area will be located between KLF Phase I and Phase II.

The landfill office, scale house, maintenance building, leachate evaporation pond, and infiltration basin are located along the northeast property line. A materials drop-off facility (MDOF) is located between the leachate evaporation pond and the office. The MDOF provides public drop-offs of green waste, recyclables, municipal solid waste, tires, and white goods. A used oil drop-off is located in the maintenance building. The site layout is shown on Figure .

### **2.2 Surface Water Management System**

The surface water system includes diversion berms located approximately 20 to 40 ft below the perimeter of the landfill top deck and along the perimeter road that direct surface water to downdrains (currently geosynthetic liner is used for downdrains). Each downdrain has a trapezoidal cross-section with each downdrain conveying water to an infiltration drainage ditch, which is conveyed via a perimeter channel or a culvert in select locations. The infiltration drainage ditch conveys surface water to the infiltration basin located near the entrance of the facility.

The diversion berms have been designed to convey run-off from a 25-year, 24-hour storm event with allowance for minimal freeboard. Each of the downdrains has been analyzed and designed to convey run-off. Each of the channels has side slopes of 2:1 and varies in width from one (1) to two (2) ft. The surface water management system is shown on Figure 2.

The infiltration basin is large enough to accommodate all three-design storms and associated surface water from the entire Phase II landfill, including Cell 1 and Cell 2. The

infiltration rate from the bottom of the basin is 1 inch per 6 minutes. The overall design of the basin is such that the infiltration basin is excavated at existing grade of approximately 11 to 12 ft mean sea level (msl) with a bottom elevation of 7.5 ft msl, which correlates to the invert elevation of the infiltration ditches. With the Cell 2 expansion, the existing 2.2-acre infiltration basin is expected to perform in the same manner and in conjunction with the existing infiltration ditches.

### **3. SWMP IMPLEMENTATION**

#### **3.1 Best Management Practices**

Best Management Practices (BMPs) for erosion and sediment controls are implemented in conjunction with the surface water management features described in Section 2.0. BMP measures include geosynthetic lined downdrains and infiltration ditches; gravel resurfacing of access roads and the placement of mulch on the side slopes. In addition, fiber rolls and silt fences may be used for sediment control and geosynthetic tarps and ripped lined downdrains may be used for erosion control.

#### **3.2 Inspections**

An example of the annual inspection log sheet that is used for documentation is presented in Appendix A. After all major rainstorm events (i.e. greater than 1.0 inch of rainfall), inspections of the drainage system, infiltration basin, and erosion and sediment measures are performed to identify failures, breaches, or sediment deposition requiring repair or cleanout. An example of the post-storm inspection sheet is presented in Appendix A.

#### **3.3 Recordkeeping**

Records of the inspections and follow-up actions are maintained in the landfill operating files.

#### **3.4 Reporting**

The effectiveness of the landfill storm water run-on and run-off drainage systems is reviewed on an annual basis and a report is submitted to the DOH by no later than September 1 of each year. The annual inspection log is used to document the effectiveness and appropriateness of the existing erosion and sediment control measures and drainage system features for current site conditions. The annual report contains the following information:

- Report of an annual inspection of surface water management features and facilities, together with a description of required maintenance and changes.

- Updated drawings showing current topography of the landfill, surface water drainage paths and conveyances, and drainage system modifications planned for the next year in response to waste filling.
- Engineering calculations documenting the capability of the surface water management system to comply with the run-on and run-off requirements outlined in the KLF Solid Waste Permit.
- Any updates to the SPCC Plan prepared pursuant to federal requirements under the CWA.

#### **4. REFERENCES**

AECOM Technical Services, Inc., 2010. *Spill Prevention Control and Countermeasure Plan, Kekaha Landfill, Kauai, Hawaii*. January 2010.

WMH, 2014. *Site Operations Manual, Kekaha Landfill, Kekaha, Kauai, Hawaii*. Waste Management of Hawaii, Inc., Volume I.

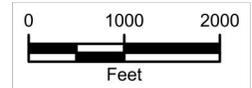


## FIGURES

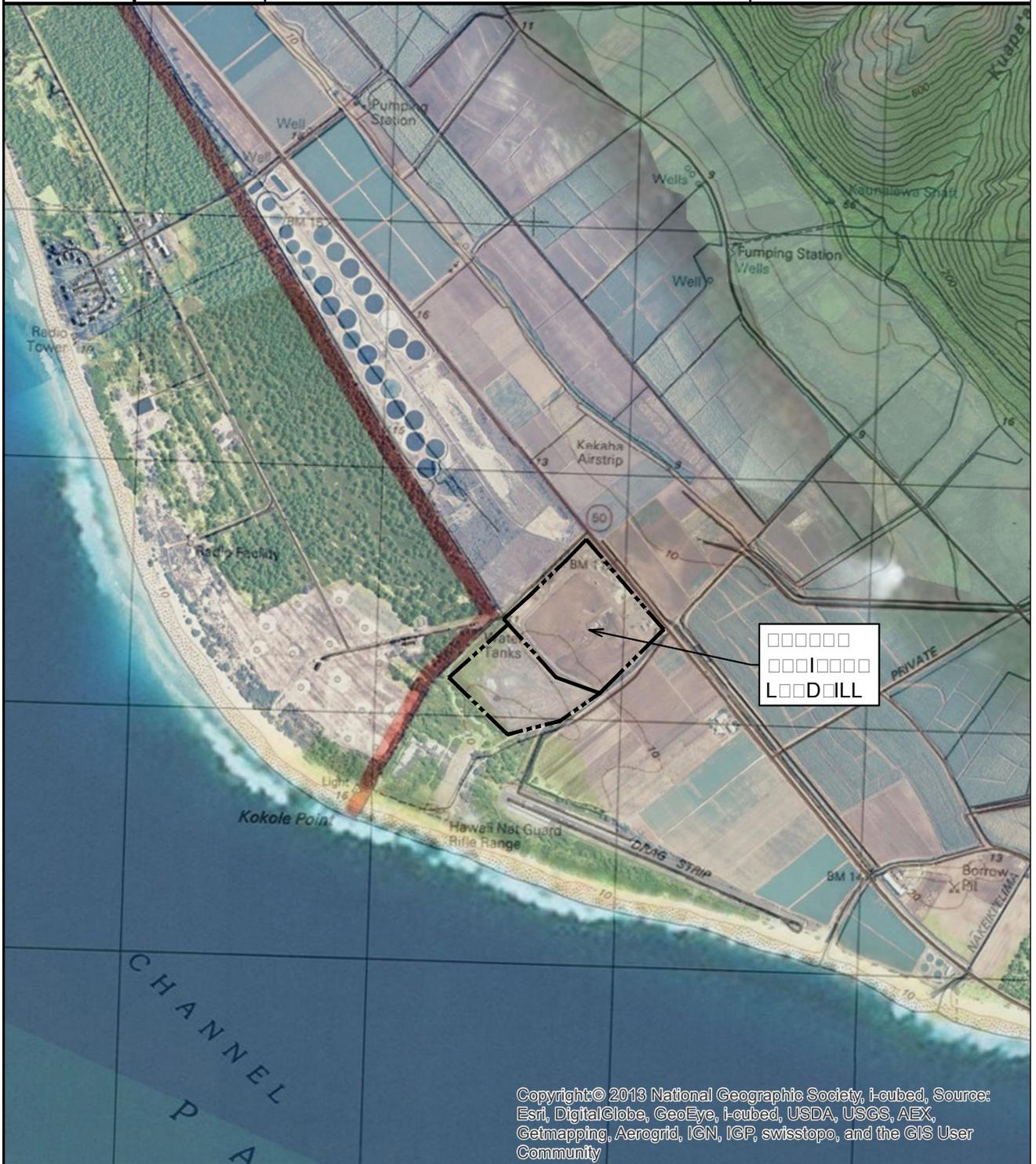




COORDINATE SYSTEM: NAD 1983 STATEPLANE HAWAII 3 FIPS 5103 FEET  
 PROJECTION: TRANSVERSE MERCATOR  
 DATUM: NORTH AMERICAN 1983  
 FALSE EASTING: 1,640,416.6667  
 FALSE NORTHING: 0.0000  
 CENTRAL MERIDIAN: -158.0000  
 SCALE FACTOR: 1.0000  
 LATITUDE OF ORIGIN: 21.1667  
 UNITS: FOOT US



1 inch = 2,000 feet



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 Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX,  
 Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User  
 Community



## FIGURE 1 LOCATION MAP

KEKAHA SANITARY LANDFILL  
 KEKAHA, KAUAI, HAWAII

DATE:   
 FILENAME:   
 PROJ. No.





- Legend:**
- Property Line
  - Permitted Limit of Waste
  - Infiltration Ditch
  - ~ Drainage Pattern
  - Downtrain

**FIGURE 2  
SITE MAP**

KEKAHA LANDFILL  
KEKAHA, KAUAI, HAWAII

DATE:	06/07/16
FILENAME:	SITE0616.DWG
PROJ. No.	...



## **APPENDIX A**

### **FIELD FORMS**



**ANNUAL INSPECTION LOG  
KEKAHA LANDFILL  
SURFACE WATER MANAGEMENT PLAN**

**GENERAL INFORMATION**

**Date:**

**Personnel:**

**Weather:**

**Runoff: Yes/No**

**Raining: Yes/No**

**Flow Observed: Yes/No**

**Time since last rainfall event:**

**Type of flow: Sheet/Rill/Concentrated**

	<u>Inspection List</u>	Yes/No/NA	If Yes, Describe Follow-up Action (if any)
<b>Landfill Cover</b>	Gullies caused by erosion		
	Indicators of leachate seepage		
<b>Active Areas</b>	Properly graded and bermed		
<b>Drainage</b>	Sediment in slope drain inlets		
	Sediment in infiltration drainage ditches		
	Downdrains containing all runoff		
<b>Infiltration Basin</b>	Inlet obstructed		
<b>Site Facilities</b>	Sediments on pavement or in catch basins		
	Exposure of other pollutants		
	Oil/Water Separator operating properly		
<b>Access Roads</b>	Evidence of erosion		

**POST-STORM INSPECTION FORM  
KEKAHA LANDFILL  
SURFACE WATER MANAGEMENT PLAN**

Date: \_\_\_\_\_

Inspector: \_\_\_\_\_

Current Weather Conditions: \_\_\_\_\_

Landfill Cover Area:

- |   |                              |                             |
|---|------------------------------|-----------------------------|
| Evidence of ponded water in active area?      | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Evidence of erosion and/or daylighted refuse? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Gullies caused by erosion                     | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Indicators of leachate seepage                | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

Surface Water Drainage Controls:

- |  |                              |                             |
|--|------------------------------|-----------------------------|
| Sediment in downdrains?                              | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Downdrains containing all runoff?                    | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Are infiltration ditches clear of debris and litter? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Are culverts free of debris to convey storm water?   | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

Surface Water Infiltration Basin:

- |  |                              |                             |
|--|------------------------------|-----------------------------|
| Is the infiltration basin structurally sound?  | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Is the inlet to infiltration basin obstructed? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

Perimeter Observations:

- |   |                              |                             |
|---|------------------------------|-----------------------------|
| Evidence of erosion on access roads?        | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Evidence of surface water leaving the site? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

Describe deficiency:			
Corrective Action Required:			
Assigned to ( <i>Print</i> ):	Complete By ( <i>Date</i> ):	Completed On ( <i>Date</i> ):	Initials

Describe deficiency:			
Corrective Action Required:			
Assigned to ( <i>Print</i> ):	Complete By ( <i>Date</i> ):	Completed On ( <i>Date</i> ):	Initials

Describe deficiency:			
Corrective Action Required:			
Assigned to ( <i>Print</i> ):	Complete By ( <i>Date</i> ):	Completed On ( <i>Date</i> ):	Initials

Describe deficiency:			
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Describe deficiency:			
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Assigned to ( <i>Print</i> ):	Complete By ( <i>Date</i> ):	Completed On ( <i>Date</i> ):	Initials



**SECTION VI**

**GROUNDWATER AND LEACHATE MONITORING PLAN**



**GROUNDWATER AND LEACHATE  
MONITORING PLAN  
KEKAHA SANITARY LANDFILL  
KEKAHA, KAUA'I, HAWAI'I**

**County of Kaua'i**  
**Department of Public Works**  
4444 Rice Street, Room 275  
Lihu'e, Kaua'i 96766

October 2017

**GROUNDWATER AND LEACHATE  
MONITORING PLAN  
KEKAHA SANITARY LANDFILL  
KEKAHA, KAUA'I, HAWAII**

**Prepared for:**

**County of Kaua'i**  
**Department of Public Works**  
4444 Rice Street, Room 275  
Lihu'e, Kaua'i 96766

**Prepared by:**

**AECOM Technical Services, Inc.**  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813-3698

October 2017

### **Qualified Groundwater Scientist Certification**

I declare to the best of my professional knowledge and belief, I meet the definition of a Qualified Groundwater Scientist as defined in HAR Title 11 Chapter 58.1-16. By means of this Certification/Re-Certification, I attest that this Groundwater Monitoring Plan satisfies the requirements and criteria of HAR Title 11 Chapter 58.1-16: the number, locations, and depths of the proposed groundwater monitoring network will yield samples that will adequately represent the quality of background groundwater, and will represent the quality of groundwater passing the relevant point of compliance.

Upon approval of this monitoring plan, this certification will be placed in the operating record.

A handwritten signature in black ink, reading "Thomas F. Hanneman", written over a horizontal line.

Thomas Hanneman, P.E.  
Senior Environmental Engineer  
AECOM Environment  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813

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## ACRONYMS AND ABBREVIATIONS

%	percent
°C	degree Celsius
µg/L	microgram per liter
ASTM	ASTM International
ASD	alternate source demonstration
bgs	below ground surface
CaCO <sub>3</sub>	calcium carbonate
CFR	Code of Federal Regulations
COC	chain-of-custody
COD	chemical oxygen demand
CUSUM	cumulative sum
DOH	Department of Health, State of Hawai'i
DQR	data quality review
EPA	Environmental Protection Agency, United States
FR	Federal Register
ft	foot or feet
GLMP	groundwater and leachate monitoring plan
H <sub>2</sub> SO <sub>4</sub>	sulfuric acid
HAR	Hawai'i Administrative Rules
HCl	hydrochloric acid
HNO <sub>3</sub>	nitric acid
ID	identification
IDW	investigation-derived waste
KLF	Kekaha Sanitary Landfill
MDL	method detection limit
mg/L	milligram per liter
mL	milliliter
MS	matrix spike
MSD	matrix spike duplicate
msl	mean sea level
MSW	municipal solid waste
MW	monitoring well
NaOH	sodium hydroxide
no.	number
PCE	tetrachloroethylene
POC	point-of-compliance
PQL	practical quantitation limit
QA	quality assurance
QAPP	quality assurance program plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
SSI	statistically significant increase
TDS	total dissolved solids
TOC	total organic carbon
U.S.	United States
USGS	United States Geological Survey
VOA	volatile organic analysis
VOC	volatile organic compound

WBZ                      water bearing zone  
WMH                      Waste Management of Hawaii

## 1.0 INTRODUCTION

This Groundwater and Leachate Monitoring Plan (GLMP) describes methods and procedures for monitoring groundwater and leachate for the Kekaha Sanitary Landfill (KLF). This GLMP replaces the previous *Groundwater Monitoring Plan Kekaha Landfill Phase II*, (AECOM 2013) and the *Revised Groundwater Monitoring Plan, Kekaha Landfill Phase I* (Earth Tech 2004). The County of Kaua'i (County) owns the KLF, which is located near the town of Kekaha on the coastal plain on the southwest side of the island of Kaua'i.

### 1.1 SITE BACKGROUND

The KLF is located near the southwest coast of the Island of Kaua'i, about 2 miles west of the town of Kekaha, at mile marker 28 of Kaunuaui'i Highway (Highway 50). As shown on Figure 1-1, the seaward boundary of the landfill site is located approximately 4,000 feet (ft) northeast of the ocean shoreline. The KLF facility, as permitted, currently consists of two noncontiguous landfill phases, the Phase I landfill and the Phase II landfill.

The KLF Phase I landfill occupies approximately 33 acres and varies in elevation from approximately 10 to 49 ft above mean sea level (msl). The County opened the Phase I landfill in 1953, and accepted solid wastes at the facility until operations ceased on October 8, 1993. The Phase I landfill has no liner system beneath the refuse; however, the final cover of the Phase I Landfill was designed and constructed in accordance with the following environmental rules and regulations in effect at the time of construction:

- Y United States (U.S.) Environmental Protection Agency (EPA) *Solid Waste Disposal Facility Criteria*, under Resource Conservation and Recovery Act (RCRA) Subtitle D, published as 40 Code of Federal Regulations (CFR) Part 258.
- Y State of Hawai'i Department of Health (DOH) *Solid Waste Management Control and Interim Guidelines for Landfill Closure*, Draft, Hawai'i Administrative Rules (HAR) Title 11, Chapter 58.

The KLF Phase II landfill was constructed in 1993 and is bounded by Kaunuaui'i Highway to the northeast, an unpaved access road and agricultural area to the southeast, an aquaculture facility to the northwest, and the Phase I Landfill to the southwest. The Phase II Landfill was constructed to meet RCRA Subtitle D criteria and is currently an active municipal solid waste (MSW) landfill. The Phase II landfill facility is co-operated by Waste Management of Hawaii, Inc. (WMH).

Since it opened in 1993, the Phase II landfill has been expanded four times: three vertical expansions (1998, 2005, and 2014) and one lateral expansion (2010). The County of Kaua'i is now proposing a second lateral expansion, designated Cell 2, to provide additional airspace while a potential future landfill site is being permitted.

The most recent lateral expansion of the Phase II landfill was designated as Cell 1, which was constructed in 2010 and added approximately 6.4 acres to the west end of the Phase II landfill, increasing the total permitted footprint of the Phase II landfill to 38.5 acres. Unless otherwise noted, the term "Phase II landfill" as used in this GLMP includes all of the original Phase II landfill area, the Cell 1 lateral expansion, and the three vertical expansions.

The proposed Cell 2 lateral expansion will fill the area between the southwest bank of the Phase II landfill and the northeast bank of the unlined Phase I landfill (Figure 1-1). Construction of the Cell 2 expansion will create a continuous Subtitle D base liner system that underlies all of the Phase II landfill, including Cell 2. Cell 2 will extend the permitted footprint of the lined Phase II landfill by approximately 6.6 acres and provide an estimated 947,500 cubic yards of gross airspace based on a final cover elevation of 120 ft above msl. If current landfill waste density and daily disposal rates remain consistent, the Cell 2 expansion is expected to extend the operating life of the Phase II landfill by approximately 7.5 years.

## 1.2 PROGRAM OVERVIEW

This GLMP describes the methods and procedures developed to monitor groundwater and leachate for the KLF Phases I and II. Locations of the existing monitoring wells (MWs) are shown on Figure 1-2.

All elements of the monitoring program described in this GLMP comply with the following regulations and permit requirements:

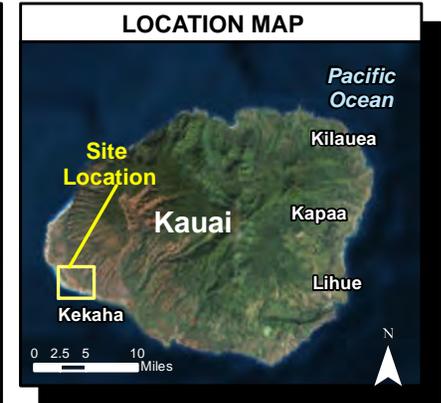
- Y 40 CFR part 258 (Subtitle D).
- Y Chapter 342H, Hawai'i Revised Statutes.
- Y HAR, Title 11 – DOH, Chapter 58.1 – *Solid Waste Management Control* (DOH 1994).
- Y *State of Hawai'i Landfill Groundwater Monitoring Guidance Document* (DOH Guidance Document), Version 1.8 – September 2002 – DOH Solid and Hazardous Waste Branch (DOH 2002).
- Y The KLF Phase II is currently authorized to operate under Permit Number (No.) LF-0052-13 issued by the DOH on March 5, 2014. This GLMP also complies with the conditions in the Draft Cell-2 Permit No. LF-0053-09, dated April 29, 2013.

The State of Hawai'i is authorized to implement 40 CFR Part 258 (Subtitle D), and has adopted all elements of this federal statute into applicable state regulations (listed above), the facility permit (Permit No. LF-0052-13), and Draft Cell-2 permit (Permit No. LF-0053-09 dated April 29, 2013). The activities described in this plan constitute the monitoring program proposed for the KLF. This GLMP will serve as a technical guidance document for personnel performing site monitoring during the active life of the facility, and during the closure and post-closure periods.

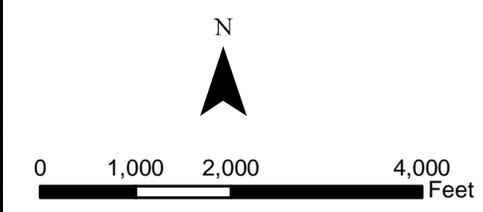
The KLF groundwater monitoring program described in this GLMP is based on the distinct hydrogeologic characteristics of the area. Groundwater monitoring involves the effective use of monitoring parameters (or "indicator" parameters) and locations to provide the earliest possible detection of a potential release from a facility.

The objective of this groundwater monitoring program is to select proper sampling locations and parameters, estimate background concentration ranges for groundwater in the landfill area (i.e., local groundwater that has not been affected by chemicals released from the KLF), and evaluate potential changes in water quality using an effective statistical methodology. The statistical methodology must be environmentally sensitive and account for the probability of false positive (i.e., indication of a release when none exists) and false negative errors (i.e., falsely concluding there is no release).

The monitoring activities outlined in this GLMP will be performed to verify attainment of performance objectives for the site at appropriate points of compliance, in accordance with Solid Waste Disposal Facility Criteria (and its revisions), initially promulgated on October 9, 1991, in 40 CFR Part 258 (Subtitle D). Environmental monitoring is required at the KLF in accordance with conditions specified in the facility permit LF-0052-13 issued by DOH on March 5, 2014, and the Draft Cell-2 Permit issued on April 28, 2013.



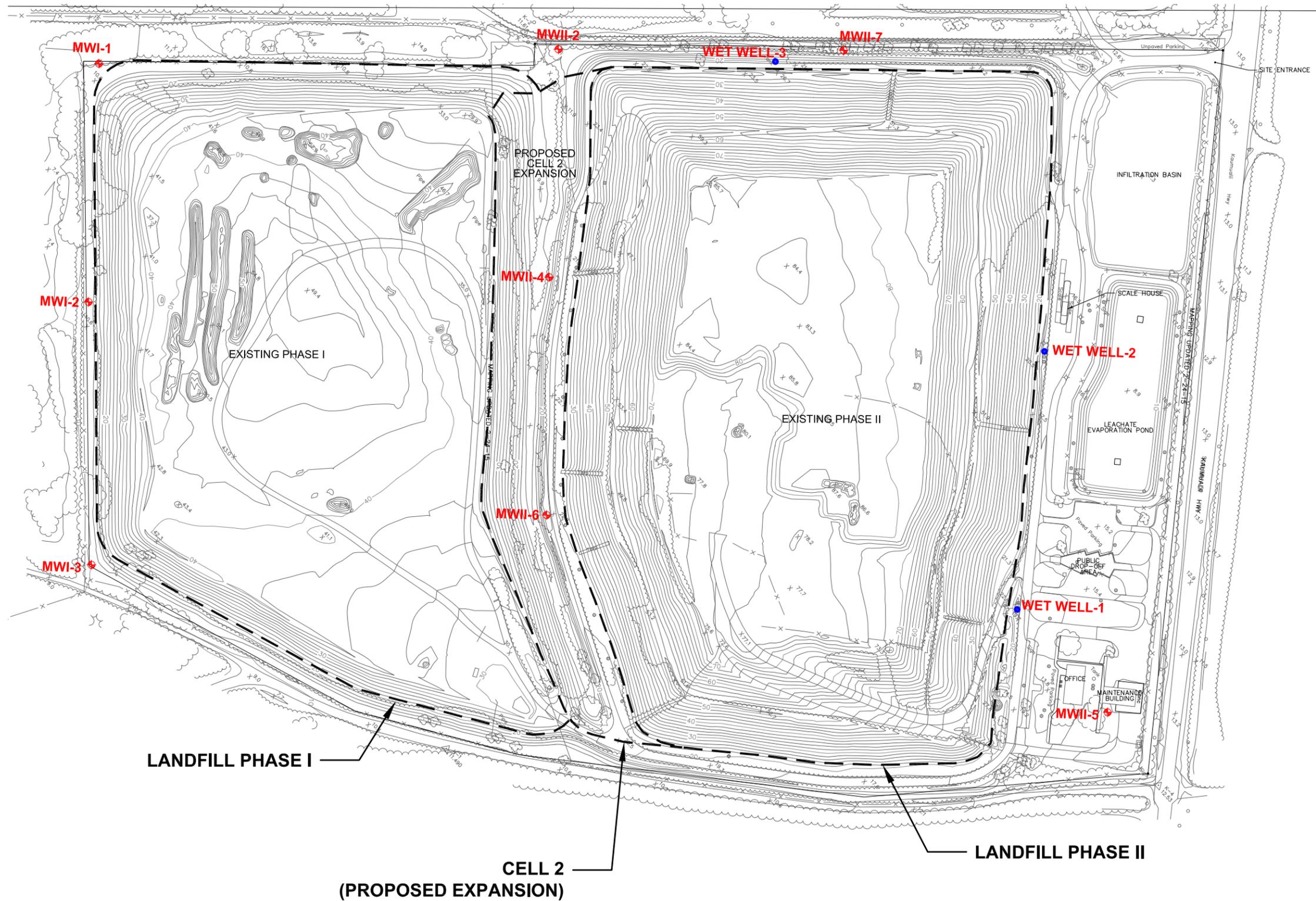
- NOTES**
1. Map projection is Hawaii State Plane, Zone 4, NAD83.
  2. Location Map Source: ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid,GN, IGP, swisstopo, and the GIS User Community.
  3. Site Location Map Source:  
Citation\_Information:  
Originator:  
DigitalGlobe, Inc. (DG) and NRCS.  
Publication\_Date: 2014  
Title: Digital Globe and NRCS DOQ



**Figure 1-1**  
**Site Location Map**  
**Kekaha Sanitary Landfill**  
**Kauai, Hawaii**



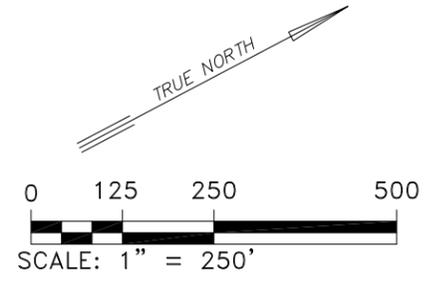
S:\Projects\Legacy\BHV\Non-Federal\County of Kauai\0197394 KAUAI-Vehole Cell 2\07 Deliverables\04 Tables\Task 10 Off Min Plan\05 GFI\2\_015\_LMNetwork.dwg 08/20/16 3:19 PM named



LEGEND	
	GROUNDWATER MONITORING WELL
	LEACHATE WET WELL

NOTES	
1. GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A FEBRUARY 2015 AERIAL SURVEY.	



**Figure 1-2  
Existing KLF  
Monitoring Well Network**



Kekaha Sanitary Landfill, Kaua'i, Hawai'i



## 2.0 HYDROGEOLOGIC SETTING

The KLF is located within the Kekaha-Mana coastal plain, approximately 4,000 ft northeast of the Pacific Ocean shoreline. The arch-shaped coastal plain covers an area approximately 15 miles long and 2 miles wide between the leeward shore of Kaua'i and the slopes of the interior mountains.

The coastal plain is a relatively flat outwash plain composed of alluvium washed down from the uplands, calcareous and earthy lagoon deposits, and calcareous beach and dune sands. Surface soils in the site area are classified in the Jaucas-Mokuleia Association, and are more specifically defined as Jaucas loamy fine sands that are deep, nearly level to moderately sloping, excessively drained and well drained soils that have coarse-textured underlying materials (USDA SCS 1972).

### 2.1 CLIMATE AND TOPOGRAPHY

The Kekaha-Mana coastal plain is relatively arid compared to the rest of Kaua'i due to the "rain-shadow" effect. Average annual rainfall in the area averages between 10 to 40 inches per year, while areas near the center of the island average more than 280 inches of rain per year (Oregon Climate Service 1998).

### 2.2 REGIONAL GEOLOGY

The geologic formations of the Kekaha-Mana coastal plain consist primarily of older alluvium and contemporary coralline and marl sedimentary rocks of marine, littoral, and terrestrial origin (Sanifill and Baquerizo 1996). These sedimentary rocks were deposited in lagoon and estuarine environments and in a flanking terrestrial environment. The thickness of the coastal plain sedimentary deposits ranges from zero on the inland edge to more than 400 ft along the seaward edge of the plain. The surface deposits extend to depths of approximately 50 ft below ground surface (bgs), and consist predominantly of loose sand, coral fragments, and shell debris. The sedimentary deposits beneath the KLF are estimated to be over 400 ft thick, and are underlain by basalt; the top of the basalt is a drowned, wave-cut bench sloping gently seaward (Sanifill and Baquerizo 1996).

### 2.3 REGIONAL HYDROGEOLOGY

Two aquifers with distinctly different hydrogeologic properties underlie the Kekaha-Mana coastal plain: a coastal plain aquifer within the near-surface sedimentary (caprock) deposits and a deep aquifer within the underlying fractured basalt. The basaltic aquifer occurs within lava flows of the Nāpali Formation. This aquifer typically yields large quantities of water from wells and shafts with relatively little drawdown, reflecting generally high hydraulic conductivity, estimated by the U.S. Geological Survey (USGS) as approximately 400 ft per day. Saturated sediments of the caprock formation (the caprock aquifer) overlie the basaltic aquifer and retard the seaward discharge of groundwater from the deeper aquifer. According to the USGS, the regional average hydraulic conductivity of the coastal plain aquifer is relatively low, i.e., approximately 0.12 ft per day (Burt 1976).

The uppermost groundwater at the KLF is encountered within the coastal plain aquifer at approximately 5–7 ft bgs, which is about 3–5 ft above msl. The water table level in the site area is artificially controlled by pumping stations in the area operated and maintained by the State of Hawaii Agribusiness Development Corporation and the Kekaha Agricultural Association, in coordination with the U.S. Navy. The primary pumping station in the Kekaha area (Kawaiele) is a drainage pumping station comprised of three pumps that can achieve a flow of 50 million gallons per day. If the groundwater management system pumps were shut down, lower elevations on the Mana Plain would be flooded due to a rise in the groundwater level (Sanifill and Baquerizo 1996).

### 2.4 SITE GEOLOGY

Borings have been advanced to more than 50 ft below existing grade without reaching the bottom of the coastal plain aquifer, and it is estimated that the thickness of the coastal plain aquifer may

exceed 400 ft beneath the landfill area (Sanifill and Baquerizo 1996). The upper 50 ft of these deposits consist of surficial alluvial sediments composed of loose, sand-size coral and shell debris. Below a depth of 50 ft, these deposits become increasingly consolidated and indurated, and represent the coralline and marl sedimentary rocks reported in regional investigations.

## 2.5 SITE HYDROGEOLOGY

Shallow groundwater underlying the KLF occurs within the surficial sedimentary deposits of the coastal plain aquifer; the water table elevation ranges from approximately 1 to 5 ft above msl. The historical water level monitoring data indicate that groundwater typically flows toward the ocean in a west-southwest direction, with a hydraulic gradient of approximately 0.0005 ft per foot. As shown on the groundwater table contour maps presented in Appendix A, the historical monitoring data indicate that the direction of groundwater flow at the site can periodically shift more than 90 degrees toward the north and more than 60 degrees toward the south relative to the typical west-southwest flow direction. However, the magnitude of the hydraulic gradient during these periodic shifts is small compared to the prevailing seaward-directed gradient, and at times the gradient becomes essentially flat, suggesting that inland-directed flow is relatively insignificant.

Several factors may contribute to apparent periodic shifts in the groundwater flow direction at the landfill. The direction of the local hydraulic gradient is likely affected by variations in pumping rates for the groundwater management system wells and other production wells near the site, including the water levels maintained in the irrigation canals near the site. These nearby wells are used to supply water for irrigation and other non-potable purposes, and to draw down the groundwater table to prevent saturation of surface soil by the brackish groundwater, thus allowing cultivation of sugarcane and other crops on the Mana Plain. Infiltration from leaks in the aquaculture (shrimp farm) ponds located immediately northwest of the Phase II Landfill site also may contribute to periodic localized fluctuations in the magnitude and direction of the hydraulic gradient. Similarly, the landfill's storm- and surface-water control systems, particularly the infiltration basin, may affect localized groundwater flow patterns, especially after rain events. As discussed below, tidal study results suggest that tidal effects do not significantly influence the prevailing groundwater flow direction; however, short-term tidal effects may also contribute to the flow direction and gradient variations indicated by the historical monitoring data.

Although the shallow groundwater beneath the KLF occurs within the caprock formation, the local hydraulic conductivity is significantly greater than the 0.12 ft per day regional average value reported by the USGS (Burt 1976). The results of an aquifer test performed during the week of October 16, 1995, indicate that the hydraulic conductivity of the caprock aquifer underlying the KLF site is approximately 162 ft per day ( $6 \times 10^{-2}$  centimeters per second). The aquifer test was implemented by pumping MWI-1 (Figure 1-2) at a rate of 0.56 cubic ft per minute for approximately 36 hours while measuring the corresponding drawdown at MWII-5. The hydraulic conductivity value reported from this test is approximately three orders of magnitude greater than the 0.12 ft per day value reported by the USGS for the regional coastal plain sedimentary aquifer (Burt 1976). This difference is likely due to the unconsolidated nature of the surficial alluvial sediments in the shallow coastal plain aquifer underlying the KLF. Based on previous geotechnical investigations of soil types, and the relatively flat hydraulic gradients, the higher conductivity value is likely more representative of site conditions than the lower value reported in the literature.

The vertical component of groundwater flow at the site is negligible; therefore, the groundwater flows horizontally beneath the facility, ultimately discharging to the ocean southwest of the site. The KLF MWs therefore target the upper interval of the coastal plain aquifer.

### 2.5.1 Tidal Effects

Recharge to the uppermost water bearing zone (WBZ) of the coastal plain aquifer underlying the KLF occurs in the upland areas northeast of the facility. Groundwater flows from the higher elevations to the northeast, through the Nāpali basalts, and into the sedimentary coastal plain

aquifer. The groundwater enters the coastal sedimentary units at their contact with the upland basalts, flows seaward, and discharges to the Pacific Ocean. Total dissolved solids (TDS) concentrations increase significantly from inland (Mauka) areas to seaward (Makai) areas as the groundwater flows through the coastal sediments and mixes with sea water. However, the results of an April 1994 tidal study indicate that tidal effects do not significantly influence the prevailing groundwater flow direction within the coastal plain aquifer at the site (Sanifill and Baquerizo 1996).

### **2.5.2 Hydrogeochemistry**

Spatial and temporal variations in the hydrogeochemical characteristics of groundwater at the KLF are significant due to the effects of seawater intrusion, which vary during the tidal cycle and with distance from the shoreline. The TDS and major cation and anion concentrations (i.e., calcium, potassium, magnesium, chloride, bicarbonate, and sulfate) indicate a significant degree of natural chemical variability at the site. Infiltration from the aquaculture (shrimp farm) ponds located immediately northwest of the Phase II Landfill site also contributes to variations in the hydrogeochemical characteristics of groundwater at the KLF.



### 3.0 GROUNDWATER MONITORING

This section describes the KLF groundwater monitoring program, including details of the MW network, the monitoring parameters, and the sampling schedule. The monitoring program utilizes an intra-well detection monitoring approach in accordance with HAR Title 11, Chapter 58.1 and the DOH *State of Hawai'i Landfill Groundwater Monitoring Guidance Document* (DOH 2002) to evaluate whether leachate from the KLF may be impacting groundwater.

#### 3.1 GROUNDWATER MONITORING NETWORK

The groundwater monitoring network currently consists of eight wells: MWI-1, MWI-2, MWI-3, MWII-2, MWII-4, MWII-5, MWII-6, and MWII-7 (Figure 1-2). Proposed modifications to the KLF MW network (Figure 3-1) are as follows:

- Ÿ A new well (MWII-8) is proposed to be constructed along the landfill perimeter road at the southeast end of the Cell 2 expansion area. MWII-8 will be downgradient of the Phase II waste cells under the prevailing groundwater flow conditions and when the flow direction shifts toward the south.
- Ÿ An additional upgradient well (MWII-9) is proposed to further evaluate the potential impact of off-site chemical sources.
- Ÿ Existing wells MWII-4 and MWII-6 are located within the proposed Cell 2 expansion area and will therefore be decommissioned during the Cell 2 construction.
- Ÿ Large amounts of organic material are present within wells MWI-1, MWI-2, and MWI-3 due to penetration by tree roots. Therefore, these three wells will be abandoned and replaced with new wells (MWI-1A, MWI-2A, and MWI-3A) installed at locations approximately twenty five feet downgradient of the current well locations (or just inside the fence line of the landfill property if permission for well installation cannot be obtained from the owner of the adjacent property [Hawaii National Guard]).
- Ÿ Groundwater chemistry for all new wells will be established based on comprehensive data representing at least eight quarterly sampling events and the full range of background parameters, as discussed below in Section 3.3.

The rationale for the network well placement is based on the local groundwater flow direction and the location of the potential contaminant source area at the site. The targeted detection monitoring zone is defined as the hydrostratigraphic unit nearest to the natural ground surface that provides the earliest possible detection of a potential release from the facility. Groundwater MWs at the KLF are therefore positioned so that their well screens lie at the top of the upper-most WBZ within the coastal plain aquifer. Well construction details are presented in Table 3-1. The function of each well is described in Table 3-2. The new MWs will be constructed in accordance with the *Landfill Groundwater Monitoring Guidance Document* (DOH 2002), ASTM International (ASTM) D5092 (ASTM 2004b).

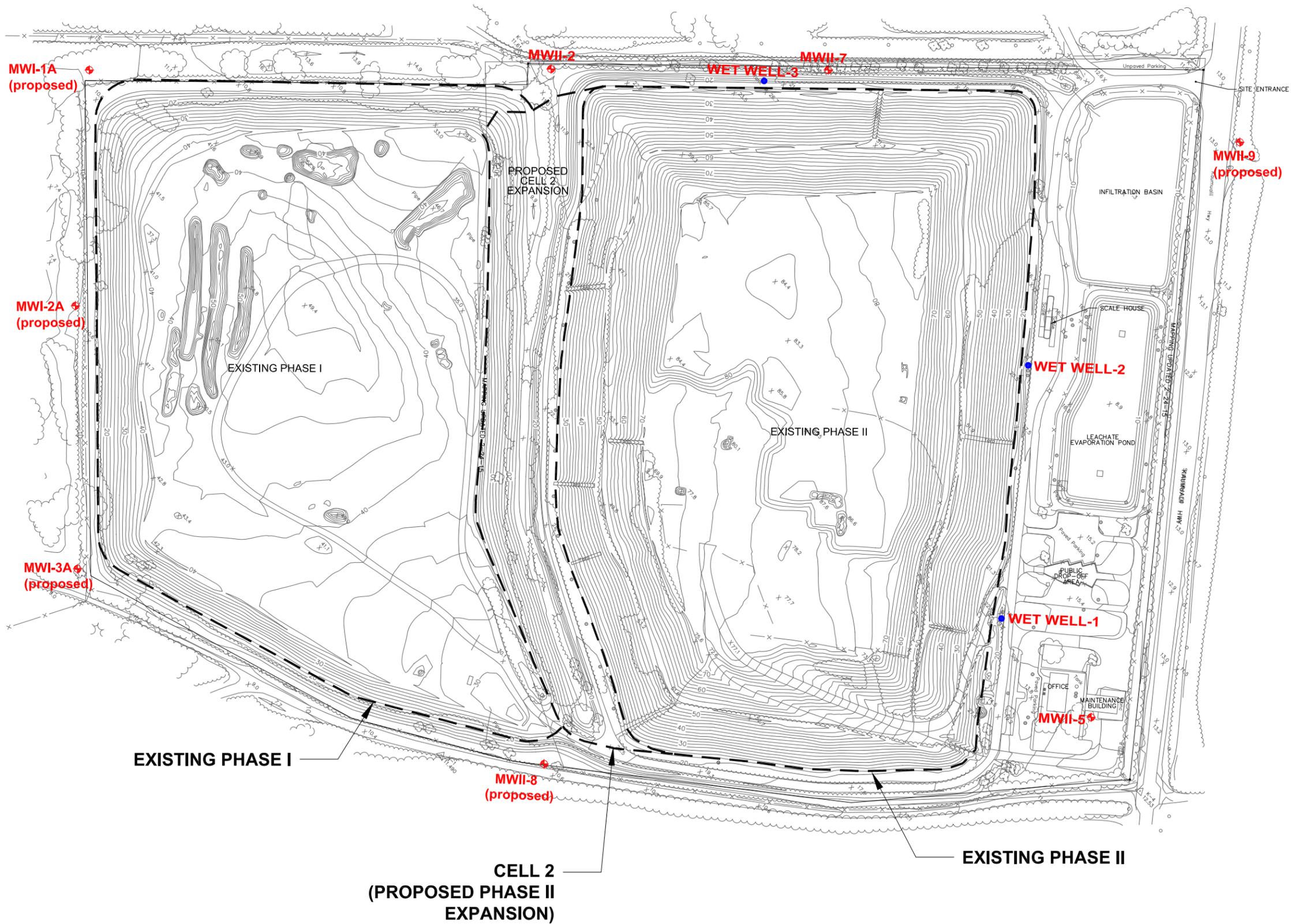
MW inspections will be performed during all routine groundwater monitoring events, or more frequently if necessary. The groundwater sampling team will visually inspect each well and the surrounding area and record the observations on a well inspection form (Appendix C). Information to be documented as part of each well inspection includes the following:

- Ÿ Condition of the well identification plate or sign
- Ÿ Evidence that the well was recently painted
- Ÿ Condition of the locking mechanism to confirm that the well is locked and the key works
- Ÿ The integrity of well construction and sampling equipment including:

- Physical surroundings (e.g., high weeds, standing water, cleanliness, nearby activities)
  - Condition of dedicated pumps
  - Condition of protective casing
  - Obstructions or kinks in well casing
  - Condition of concrete footing (e.g., cracked or raised concrete, water in annular space)
  - Grease around top of well on threaded caps
  - Fit of cap
- ÿ Weather conditions during observations including:
- Wind direction (as necessary to evaluate the potential impact of upwind sources of volatile chemicals)
  - Whether or not sampling was performed downwind
- ÿ Visible evidence of contamination
- ÿ Well “guard-post” condition (if applicable)



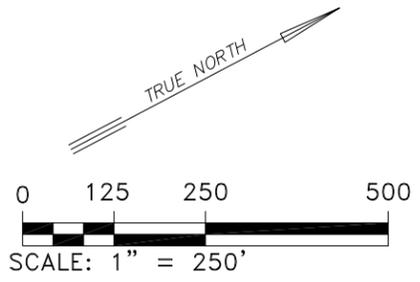
S:\Projects\Legacy\BVI\Non-Federal\County of Kauai\0187894\_KAUAI-Kekaha Cell 2\07\_Deliverables\Old Tasks\TASK 10 Off Man Plan\05\_Gfigs-1\_ProposedNetwork.dwg 08/20/16 3:48 PM namod



LEGEND	
	GROUNDWATER MONITORING WELL
	LEACHATE WET WELL

NOTES	
1.	GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A FEBRUARY 2015 AERIAL SURVEY.



**Figure 3-1  
Proposed KLF  
Monitoring Well Network**



Kekaha Sanitary Landfill, Kaua'i, Hawai'i



**Table 3-1: Monitoring Well Construction Specifications**

MW ID No.	MW Location	Easting	Northing	Top of Casing Elevation <sup>a</sup> (ft msl)	Total Well Depth <sup>b</sup> (ft btoc)	Boring Diameter (in.)	Well Diameter (in.)	Elevation of Well Screen Interval <sup>c</sup> (ft msl)
MWI-1	Northwest corner of Phase I Landfill	1554884.42	54475.73	13.58	18.0	8	2	8.0 above msl to 7.0 below msl
MWI-1A (proposed replacement well)	Suitable nearby location downgradient of existing well	TBD	TBD	TBD	TBD	10	2	8.0 above msl to 12.0 below msl <sup>a</sup>
MWI-2	Midway between northwest and southeast corners of Phase I Landfill	1555269.57	54077.57	12.27	18.0	8	2	6.5 above msl to 8.5 below msl
MWI-2A (proposed replacement well)	Suitable nearby location downgradient of existing well	TBD	TBD	TBD	TBD	10	2	8.0 above msl to 12.0 below msl <sup>a</sup>
MWI-3	Southeast corner of Phase I Landfill	1555724.07	53666.07	12.58	18.0	8	2	7.0 above msl to 8.0 below msl
MWI-3A (proposed replacement well)	Suitable nearby location downgradient of existing well	TBD	TBD	TBD	TBD	10	2	8.0 above msl to 12.0 below msl <sup>a</sup>
MWII-2	Northwest end of Phase II Landfill Cell #2; adjacent to site boundary fence line and MWII-1	1555586.09	55282.30	14.70	18.0	10	2	7.7 above msl to 2.3 below msl
MWII-4	Midway between northwest and southeast corners of Phase II Landfill Cell #2; adjacent to MWII-3	1556009.39	54892.15	20.38	13.0	10	2	17.4 above msl to 7.4 above msl
MWII-5	Northeast of Phase II Landfill Cell #1; adjacent to office building	1557574.44	55178.02	12.41	13.0	10	2	9.4 above msl to 0.6 below msl
MWII-6	Southwest of Phase II Landfill Cell #2	1556410.64	54512.11	22.14	38.0	10	2	7.1 above msl to 12.9 below msl
MWII-7	Northwest of Phase II Landfill Cell #1; adjacent to site boundary fence line	1556039.23	55767.77	10.16	26.0	10	2	4.7 above msl to 15.3 below msl

MW ID No.	MW Location	Easting	Northing	Top of Casing Elevation <sup>a</sup> (ft msl)	Total Well Depth <sup>b</sup> (ft btoc)	Boring Diameter (in.)	Well Diameter (in.)	Elevation of Well Screen Interval <sup>c</sup> (ft msl)
MWII-8 (proposed new well)	Southeast end of Phase II Landfill Cell #2; along the Landfill perimeter road	TBD	TBD	TBD	TBD	10	2	8.0 above msl to 12.0 below msl <sup>a</sup>
MWII-9 (proposed new well)	North of Phase II Landfill; northwest of leachate pond; along landfill perimeter fence	TBD	TBD	TBD	TBD	10	2	8.0 above msl to 12.0 below msl <sup>a</sup>

Note: Well installation logs are provided in Appendix B.

btoc below top of casing

dia. diameter

ID identification

in. inch

TBD to be determined

<sup>a</sup> Estimated; to be surveyed or measured upon completion.

<sup>b</sup> Top of casing elevations are from the December 2011 survey conducted by Honua Engineering, Inc.

<sup>c</sup> Estimated; based on MW construction logs.

<sup>d</sup> Estimated; based on HLA (1993) and December 2011 Honua Engineering, Inc. survey.

<sup>e</sup> Estimated; based on depth of screen interval.

<sup>f</sup> Well construction details are from HLA (1993) and AMEC (2008).

<sup>g</sup> Groundwater elevation data range between July 12, 1999, through May 31, 2015.

**Table 3-2: Proposed Groundwater Monitoring Well Network Summary**

MW ID No.	MW Location	Function of Well as Part of KLF Groundwater Monitoring Network
MWI-1A (proposed replacement well)	Southwest corner of Phase I Landfill; adjacent to site boundary fence line.	Point of compliance (POC) well for long-term monitoring of groundwater level and chemistry in the shallow WBZ downgradient or crossgradient of the Phase I Landfill (depending on groundwater flow conditions at the time of monitoring). This well will be monitored on a quarterly basis until background groundwater chemistry has been established.
MWI-2A (proposed replacement well)	South end of Phase I Landfill; adjacent to site boundary fence line.	POC well for long-term monitoring of groundwater level and chemistry in the shallow WBZ downgradient or crossgradient of the Phase I Landfill (depending on groundwater flow conditions at the time of monitoring). This well will be monitored on a quarterly basis until background groundwater chemistry has been established.
MWI-3A (proposed replacement well)	Southeast corner of Phase I Landfill; adjacent to site boundary fence line.	POC well for long-term monitoring of groundwater level and chemistry in the shallow WBZ downgradient or crossgradient of the Phase I Landfill (depending on groundwater flow conditions at the time of monitoring). This well will be monitored on a quarterly basis until background groundwater chemistry has been established.
MWII-2	Northwest end of Phase II Landfill Cell #2; adjacent to site boundary fence line.	POC well for long-term monitoring of groundwater level and chemistry in the shallow WBZ downgradient or crossgradient of the Phase II Landfill (depending on groundwater flow conditions at the time of monitoring). Background groundwater chemistry has already been established for MWII-2; therefore, this well will be monitored on a semi-annual basis for intra-well detection monitoring.
MWII-5	Northeast of Phase II Landfill Cell #1; adjacent to office building.	POC well for long-term monitoring of groundwater level and chemistry in the shallow WBZ northeast of the Phase II Landfill. Background groundwater chemistry has already been established for MWII-5; therefore, this well will be monitored on a semi-annual basis for intra-well detection monitoring.
MWII-7	Northwest of Phase II Landfill Cell #1; adjacent to site boundary fence line.	POC well for long-term monitoring of groundwater level and chemistry in the shallow WBZ downgradient or crossgradient of the Phase II Landfill (depending on groundwater flow conditions at the time of monitoring). Background groundwater chemistry has already been established for MWII-7; therefore, this well will be monitored on a semi-annual basis for intra-well detection monitoring.

MW ID No.	MW Location	Function of Well as Part of KLF Groundwater Monitoring Network
MWII-8 (proposed new well)	Southeast end of Phase II Landfill Cell #2; adjacent to perimeter road.	POC well for long-term monitoring of groundwater level and chemistry in the shallow WBZ downgradient or crossgradient of the Phase II Landfill (depending on groundwater flow conditions at the time of monitoring). After background groundwater chemistry has been established based on data representing at least eight quarterly sampling events, this well will be monitored on a semi-annual basis for intra-well detection monitoring.
MWII-9 (proposed new well)	North of Phase II Landfill; northwest of leachate pond; adjacent to site boundary fence line.	Upgradient MW for long-term monitoring of groundwater level and chemistry in the shallow WBZ upgradient of the Phase II Landfill. After background groundwater chemistry has been established based on data representing at least eight quarterly sampling events, this well will be monitored on a semi-annual basis for upgradient background monitoring.

### 3.2 GROUNDWATER DETECTION MONITORING PARAMETERS

The technical rationale used to select appropriate monitoring parameters for the KLF groundwater monitoring program is based on: (1) HAR Title 11, Chapter 58.1 (DOH 1994), (2) the *State of Hawaii Landfill Groundwater Monitoring Guidance Document* (DOH 2002), and (3) historical data representing concentrations of the chemical constituents present in the local groundwater and the Phase II Landfill leachate.

HAR Title 11, Chapter 58.1 (DOH 1994) specifies that MSW landfills should routinely monitor groundwater for the 15 metals and 47 volatile organic compounds (VOCs) listed in Appendix I of Chapter 58.1. This is the same list of monitoring parameters contained in the Federal Subtitle D regulations (40 CFR Part 258, Appendix I). This list includes many parameters that are generally viewed as ineffective monitoring parameters because of their limited mobility in most subsurface environments, or because they are not constituents of typical MSW landfill leachate. The EPA intended the Appendix I analytes to be default parameters for use in states that have not yet obtained Subtitle D authorization. In accordance with 40 CFR Part 258.54 (a)(1) and (2), the EPA has allowed authorized states, including Hawai'i, to approve alternative lists of site-specific monitoring parameters. Therefore, this plan describes the approach for selecting site-specific groundwater monitoring parameters for the KLF groundwater monitoring program.

As noted in the *State of Hawaii Landfill Groundwater Monitoring Guidance Document* (DOH 2002), a combination of VOCs plus a carefully selected "short list" of site-specific water quality parameters (referred to herein as "site-specific detection monitoring parameters") will typically provide the most reliable monitoring parameters for most MSW landfills.

VOCs can be highly effective monitoring parameters for providing an early indication of a potential release from a landfill because they are: (1) rarely detected in background groundwater samples; (2) detected more frequently than any other class of organic compounds in MSW landfill leachate; (3) analytically sensitive (i.e., they can be detected at extremely low concentrations); and (4) relatively mobile in groundwater. Although commonly present in MSW landfill leachate, semivolatile organic compounds, as a group, are significantly less mobile than VOCs in most subsurface environments and do not typically provide for substantial additional monitoring benefits.

The detection monitoring parameter data will be subjected to statistical analysis as described in Section 5.0 to identify any statistically significant concentration increases that would trigger assessment monitoring (or an alternate source demonstration [ASD] if the detection is unrelated to a release from the landfill). In addition to VOCs and site-specific detection monitoring parameters, the groundwater samples will be analyzed for supplemental geochemical parameters to provide additional data for evaluating site groundwater conditions. Data representing the supplemental parameters will not be used for routine detection monitoring statistical analysis, but can be used to evaluate local hydrogeologic conditions and distinguish between background groundwater impacts and groundwater impacted by leachate released from the landfill.

### 3.2.1 Approach for Selection of Site-Specific Detection Monitoring Parameters

Site-specific detection monitoring parameters for the KLF groundwater monitoring program have been selected based on regulatory requirements and chemical-specific properties (including persistence, detectability, and mobility). As a class, VOCs are detected more frequently than any other class of organic compounds in MSW landfill leachate. However, other chemical parameters referenced in HAR Title 11, Chapter 58.1 (DOH 1994) are not often found in landfill leachates. Research by Dr. Gibbons and others indicates that in addition to VOCs, certain leachate indicators (e.g., TDS, alkalinity) and metals (e.g., magnesium, calcium, potassium) are more frequently detected in leachate than other constituents specified in the regulations (DOH 2002).

Because of these factors, a detection monitoring program based solely on the extensive list of parameters specified in the HAR Title 11 Chapter 58.1 regulations would be less effective than a program based on site-specific background groundwater and leachate chemistry data. Appropriate detection monitoring parameters for the KLF site were therefore identified based on background data representing concentrations of the constituent chemicals detected in both groundwater and leachate at the site, as well as the migration potential of the detected constituents. Characterization of background groundwater and leachate quality becomes progressively more accurate as detection monitoring continues at a site; therefore, the list of site-specific detection monitoring parameters may be updated based on new data as it becomes available (any changes to the list of detection monitoring parameters will require DOH approval).

The first step for selection of site-specific detection monitoring parameters was to identify chemicals that have been detected in the Phase II Landfill leachate at concentrations significantly higher than in groundwater. The resulting list of potential detection monitoring parameters was then refined by identifying and removing parameters that would provide redundant information (e.g., specific conductance and TDS). From the remaining parameters, those anticipated to provide the earliest and most reliable indication of a release were selected as detection monitoring parameters for statistical evaluation purposes. This determination was based on the relative mobility of the chemicals in soil and groundwater, local hydrogeologic conditions, the detectability and likelihood of false positive results for each parameter (based on existing analytical methods), and concentration changes that might be expected during migration through the unsaturated and saturated zones beneath the facility (e.g., due to variations in pH or redox conditions). As described in Section 4.0, an established leachate database exists for KLF Phase II. Leachate samples have been collected from three monitoring points (Wet Wells-1, -2, and -3 [Figure 3-1]) and analyzed for an extensive list of parameters on an annual basis. Wet Wells-1 and -2 have been sampled since 1994 and Wet Well-3 has been sampled since 2010. Analytical parameters include Subtitle D Appendix I constituents, major cations and anions, major leachate indicator parameters, metal constituents, VOCs, and field measurements.

The *State of Hawaii Landfill Groundwater Monitoring Guidance Document* (DOH 2002) recommends that potential detection monitoring parameters should first be screened by calculating the concentration contrast between leachate and groundwater, and suggests that an effective monitoring parameter should exhibit a concentration in leachate at least five times greater than the upper background limit in groundwater. If insufficient contrast exists for a specific chemical, then that chemical may be eliminated from further consideration as a potential site-specific detection monitoring parameter.

The effectiveness of the KLF groundwater monitoring program will be enhanced by using this approach because only those parameters that have been actually detected in the leachate and that pass specific performance criteria are identified as site-specific detection monitoring parameters for statistical evaluation. As leachate data are generated by annual or other leachate sampling events, the detection monitoring parameter list will be re-evaluated and updated, as appropriate. If the data indicate that additional parameters should be added to the detection monitoring list, then background concentrations for the additional parameters will be estimated, and the parameters will be added to the program upon receiving DOH approval. Conversely, if parameters proposed for routine detection

monitoring are not found in the site leachate during repeated sampling events, these parameters may be deleted from the KLF detection monitoring program (also upon receipt of DOH approval).

Average constituent concentrations based on the historical analytical data were calculated for the groundwater wells and leachate sumps (Wet Wells -1, -2, and -3). The ratio between average leachate and groundwater concentrations was then calculated for each constituent. These ratios were then evaluated to identify parameters that show significant differences between concentrations in the Phase II groundwater and the Phase II leachate, and therefore represent potential site-specific detection monitoring parameters.

Table 3-3 lists the constituent concentrations for the groundwater wells and leachate sumps, along with the average concentrations for the groundwater and Phase II leachate, and the corresponding leachate/groundwater concentration ratios. As shown in Table 3-3, five constituents have average leachate/groundwater concentration ratios of five or greater: total alkalinity, total iron, total manganese, chemical oxygen demand (COD), and total organic carbon (TOC). The ratios for dissolved constituents could not be estimated because the leachate samples were not filtered prior to analysis (as required to quantify dissolved concentrations).

### **3.2.2 Site-Specific Detection Monitoring Parameters**

The constituents listed in Table 3-4 were selected as site-specific detection monitoring parameters for intra-well statistical analysis. Data representing these constituents are likely to provide clear indications of a potential leachate release because evaluation of the historical groundwater data and leachate data indicates that (with the exception of arsenic) they have leachate/groundwater concentration ratios of five or greater, and can be readily distinguished from constituents present in the local groundwater due to site-specific hydrogeologic conditions (e.g., the effects of seawater intrusion on groundwater chemistry).



**Table 3-3: Comparison of Phase II Groundwater and Phase II Leachate Data**

Constituent	Units	MWII-2	MWII-4	MWII-5	MWII-6	MWII-7	Wet Well-1	Wet Well-2	Wet Well-3	WET Well AVG	MW AVG	Ratio (Wet Well/MWII)	Acceptable Indicator Parameter	Comments
Alkalinity, bicarbonate (as CaCO <sub>3</sub> )	mg/L	411.11	437.25	328.22	401.21	326.47	1231.47	1566.67	1308.00	1368.71	380.85	3.59	Y	Ratio too Low
Alkalinity, carbonate (as CaCO <sub>3</sub> )	mg/L	5.74	6.43	6.48	6.75	5.00	6.05	5.00	5.00	5.35	6.08	0.88	N	Ratio too Low
Alkalinity, total (as CaCO <sub>3</sub> )	mg/L	411.11	434.04	328.22	401.93	326.47	1231.47	1566.67	1308.00	1368.71	380.35	3.60	Y	Ratio too Low
Ammonia (as n)	mg/L	0.20	1.03	0.43	1.18	0.86	81.85	152.78	3.67	79.43	0.74	107.23	Y	—
Antimony, dissolved	µg/L	10	9.51	10.00	9.49	10.55	NA	NA	NA	0.00	9.91	0.00	N	Dissolved Metals Not Analyzed For Leachate
Antimony, total	mg/L	0.00891	0.01	0.01	0.01	0.01	0.02	0.04	0.06	0.04	0.01	4.17	N	All Non Detect Values
Arsenic, dissolved	mg/L	0.00798	0.022	0.03	0.037	0.01	NA	NA	NA	0.00	0.02	0.00	N	Dissolved Metals Not Analyzed For Leachate
Arsenic, total	mg/L	0.0140	0.02	0.03	0.031	0.01	0.16	0.18	0.02	0.06	0.02	2.81	N	Ratio too Low
Barium, dissolved	µg/L	3.89	5.59	3.55	3.29	8.09	NA	NA	NA	0.00	4.88	0.00	N	Dissolved Metals Not Analyzed For Leachate
Barium, total	mg/L	0.14	0.084	0.0895	0.083	0.01	0.11	0.19	0.10	0.13	0.08	1.64	N	Ratio too Low
Beryllium, dissolved	µg/L	2.85	2.71	2.85	2.85	3.40	NA	NA	NA	0.00	2.93	0.00	N	Dissolved Metals Not Analyzed For Leachate
Beryllium, total	mg/L	0.00155	0.0015	0.002	0.0015	0.00	0.00	0.00	0.01	0.00	0.00	2.45	N	Ratio too Low
Bromide	mg/L	1.28	1.43	1.03	1.53	15.45	7.32	6.59	1.04	4.98	4.15	1.20	N	Ratio too Low
Cadmium, dissolved	µg/L	1.99	2.84	3.30	1.64	2.41	NA	NA	NA	0.00	2.44	0.00	N	Dissolved Metals Not Analyzed For Leachate
Cadmium, total	mg/L	0.0019	0.0029	0.003	0.0025	0.00	0.00	0.00	0.00	0.00	0.00	0.32	N	Ratio too Low
Calcium, dissolved	mg/L	47.35	49.01	41.40	41.24	141.76	NA	NA	NA	0.00	64.15	0.00	N	Dissolved Metals Not Analyzed For Leachate
Calcium, total	mg/L	55.67	53.31	45.28	45.34	144.11	90.65	82.89	50.20	74.58	68.74	1.08	N	Ratio too Low
COD	mg/L	15.21	13.66	14.52	13.18	60.01	271.11	412.22	71.18	251.50	23.31	10.79	Y	—
Chloride	mg/L	306.04	334.82	213.48	337.86	4116.35	402.01	634.44	188.60	408.35	1061.71	0.38	N	Ratio too Low
Chromium, dissolved	µg/L	7.91	10.00	9.29	9.29	7.54	NA	NA	NA	0.00	8.81	0.00	N	Dissolved Metals Not Analyzed For Leachate
Chromium, total	mg/L	0.0077	0.0072	0.01	0.01	0.01	0.03	0.03	0.01	0.02	0.01	2.91	N	Ratio too Low
Cobalt, dissolved	µg/L	15.67	15.09	16.15	16.15	16.83	NA	NA	NA	0.00	15.98	0.00	N	Dissolved Metals Not Analyzed For Leachate
Cobalt, total	mg/L	0.008518	0.009	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	1.57	N	Ratio too Low
Copper, dissolved	µg/L	9.26	10.56	10.12	10.06	7.20	NA	NA	NA	0.00	9.44	0.00	N	Dissolved Metals Not Analyzed For Leachate
Copper, total	mg/L	0.011	0.0103	0.01	0.0085	0.01	0.14	0.01	0.00	0.05	0.01	4.85	N	Leachate Avg for WWI Biased High Due to 1 Outlier (1.3 MG/L)
Cyanide	mg/L	0.011	0.0093	0.01	0.0154	0.01	0.01	0.01	0.01	0.01	0.01	0.78	N	Ratio too Low
Iron, dissolved	mg/L	0.06	0.045	0.051	0.12	0.14	NA	NA	NA	0.00	0.08	0.00	N	Dissolved Metals Not Analyzed For Leachate
Iron, total	mg/L	0.10	0.16	0.08	0.18	0.18	13.03	12.73	5.17	10.31	0.14	75.26	Y	—
Lead, dissolved	µg/L	6.85	6.71	6.85	6.85	14.56	NA	NA	NA	0.00	8.36	0.00	N	Dissolved Metals Not Analyzed For Leachate
Lead, total	mg/L	0.01	0.009	0.01	0.009	0.01	0.01	0.00	0.00	0.01	0.01	0.64	N	Ratio too Low
Magnesium, dissolved	µg/L	95,625.00	84440.00	66791.67	89708.33	322117.65	NA	NA	NA	0.00	131736.53	0.00	N	Dissolved Metals Not Analyzed For Leachate
Magnesium, total	mg/L	105.27	92.70	69.10	98.35	307.33	169.16	245.56	181.60	198.77	134.55	1.48	N	Ratio too Low
Manganese, dissolved	µg/L	4.53	9.45	5.19	8.22	12.36	NA	NA	NA	0.00	7.95	0.00	N	Dissolved Metals Not Analyzed For Leachate
Manganese, total	mg/L	0.01	0.010	0.0073	0.010	0.01	0.45	0.71	0.27	0.48	0.01	50.99	Y	—
Mercury, dissolved	µg/L	0.20	0.20	0.1754	0.20	0.17	NA	NA	NA	0.00	0.19	0.00	N	Dissolved Metals Not Analyzed For Leachate
Mercury, total	µg/L	0.20	0.2	0.2000	0.20	0.20	0.18	0.18	0.17	0.18	0.20	0.89	N	Ratio too Low
Nickel, dissolved	µg/L	31.23	15.36	22.43	31.32	7.71	NA	NA	NA	0.00	21.61	0.00	N	Dissolved Metals Not Analyzed For Leachate
Nickel, total	mg/L	0.0201	0.0123	0.02	0.02	0.01	0.03	0.07	0.04	0.05	0.02	2.92	N	Ratio too Low
Nitrogen, nitrate-nitrite	mg/L	5.3755	0.17	0.12	0.09	3.54	0.22	3.62	2.99	2.27	1.86	1.22	N	Ratio too Low
pH (Field)	STD	7.43	7.26	7.40	7.33	7.47	7.20	7.04	7.38	7.21	7.38	0.98	N	Ratio too Low
Potassium, dissolved	mg/L	24.82	21.20	9.42	35.16	66.95	NA	NA	NA	0.00	31.51	0.00	N	Dissolved Metals Not Analyzed For Leachate
Potassium, total	mg/L	29.66	27.71	10.03	46.73	67.67	75.04	105.22	39.08	73.11	36.36	2.01	N	Ratio too Low
Selenium, dissolved	µg/L	15.00	14.29	14.32	14.30	15.93	NA	NA	NA	0.00	14.77	0.00	N	Dissolved Metals Not Analyzed For Leachate
Selenium, total	mg/L	0.01	0.013	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.40	N	Ratio too Low
Silicon, dissolved	µg/L	9,871.43	11500.00	12571.43	9452.38	11588.24	NA	NA	NA	0.00	10996.69	0.00	N	Dissolved Metals Not Analyzed For Leachate
Silicon, total recoverable	µg/L	9,853.33	11125.00	12393.33	9546.67	11688.89	29111.11	37888.89	40600.00	35866.67	10921.44	3.28	Y	Ratio too Low

Constituent	Units	MWII-2	MWII-4	MWII-5	MWII-6	MWII-7	Wet Well-1	Wet Well-2	Wet Well-3	WET Well AVG	MW AVG	Ratio (Wet Well/MWII)	Acceptable Indicator Parameter	Comments
Silver, dissolved	µg/L	8.79	8.25	8.77	9.41	8.85	NA	NA	NA	0.00	8.81	0.00	N	Dissolved Metals Not Analyzed For Leachate
Silver, total	mg/L	15,000.02	0.019	0.02	0.02	0.01	0.04	0.02	0.00	0.02	3000.02	0.00	N	Ratio too Low
Sodium, dissolved	µg/L	185,708.33	208000.00	125000.00	175000.00	2118647.06	NA	NA	NA	0.00	562471.08	0.00	N	Dissolved Metals Not Analyzed For Leachate
Sodium, total	mg/L	207.50	220.52	116.55	215.48	2020.00	266.18	387.78	236.20	296.72	556.01	0.53	N	Ratio too Low
Specific conductance (field)	um/cm	1,647.70	1792.00	1243.91	1688.03	11000.63	3887.67	4291.33	2278.00	3485.67	3474.45	1.00	N	Ratio too Low
Sulfate	mg/L	107.96	87.96	26.68	119.93	586.41	40.40	45.84	43.12	43.12	185.79	0.23	N	Ratio too Low
Sulfide	mg/L	0.05	0.05	0.05	0.05	0.05	0.90	1.00	1.00	0.97	0.05	19.31	N	Insufficient Historical Sulfide Data for GW
Thallium, dissolved	µg/L	10.00	10.00	10.00	10.00	12.19	NA	NA	NA	0.00	10.44	0.00	N	Dissolved Metals Not Analyzed For Leachate
Thallium, total	mg/L	0.008	0.01	0.01	0.0078	0.01	0.00	0.01	0.01	0.01	0.01	0.81	N	Ratio too Low
TDS	mg/L	517.45	1048.40	704.04	1070.00	6809.41	1727.58	2277.78	200.00	1401.79	2029.86	0.69	N	Ratio too Low
TOC	mg/L	1.80	1.74	1.74	2.81	2.55	69.83	143.67	1582.00	598.50	2.13	<b>281.57</b>	Y	—
Vanadium, dissolved	µg/L	5.34	5.87	13.04	11.24	5.87	NA	NA	NA	0.00	8.27	0.00	N	Ratio too Low
Vanadium, total	mg/L	0.0053	0.0067	0.0177	0.01	0.00	0.02	0.02	0.01	0.02	0.01	1.62	N	Ratio too Low
Zinc, dissolved	µg/L	15.60	16.94	17.78	17.93	18.36	NA	NA	NA	0.00	17.32	0.00	N	Dissolved Metals Not Analyzed For Leachate
Zinc, total	mg/L	0.01	0.02	0.0153	0.01	0.02	0.05	0.03	0.01	0.03	0.01	2.02	N	Ratio too Low

Notes: Based on historical sampling data from March 1996 through February 2015.

**Bold** indicates average leachate/groundwater concentration ratio is five or greater.

— no data

µg/L microgram per liter

CaCO<sub>3</sub> calcium carbonate

mg/L milligram per liter

NA not analyzed for

<sup>a</sup> Ratio WW Average/Phase II MW Average.

**Table 3-4: Summary of KLF Site-Specific Monitoring Parameters**

Site Specific Monitoring Parameters (for statistical analysis)
· Ammonia (as N)
· COD
· Iron (total)
· Manganese (total)
· TOC
· Arsenic

Several of the trace metal and mineral parameters referenced in HAR Title 11, Chapter 58.1 (DOH 1994) have been consistently present in KLF background groundwater samples at levels that would likely mask a release from the KLF waste cells, and were therefore not selected as site-specific detection monitoring parameters. However, as discussed below, these constituents are included on the list of supplemental geochemical parameters. These parameters are generally the same as the major dissolved chemicals found in sea water (sodium, calcium, potassium, magnesium, chloride, and sulfate) because the facility is located near the ocean. Comparison of the concentrations of these parameters in background groundwater samples with concentrations of the major ions present in typical sea water suggests that the elevated constituent levels in groundwater are likely caused by the effects of sea water intrusion (Sanifill and Baquerizo 1996). Additional sources of dissolved chemicals similar to those found in seawater may be associated with the nearby aquaculture (shrimp farm) ponds located immediately northwest of the Phase II Landfill site.

In the January 2006 sampling conducted for the KLF Phase II monitoring program, a statistically significant increase (SSI) in total arsenic was detected in a sample from MWII-6. Inorganic arsenic occurs naturally in Hawaiian rocks and soil; therefore, rock in the west Kaua'i watershed and soil on the Mana Plain represent natural sources of arsenic. Other potential sources outside of the KLF include soil impacted by pesticides (e.g., rat poison) and herbicides used in agricultural operations (e.g., sugarcane cultivation) on the Mana Plain upgradient of the KLF. In 2007, WMH prepared an ASD to identify possible sources of the arsenic (WMH 2007). The ASD report concluded that the elevated arsenic concentrations were most likely attributable to naturally occurring arsenic mobilized from the aquifer matrix due to the geochemical effects of landfill gas generated by the Phase I MSW, and were not likely to represent a release of inorganic constituents from the Phase II MSW. Although arsenic may not be a reliable monitoring parameter for determining whether leachate is impacting groundwater, based on the ASD results and per DOH request, arsenic is included as a site-specific detection monitoring parameter for intra-well statistical analysis.

A similar SSI in total arsenic (as well as ammonia and TOC) was detected in June 2008, as described in an ASD dated November 14, 2008 (WMH 2008). A 1998 SSI for ammonia was described in an ASD dated June 19, 1998 (WMH 1998).

Concentration limits based on both statistical and non-statistical methods, as appropriate, will be established for each of the detection monitoring parameters (as described in Section 5.0). As additional leachate data are generated throughout the course of landfill operations, the detection monitoring parameter list will be re-evaluated and updated as required. If parameters are added to the site-specific detection-monitoring list, background concentrations will be established using appropriate statistical methods and added to the long-term monitoring program after the changes are approved by the DOH. If parameters are removed from the site-specific detection-monitoring list (with DOH approval), they may be added to the Supplemental Geochemical Parameters list.

### 3.2.3 Supplemental Geochemical Parameters

The supplemental geochemical parameters listed in Table 3-5 have been selected to provide additional data for non-statistical analysis as necessary to evaluate the general chemical characteristics of groundwater at the site and identify natural and anthropogenic mechanisms that

may affect groundwater quality. The supplemental geochemical parameter data will not be evaluated statistically, but can be used on an as-needed basis to evaluate data reliability and potential changes in groundwater quality without affecting the site-wide false-positive statistical error rate for the site-specific detection monitoring parameters. For example, the major cation and anion data can be used to construct Piper and Stiff geochemical plots, which can be useful for distinguishing between background groundwater and groundwater impacted by leachate released from the landfill.

**Table 3-5: Summary of KLF Supplemental Geochemical Parameters**

<b>Supplemental Geochemical Parameters (for non-statistical analysis)</b>
<ul style="list-style-type: none"> <li>. Metals (dissolved) listed in Appendix I of 40 CFR Part 258 (Subtitle D)</li> <li>. Bicarbonate (as CaCO<sub>3</sub>)</li> <li>. Carbonate (as CaCO<sub>3</sub>)</li> <li>. Calcium, dissolved</li> <li>. Chloride</li> <li>. Manganese, total</li> <li>. Magnesium, dissolved</li> <li>. Nitrate-Nitrite (as N)</li> <li>. Potassium, dissolved</li> <li>. Sodium, dissolved</li> <li>. Sulfate</li> <li>. Total Alkalinity (as CaCO<sub>3</sub>)</li> <li>. TDS</li> <li>. Specific Conductance, pH, Temperature, and Turbidity (field measurements)</li> </ul>

Note: Nitrate-nitrite as nitrogen (N) will be analyzed instead of nitrate-N due to the short holding time required for analysis of nitrite-N for calculation of nitrate-N.

### 3.2.4 Summary of Groundwater Detection Monitoring Parameters

The full list of parameters identified for the KLF detection monitoring program is presented in Table 3-6. The parameter list is based on requirements detailed in the Draft Cell-2 Permit No. LF-0053-09 dated April 29, 2013. Groundwater and leachate data collected during future groundwater monitoring events will be evaluated to determine whether any parameters should be added to or deleted from this list. Proposed changes in the list of parameters will be submitted to the DOH for review and approval, and background concentrations for additional parameters will be estimated as required for future statistical analysis.

**Table 3-6: Summary of KLF Detection Monitoring Parameters**

<b>Appendix I Constituents</b>
<ul style="list-style-type: none"> <li>. Chemicals listed in Appendix I of 40 CFR Part 258 (Subtitle D)</li> </ul>
<b>Major Cations and Anions, Not listed in Appendix I of 40 CFR Part 258 (Subtitle D)</b>
<ul style="list-style-type: none"> <li>. Calcium, dissolved</li> <li>. Magnesium, dissolved</li> <li>. Potassium, dissolved</li> <li>. Sodium, dissolved</li> <li>. Chloride</li> <li>. Sulfate</li> <li>. Carbonate (as CO<sub>3</sub>)</li> <li>. Bicarbonate (as HCO<sub>3</sub>)</li> </ul>

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**Major Leachate Indicators, Not listed in Appendix I of 40 CFR Part 258 (Subtitle D)**


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- Bromide
  - TDS
  - TOC
  - Alkalinity, total (as CaCO<sub>3</sub>)
  - Ammonia (as N)
  - COD
  - Iron, dissolved
  - Nitrate-Nitrite (as N)
- 

**Field Measurements**


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- Specific conductance, pH, temperature, and turbidity
- 

Note: Nitrate-nitrite as N will be analyzed instead of nitrate-N due to the short holding time required for analysis of nitrite-N for calculation of nitrate-N.

### 3.3 INTRA-WELL DETECTION MONITORING APPROACH

MWI-1A, MWI-2A, MWI-3A, MWII-2, MWII-5, MWII-7, MWII-8, and MWII-9 will be used as point of compliance (POC) wells for intra-well detection monitoring at the KLF in accordance with the statistical evaluation methods and procedures described in Section 5.0. Intra-well detection monitoring is generally preferable to inter-well monitoring because it eliminates the spatial component of background groundwater chemistry variability inherent in the alternative approach, i.e., inter-well monitoring. This spatial component contributes a significant portion of the variability in background conditions that must be accounted for by the statistical methodology. As indicated on figure 3-1, spatial variability is a particularly important issue for the Kekaha site due to temporal variations in the groundwater flow direction, the presence of the unlined Phase I Landfill, the proximity of the downgradient wells to the ocean shoreline, and neighboring land uses (particularly the aquaculture facility located immediately northwest of the Phase II Landfill).

Intra-well monitoring requires a minimum of eight discrete groundwater sampling events (e.g., two years of quarterly sampling) to establish background conditions for each well prior to statistical evaluation. Data representing a minimum of eight discrete sampling events are required to account for seasonal trends or other causes of temporal variability and achieve adequate statistical sensitivity. The newly installed wells will be sampled quarterly for at least two years to establish background conditions, and the background data will be evaluated to identify potential anomalies and outliers before they are used for statistical analysis as described in Section 5.0. Quarterly groundwater samples from the new wells will be analyzed for the following constituents: chemicals listed in 40 CFR 258, Appendix I, major cations and anions (Mg, Na, Ca, K, Cl, CO<sub>3</sub>, SO<sub>4</sub>, HCO<sub>3</sub>), major leachate indicators (TDS, TOC, total alkalinity, ammonia as nitrogen, Cl, Fe), COD, nitrate-N, bromide, and field measurements (electrical conductance, pH, temperature, turbidity, and groundwater surface elevation), or as required or otherwise approved by the DOH.

If a SSI is detected and verified for one or more of the site-specific detection monitoring parameters, or if one or more VOC concentrations exceeding the practical quantitation limits (PQLs) are reported and verified and the exceedance(s) cannot be attributed to a source other than the KLF, then assessment monitoring will be conducted within 90 days in accordance with HAR Chapter 11-58.1 (DOH 1994).

### 3.4 UPGRADIENT GROUNDWATER SAMPLING

Monitoring of upgradient wells is not required for intra-well groundwater monitoring because data representing the chemical characteristics of groundwater at each well location are compared to historical data representing the same well to identify statistically significant changes. However, upgradient data may be useful to evaluate the chemical characteristics of groundwater entering the landfill area from upgradient sources and assess the potential impact of off-site chemical sources on the groundwater, if required.

Historically, MWII-5 had been utilized as an upgradient MW at the KLF; however, as shown in the groundwater contour figures provided in Appendix A, recent gauging data indicate that there may be periods during which the groundwater flows cross-gradient toward MWII-5. Several factors, such as localized drawdown at nearby production wells or irrigation canals (discussed in detail in Section 2.5) may contribute to the apparent shift in the groundwater flow direction in the vicinity of MWII-5. Based on the recommendation of the DOH, MWII-5 will be utilized as a POC well, unless additional data show conclusively that the well is upgradient of the landfill. Therefore, groundwater samples will be collected from the MWII-5 on a semi-annual basis and analyzed for the parameters listed in Table 3-6. Additionally, MWII-5 data will be used for statistical analysis of the site-specific detection monitoring parameters as described in Section 5.0.

In order to further evaluate the potential impact of off-site chemical sources, an upgradient monitoring well (MWII-9) will be installed. MWII-9 will be installed north of the Phase II landfill, along the north side of the Kaumuali Highway, northwest of the leachate pond. Groundwater samples will be collected from the upgradient well (MWII-9) on a semi-annual basis and analyzed for the parameters listed in Table 3-6. The MWII-9 data will not be used for statistical analysis of the site-specific detection monitoring parameters as described in Section 5.0.

### **3.5 GROUNDWATER MONITORING SCHEDULE**

Detection monitoring of the POC wells will be conducted on a semi-annual basis. All newly installed wells will be sampled quarterly until background is established. MWII-4 and MWII-6 will be decommissioned during construction of the proposed Cell 2.

## 4.0 LEACHATE MONITORING

An established leachate database exists for the KLF. Leachate samples have been collected on a routine basis (from Wet Well-1 and Wet Well-2 since April 1994 and from Wet Well-3 since 2010) and analyzed for an extensive list of parameters. Leachate monitoring is not specifically required by HAR Title 11 Chapter 58.1 regulations; however, it is a permit requirement and the DOH Guidance Document (DOH 2002) recommends collecting leachate data to characterize the potential contaminant source (i.e., the landfill waste materials) and evaluate the suitability of site-specific monitoring parameters.

### 4.1 LEACHATE MONITORING SYSTEM

The KLF Phase II leachate collects in Wet Wells-1 and -2 prior to discharge to the onsite leachate evaporation pond. The KLF Phase II Cell 1 leachate collects in Wet Well-3 prior to discharge to the evaporation pond. The KLF Phase II Cell 2 leachate will discharge directly to the evaporation pond. The KLF Phase I is unlined and no leachate is collected.

As part of the KLF monitoring program, leachate samples will be collected from the three leachate wet wells on an annual basis. The Cell 2 leachate will be sampled semi-annually for the first two years following initial placement of MSW in the Cell 2 expansion and then the sampling frequency will be reduced to annually.

### 4.2 LEACHATE MONITORING PARAMETERS

As required in the Draft Cell-2 Permit No. LF-0053-09 dated April 29, 2013, leachate samples will be analyzed for the constituents listed in Table 4-1, and the results will be compared to the groundwater monitoring data. If chemical parameters that meet site-specific detection monitoring criteria (as outlined in Section 3.2.1) are detected in the leachate, those parameters may be proposed for addition to the KLF detection monitoring program. New analytes may also be proposed for addition to the list of leachate monitoring parameters. Conversely, as the leachate database becomes more fully developed, parameters that are not found in the site leachate may be removed from the KLF detection monitoring program (with DOH approval).

**Table 4-1: Summary of KLF Phase II Leachate Monitoring Parameters**

<b>Appendix II Constituents</b>
<ul style="list-style-type: none"> <li>· Chemicals listed in Appendix II of 40 CFR Part 258 (Subtitle D)</li> </ul>
<b>Major Cations and Anions, Not listed in Appendix II of 40 CFR Part 258 (Subtitle D)</b>
<ul style="list-style-type: none"> <li>· Calcium</li> <li>· Magnesium</li> <li>· Potassium</li> <li>· Sodium</li> <li>· Chloride</li> <li>· Sulfate</li> <li>· Carbonate (as CO<sub>3</sub>)</li> <li>· Bicarbonate (as HCO<sub>3</sub>)</li> </ul>
<b>Major Leachate Indicators, Not listed in Appendix II of 40 CFR Part 258 (Subtitle D)</b>
<ul style="list-style-type: none"> <li>· Bromide</li> <li>· TDS</li> <li>· TOC</li> <li>· Alkalinity, total (as CaCO<sub>3</sub>)</li> <li>· Ammonia (as N)</li> <li>· COD</li> <li>· Iron</li> <li>· Nitrate-Nitrite (as N)</li> </ul>

**Field Measurements**

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- Specific conductance, pH, temperature, and turbidity
- 

Note: Nitrate-nitrite as N will be analyzed instead of nitrate-N due to the short holding time required for analysis of nitrite-N for calculation of nitrate-N.

## 5.0 DATA EVALUATION METHODS

The following subsections describe the methods and procedures for statistical and non-statistical evaluation of the KLF monitoring data. These methods and procedures represent a conservative approach to evaluation of groundwater chemistry data and incorporate state-of-the-art statistical and other evaluation methodologies.

### 5.1 STATISTICAL METHODOLOGY FOR EVALUATION OF INORGANIC PARAMETERS

Consistent with the existing groundwater monitoring program at the KLF, an intra-well monitoring strategy using Shewhart-cumulative sum (CUSUM) control charts will be used for routine detection monitoring. Shewhart-CUSUM control charts are useful because they are capable of detecting both sudden and gradual changes in groundwater chemistry (DOH 2002). Shewhart-CUSUM control charts will be constructed for each well to provide a statistical and visual tool for detecting trends and abrupt changes in inorganic groundwater chemistry. The combined Shewhart-CUSUM procedure assumes that the data are independent and normally distributed. The most important assumption is independence (DOH 2002). Therefore, care should be taken to never sample wells more frequently than sample independence can be demonstrated based on site-specific hydrogeologic factors. The assumption of normality is somewhat less of a concern because the data can usually be adequately transformed for most applications. Non-detects can be replaced by one-half of the PQL without serious consequence, although this procedure should be applied only to constituents that are detected in at least 25 percent (%) of all samples. For data sets with less than 25% detected values in the background data set, non-parametric prediction limits will be used in lieu of Shewhart-CUSUM control charts.

Intra-well monitoring eliminates the spatial component of background groundwater chemistry variability inherent in the alternative approach (i.e., inter-well monitoring) from the statistical evaluation. For intra-well comparisons, a minimum of 8 background samples (i.e., from each well in the monitoring program) are required for parametric (i.e., Shewhart-CUSUM) tests and 13 background samples for non-parametric (i.e., Prediction Limit) tests. Background data representing groundwater at all of the KLF well locations, except proposed new wells MWII-8 and MWII-9 and proposed replacement wells MWI-1A, MWI-2A, MWI-3A, have already been collected. New and replacement wells will be sampled quarterly until background is established (8 events). All other wells will be sampled on a semi-annual basis. Statistical evaluation of groundwater monitoring data will continue to be performed using DUMPStat statistical modeling software, developed consistent with EPA and ASTM guidance on groundwater monitoring at Subtitle D and Subtitle C facilities (DOH 2002).

### 5.2 NON-STATISTICAL METHODOLOGY FOR EVALUATION OF VOCs

VOCs have been demonstrated to be effective indicators of a release from MSW landfills. However, because these compounds are rarely detected in background groundwater samples, establishing MW-specific limits for VOCs is generally not an option. Therefore, a detection monitoring decision rule based on laboratory-specific PQLs will be used to identify statistically significant monitoring results with respect to VOCs. It is generally accepted that when a landfill releases leachate to groundwater, multiple constituents contained in the leachate are associated with the source fluids and are subsequently detected by the groundwater monitoring program. A single constituent reported at very low concentration (i.e., below the PQL) typically is not the signature produced by a release. The calculation of laboratory-specific PQLs already incorporates a measure of the statistical uncertainty that is associated with the measurement process (Sanifill and Baquerizo 1996). Therefore, any VOC detected and verified at a concentration above the PQL is considered statistically significant, and would therefore trigger assessment monitoring (or an ASD if the detection is unrelated to a release from the landfill).

PQLs are designed to assure that the measured value reported for an analyte is close to the actual quantitative value. Method detection limits (MDLs), on the other hand, indicate that the analyte is present in the sample with a specified degree of confidence (Sanifill and Baquerizo 1996). For

analytes with estimated concentrations greater than the MDL but less than the PQL, it can only be concluded that the true concentration is greater than zero; the actual concentration cannot be quantified. The actual concentration corresponding to an analytical result between the PQL and the MDL (often referred to as a "trace" result or a "J-flagged" result) may actually be less than the MDL. Therefore, comparison of a detected concentration to a maximum contaminant level, or any other concentration limit, is not meaningful unless the concentration is greater than the PQL. Although the use of VOC results reported between the MDL and PQL is not appropriate for identifying a potential leachate release, such trace/J-flagged results can be used to guide further investigation in the event that long-term, repeatable trace/J-flagged results are observed.

### 5.3 DETECTION VERIFICATION PROCEDURE

If groundwater analysis results have been collected, checked for quality assurance (QA), quality control (QC), and consistency, and are determined to be above the appropriate statistical level (i.e., the Shewhart-CUSUM control chart limit or non-parametric prediction limit for inorganic monitoring parameters, or the PQL for one or more VOCs), the results should be verified in accordance with the objective of 40 CFR Part 258.53, HAR Chapter 11-58.1 (DOH 1994), and the DOH Guidance Document (DOH 2002).

The *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance* (EPA 2009) recommends that tolerance limits be used in conjunction with verification resampling of those wells suspected of possible contamination, in order to either verify or disconfirm the initial sampling results and thus avoid false positive errors. Without verification resampling, much larger statistical limits would be required to achieve site-wide false positive error rates of 5% or less. The procedures described in Section 5.3.1 and Section 5.3.2 will be performed for chemicals initially identified at concentrations above the statistical limits. Verification samples should be analyzed only for those chemicals that initially exceed their statistical limits; otherwise, an unacceptably high false-positive error rate can be expected (e.g., if tetrachloroethylene [PCE] is the only compound detected during an EPA Method 8260B scan (EPA 1997), then only PCE is targeted and reported by the laboratory during the retest).

#### 5.3.1 Volatile Organic Compounds

If concentrations above statistical limits (i.e., PQLs) are reported for one or more VOCs in groundwater samples from the POC wells, then one immediate resample and analysis should be conducted. If any single VOC is detected at a concentration above the PQL in the verification resample, a SSI will be recorded and assessment monitoring will be initiated or, if the exceedance is not likely to be associated with a release from the facility, an ASD will be performed.

#### 5.3.2 Inorganic Constituents

If one or more of the inorganic parameters are detected at concentrations above their statistical limits (i.e., Shewhart-CUSUM control chart limits or non-parametric Prediction Limits), one verification resample will be collected at the next scheduled sampling event. If verification of an elevated parameter is confirmed for one discrete verification resample, a SSI will be recorded and assessment monitoring will be initiated or, if the exceedance is not likely to be the result of a release from the facility, an ASD will be performed.

### 5.4 GROUNDWATER DATA EVALUATION

This section outlines the evaluation methodology that will be used for detection of a release from the facility using PQLs as the concentration limits for VOCs, and Shewhart-CUSUM control chart limits for the other site-specific detection monitoring parameters.

As the background database is updated, it will be necessary to examine the database to identify outliers, anomalies, and trends that might confound the evaluation. Outliers and anomalies are inconsistently large or small values that can occur due to sampling, laboratory, transportation, or

transcription errors, or even by chance alone. Significant trends may indicate a source of systematic error, which must be evaluated and corrected. The inclusion of such values in the historical database could lead to misinterpretation of the data set, which could result in high rates of false positive errors and/or false negative errors.

To reduce the possibility of this type of systematic error, outliers will be removed from consideration before the data are analyzed to establish background water quality parameters. Parameter concentrations that appear anomalous (i.e., that are five times or greater than the previous results) will be verified during the next sampling event or after a reasonable period of time (e.g., three months) to ensure sample independence. If the potential outlier result is not verified, the anomalous sample result will be removed from the database. Any detected systematic trends in the background database will be evaluated and reported to the DOH in a timely manner.

Data reported for the non-VOC detection monitoring parameters will be evaluated using time versus concentration plots. If a significant trend, such as an unexpected geochemical signature is indicated, or an anomalously high concentration (i.e., greater than five times average background concentration) is verified for a constituent after results have been subjected to QA/QC, then the DOH will be notified in a timely manner. Potential outlier data will be evaluated in an associated Data Quality Report prepared by the laboratory to determine the quality and integrity of the data in question. Information provided in the Data Quality Report will be important for evaluating the significance of the analytical results and determining whether a result represents an outlier, potential cross contamination, or other laboratory error.

In addition, leachate characterization will be performed on a continuing basis, and the results will be used to modify the list of detection monitoring parameters (if modification is warranted and the DOH approves). Source characterization is an effective technique for reducing false positive and false negative errors because groundwater concentrations indicating a potential release must be correlated with source concentrations (i.e., source concentrations must be greater and in appropriate contrast with respect to groundwater concentrations). Therefore, if a chemical is detected in groundwater at a concentration of concern but is either not detected in leachate or is detected in leachate at a much lower concentration, then the data indicate that the chemical is not attributable to a release from the landfill. Verification re-sampling will be conducted if the evaluation indicates that leachate represents a potential source of a chemical detected in groundwater.

## **5.5 ASSESSMENT MONITORING**

If an SSI has been detected and verified for one or more of the detection monitoring parameters identified in Table 3.4, and the increase cannot be attributed to a source other than the KLF, assessment monitoring will be initiated within 90 days in accordance with HAR Chapter 11-58.1 (DOH 1994). The text below provides a brief overview of the regulatory requirements for assessment monitoring, and a summary of the current Kekaha Landfill assessment monitoring program. Detailed guidance for assessment monitoring is provided in HAR Chapter 11-58.1, the DOH Landfill Groundwater Monitoring Guidance Document (DOH 2002), and ASTM D7048 (ASTM 2004a).

### **5.5.1 General Procedures**

Within ninety days of triggering an assessment monitoring program, and annually thereafter, the owner or operator must sample and analyze the groundwater for all constituents identified in Appendix II (DON 2002). A minimum of one sample from each downgradient well must be collected and analyzed during each sampling event, unless the director approves an appropriate alternative subset of wells to be tested. The director may also approve removal of any of the Appendix II parameters from the analyte list for assessment monitoring if it can be shown that the removed parameters are not reasonably expected to be in or derived from waste contained in the landfill. If any Appendix II constituents are detected in groundwater samples from the downgradient wells, then a minimum of four independent samples must be collected from each well (or from an approved subset of wells) and analyzed to establish background concentrations for the constituents.

If Appendix II parameters are detected in groundwater samples collected during the initial or subsequent sampling events described above, a notice will be placed in the operating record within twenty-four hours identifying the Appendix II constituents that have been detected, and the director will be informed that this notice has been placed in the operating record. Within ninety days, and on at least a semi-annual basis thereafter, the groundwater monitoring well network must be sampled and analyzed for the Appendix II constituents detected during the sampling events described above. The director may approve an alternative assessment monitoring frequency during the active life and post-closure period. Sampling and analysis of the constituents listed in Appendix I (or the alternative routine parameter list approved by the director) will continue throughout the assessment monitoring period.

The owner or operator must establish background concentrations and groundwater protection standards (GWPS) in accordance with HAR Chapter 11-58.1 for the constituents detected pursuant to the sampling described above. Based upon comparison to these threshold concentrations, the following actions are required:

- If the concentrations of all Appendix II constituents are shown to be at or below background values for two consecutive sampling events, the owner or operator must notify the director of this finding and may return to detection monitoring;
- If the concentrations of any Appendix II constituents are above background values, but all concentrations are below the GWPS, the owner or operator must continue assessment monitoring as described above; and
- If one or more Appendix II constituents are detected at statistically significant levels above the GWPS, the owner or operator must place a notice in the operating record within fourteen days of this finding indicating which constituents exceed the GWPS. The owner or operator must characterize the nature and extent of the release and notify all persons who own or reside on land that overlies the plume of contamination if impacts have migrated off site. Within 90 days, the owner or operator must also initiate assessment of corrective measures as outlined in HAR Chapter 11-58.1.

In the event that a potential source other than the landfill is suspected, or the SSI may have resulted from error in sampling, analysis, statistical evaluation or natural variation in groundwater quality, the owner or operator may provide a technical report documenting this conclusion. These reports are typically referred to as Alternative Source Demonstrations (ASDs). If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program, and may return to detection monitoring if Appendix II constituent concentrations are at or below background levels. Until a successful demonstration is made, the owner or operator must comply with the requirements for assessment of corrective measures as outlined in HAR Chapter 11-58.1.

### **5.5.2 Assessment Monitoring at Kekaha**

This section provides a brief overview of the Kekaha landfill assessment monitoring program. Historically, two of the monitoring wells at the site have shown verified SSIs for one or more of the detection monitoring parameters identified in Table 3.4. These verified SSIs have triggered additional action as summarized below:

- At well MWII-7, several parameters were verified to be above statistically established limits in March 2012. On July 3, 2012, WMH submitted an ASD (GeoChem Application 2012) for these exceedances in accordance with HAR Chapter 11-58.1. The ASD concluded that changes in groundwater quality resulted from brackish water impacts associated with off-site aquaculture ponds. The DOH concurred with the ASD findings and noted that the water

quality changes should be evaluated via time-series plots and Piper/Stiff plots until the data indicate that the groundwater is no longer impacted by the aquaculture ponds (DOH 2014).

- At well MWII-6, there is a long history of confirmed SSIs dating back to at least 1998. Numerous ASDs have been prepared in response to these exceedances, with the most recent dated December 4, 2009. This ASD included data representing additional soil testing and empirical evaluation of the data to support previous findings that landfill gas (LFG) from the unlined Phase 1 landfill was the cause of groundwater quality changes. The most recent ASD supported previous conclusions, i.e., that LFG from Phase 1 is likely creating geochemical conditions that favor the mobilization of arsenic (and other constituents) that occur naturally in the minerals present in the water-bearing zone. In May, 2017, a gas collection and control system that may mitigate these LFG-related impacts to groundwater was installed in both Phase 1 and Phase II.

On July 18, 2016, WMH met with DOH to discuss re-implementation of semi-annual groundwater monitoring with resumed testing for the detection monitoring parameters previously established for the Kekaha Phase II landfill. All monitoring wells for the Phase II landfill had been switched to a quarterly monitoring frequency in 2008, including those wells which had not had prior SSIs and associated ASD investigations. The request to resume semi-annual testing was based on the conclusion that continued quarterly monitoring did not provide additional benefit. The recommendation was also based on the understanding that groundwater impacts at the facility are attributable to an off-site source (aquaculture ponds) and the Phase I landfill, and are not associated with current Phase II landfill filling operations. WMH summarized their recommendation to re-implement semi-annual detection monitoring in a letter to DOH dated July 21, 2016.

In a letter dated October 18, 2016, DOH recommended that the detection monitoring frequency remain on a quarterly basis to determine whether the LFG collection and control system will effectively mitigate the background exceedances by reducing the mobility of arsenic and other constituents of concern. The DOH also noted that testing for Appendix II constituents should be performed on at least an annual basis and that it should include those Appendix II parameters that either exceeded established background concentrations or required additional sampling and analysis in order to establish background.

All monitoring wells at the Kekaha Landfill will be sampled and analyzed for the site-specific Appendix II constituents specified above on at least an annual basis. In order to assess the effect of the LFG collection system on groundwater quality, monitoring wells MWI-1, MWI-2, MWI-3, MWII-4, and MWII-6 will be sampled on a quarterly basis. Wells MWII-4 and MWII-6 will eventually be decommissioned during construction of the proposed Cell 2. Wells MWII-2, MWII-5, and MWII-7 will return to being sampled semi-annually.



## 6.0 FIELD MONITORING AND SAMPLING PROCEDURES

The field procedures for monitoring, sampling, and analysis of groundwater and leachate at the KLF Phase II described in this section will be performed in accordance with the DOH Landfill Guidance Document (DOH 2002). Methods and procedures for laboratory analysis and QA/QC for the monitoring program are described in Section 7.0. Field forms are provided in Appendix C.

### 6.1 GROUNDWATER ELEVATION MEASUREMENTS

Water levels in the groundwater wells must be measured during a single event prior to purging or sampling of any well, and the time between measurements should be as short as possible to provide the data required to accurately evaluate the magnitude and direction of the hydraulic gradient.

### 6.2 SAMPLE COLLECTION AND HANDLING PROCEDURES

Groundwater samples for chemical analysis will be collected begin after the MWs have been properly developed and purged. All sampling activities will be performed in accordance with the general requirements for groundwater, surface water, and leachate sample collection presented in the DOH Landfill Guidance Document and, in part, from the following ASTM Environmental Standards:

- Y ASTM Standard D1129-06a, (2006) – *Standard Terminology Related to Water*
- Y ASTM Standard D3370-95a, (2003) – *Standard Practices for Sampling Water from Closed Conduits*
- Y ASTM Standard D4840-99, (2004d) – *Standard Guide for Sampling Chain-of-Custody Procedures*
- Y ASTM Standard D3694-96, (2004c) – *Standard Practice for Preparation of Sample Containers and for Preservation of Organic Constituents*
- Y ASTM Standard D5088-02, (2002) – *Standard Practice for Decontamination of Field Equipment Used at Non-Radioactive Waste Sites*

Site conditions at the KLF or site-specific regulatory requirements may necessitate a deviation from the procedures described herein. Any such deviation must be documented by the sampling team leader in coordination with the KLF owner and operators.

#### 6.2.1 Monitoring Well Purging

A dedicated pump will be installed in each MW, and will be used to purge the well before groundwater samples are collected. Before well purging begins, the groundwater level will be measured. Each well will be purged at a rate that does not create substantial drawdown. The purging rate will be reduced if the drawdown rate appears to exceed the recovery rate. The purge water will be sampled at regular intervals (approximately every 5 minutes) and analyzed in the field for temperature, pH, specific conductance, and turbidity (field parameters). A minimum of four readings will be taken. Purging will be considered complete when three consecutive readings stabilize to within 10% of each other.

#### 6.2.2 Sample Collection Methods

The wells will be sampled directly from the Teflon discharge tubes of the dedicated pumps. If a well is slow to recharge, a sample will be collected no later than 2 hours after purging is completed. Water samples will be placed into appropriate laboratory-supplied containers. Samples will be preserved immediately after collection. Samples for VOC analysis will have zero headspace (no air bubbles trapped in the sample). When filling bottles containing preservative, the bottles will not be allowed to overflow any more than is necessary to eliminate headspace. Pre-measured amounts of preservative reagents are supplied with the sample bottles by the laboratory. Analytical methods identify the specific preservative (if any), and specify how much preservative is required. Bottles will not be

overfilled, and will be inverted (once capped) to mix the preservative with the sample. Bottle lids will not be placed on the ground or interchanged among sample bottles.

Groundwater samples to be analyzed for dissolved metals and TOC will be filtered through 0.45-micron membrane in-line filters, transferred to containers, and preserved with nitric acid (for metals) or sulfuric acid (for TOC) to a pH less than 2.0. Prior to collecting the filtered samples, approximately 500 milliliters of groundwater will be discharged through the filter.

### 6.2.3 Sample Labeling

A sample label with adhesive backing will be affixed to each individual sample container. Clear tape will be placed over each label to prevent loss of information on the label. The following minimum information will be recorded with a waterproof marker on each label:

- ÿ Project name or number
- ÿ Sample identification number
- ÿ Date and time of collection
- ÿ Sample preservatives (if applicable)
- ÿ Analysis to be performed

The sample labels will be obtained from the analytical laboratory, or printed on adhesive labels.

### 6.2.4 Chain-of-Custody

Sample integrity depends on strict chain-of-custody (COC) procedures to track the sample containers and samples from the time the empty sample bottles leave the laboratory to the issuance of the analytical laboratory results.

To maintain the COC, the samples will be either in sight of the assigned custodian, locked in a tamper-proof location, or sealed with a tamper-proof seal. A record of sample bottle possession and any transfers of samples will be maintained, and documented on the COC Form. The signature of the responsible party, time, and date will be recorded on the COC Form immediately before sealing the container for transport to the laboratory, and each time the sample container is transferred to the custody of another person.

Sample identification numbers, sample matrix, number of containers, date, and time of sampling will be recorded on the COC Form. The required analytical methods, use of pre-filtration bottles, and any problems with the sample will also be noted on the form. Upon receipt of the sample cooler by the laboratory, the seal will be broken, and the condition of the samples, temperature, date, and time will be recorded on the COC Form.

### 6.2.5 Sample Handling and Storage

After collection, samples will be immediately placed in insulated coolers and chilled to 4 degrees Celsius with bagged wet ice. Each cooler will be "locked" with a custody seal. The sampling team will record sample designations on COC Forms and Field Information Forms. Both forms will be reviewed to ensure completeness, and all paperwork (with the exception of carbon copies that are held for documentation purposes) will be placed in a plastic bag, sealed, and placed inside the container. Analytical methods, sample containers, preservatives, and holding times for each analytical method are listed in Section 7.0. The containers and packing materials provided by the laboratory will be designed to prevent breakage and spillage during shipping. Shock-resistant bottle holders or other materials will be used for this purpose. Volatile organic analysis vials will be arranged such that they are never in direct contact with the ice packs.

### **6.3 EQUIPMENT DECONTAMINATION**

All non-disposable, non-dedicated equipment that contacts potentially contaminated groundwater will be decontaminated prior to reuse. Equipment will be decontaminated by steam cleaning or by a non-phosphate detergent scrub, followed by tap water and distilled or deionized water rinses. Decontamination will be performed on plastic sheeting. Clean equipment will be stored on plastic sheeting in an uncontaminated area. Equipment stored for an extended period will also be covered by plastic sheeting.

### **6.4 INVESTIGATION-DERIVED WASTE MANAGEMENT**

Investigation-derived waste (IDW) will include water generated during decontamination of the sampling equipment, well development, and purge water. IDW will be minimized throughout the fieldwork as much as possible. It is anticipated that the water IDW will be disposed of onsite in accordance with the Hawaii State Landfill Groundwater Monitoring Guidance (DOH 2002).

### **6.5 LOGBOOKS**

A bound field notebook with consecutively numbered, water-repellent pages will be maintained. The logbook will be clearly identified with the name of the site, name of the logkeeper, and the beginning and ending dates of the entries. Data forms, with predetermined formats for logging field data, will be incorporated into the logbook. This logbook will serve as the primary record of field activities. The logbook will reference data maintained in other logs (e.g., groundwater sampling logs). The logbook will provide detailed entries in chronological order that will allow a reviewer to reconstruct the field activities. The logbook will be maintained in a clean area and used only when outer gloves have been removed. Entries on the data forms and in the logbook will meet the same requirements. Logbook entries will be corrected by drawing a single line through the incorrect entry, and then initialing and dating the change. Corrections of more than a simple mistake will be accompanied by an explanation. At the end of each day, the logkeeper will sign that day's entries. The logkeeper will photocopy completed pages weekly. A technical review of the logbook will be conducted by the field manager.



## **7.0 LABORATORY ANALYSIS PLAN**

This section describes the methods and procedures for laboratory analysis and QA/QC for the KLF groundwater and leachate sampling program.

### **7.1 PROGRAM QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES**

Duplicate, trip blank, equipment blank, field blank, and laboratory method blank samples will be collected and analyzed as required to provide QA/QC data for the KLF groundwater monitoring program, as described below.

#### **7.1.1 Duplicates**

Duplicate samples will be collected in the field from the POC wells and leachate sumps. Duplicates should not be physically different in color, turbidity, or other physical parameters. Sampling locations (MWs or leachate sumps) from which duplicates are collected must be identified in the field records along with any information/observations that may be useful to explain potentially anomalous results (e.g., physical differences between samples, prevailing winds, upwind contaminant sources, etc.). Each duplicate should be collected using matching sets of laboratory-supplied sample containers by alternating between the regular sample containers and the duplicate sample containers. The duplicates should be blind (i.e., the well designation is not listed on the COC form). Once a duplicate is collected, it must be handled and shipped in the same manner as the rest of the samples.

#### **7.1.2 Trip Blanks**

Trip blanks are a required part of the field sampling QA/QC program. They are used to detect VOC contamination that may be introduced in the field (either atmospheric or from sampling equipment), in transit (to or from the sampling site), or in the bottle preparation, sample log-in, or sample storage stages at the laboratory.

Trip blanks are samples of VOC-free water (e.g., deionized) prepared at the laboratory. They remain with the sample bottles while in transit to the site, during sampling, and during the return trip to the laboratory. Trip blank sample bottles must not be opened at any time during this process. Upon return to the laboratory, trip blanks will be analyzed for VOCs using the same procedures and methods that are used for the collected field samples. One trip blank will be placed in each cooler containing samples for VOC analysis.

Trip blank results should be reported in the laboratory results as separate samples, using the designations TB-(well#) as their sample point designation.

#### **7.1.3 Field Blanks**

Field blanks are a required part of the field sampling QA/QC program. The purpose of the field blank is to detect contamination that might be introduced into the groundwater samples through the air. For sites with sampling programs involving VOCs, at least one field blank should be analyzed for the first 20 samples or less. At least one field blank sample should be collected for each day of sampling, and for each subsequent 20 samples, whichever is greater. For the KLF, sampling is typically completed in one day, and comprises less than 20 samples, so a single field blank will be collected during each monitoring event.

Field blanks must be prepared in the field (at the sampling site) using laboratory-supplied bottles and deionized or laboratory reagent-quality water. Each field blank is prepared by pouring the deionized water into the sample bottles at the location of one of the wells in the sampling program. The well at which the field blank is prepared must be identified on a Field Information Form, along with any observations that may help explain anomalous results (e.g., prevailing wind direction, up-wind potential sources of contamination, etc.). Once a field blank is collected, it is handled and shipped in the same manner as the rest of the samples.

#### 7.1.4 Equipment Blanks

At the KLF, all sampling equipment is dedicated, and in general, equipment blanks are not required or collected. For non-dedicated equipment, if used, decontamination procedures consist of rinsing the equipment once with deionized or laboratory reagent quality water, brushing the equipment with a laboratory-quality soap, and triple rinsing the equipment with deionized or laboratory reagent quality water.

Equipment blank samples will be collected (if required) by pouring deionized or laboratory reagent quality water into the sampling device (e.g., a bailer) and then placed in the sample container with the proper preservative. If the corresponding groundwater samples are filtered, then the field blank water should be filtered after it has contacted the sampling device and before it is placed in the sample container.

Equipment blank results should be reported in the laboratory results as separate samples, using the designations EB-(well#) as their sample point designation.

#### 7.1.5 Method Blanks

The laboratory will prepare and analyze method blank samples to detect any laboratory-introduced contamination that may occur during the analytical process.

### 7.2 LABORATORY QUALITY CONTROL PROCEDURES

The QA program for the laboratory is described in their Quality Assurance Program Plan (QAPP), which is available from the laboratory upon request. The QAPP describes mechanisms the laboratory employs to ensure that all data reported meets or exceeds all applicable EPA and State requirements. It describes the laboratory's experience, its organizational structure, and procedures in place to ensure quality of the analytical data. The QAPP outlines the sampling, analysis, and reporting procedures used by the laboratory. The laboratory is responsible for the implementation of and adherence to the QA and QC requirements outlined in the QAPP.

Audits are an important component of the QA program at the laboratory. Audits are conducted by the laboratory. Internal system and performance audits should be conducted periodically to ensure adherence by all laboratory departments to the QAPP.

Data quality reviews (DQRs), or the equivalent, are requests submitted to the laboratory to formally review results that differ from historical results, or that exceed certain permit requirements or QC criteria. The laboratory should prepare a formal written response to each DQR explaining the discrepancy. The DQR is the first line of investigation following any anomalous result.

### 7.3 PRACTICAL QUANTITATION LIMITS

Laboratory-specific PQLs should be used as the reporting limits for applicable low-detection-frequency analytes (particularly organic compounds). The EPA developed the concept of the PQL to address the issue of analytical variability. The PQL concept was developed for compliance with the Safe Drinking Water Act (50 Federal Register [FR] 46906, November 13, 1985) where it is defined: "The PQL thus represents the lowest level achievable by good laboratories within specified limits during routine laboratory operating conditions." The EPA states in 52 FR 25699 (July 8, 1987): "The EPA developed the PQL concept to define a measurement concentration that is time and laboratory independent for regulatory purposes. MDLs, although useful to individual laboratories, do not provide a uniform measurement concentration that can be used to set standards."

The EPA's defined MDL, as described in 40 CFR 136, has limited application. The Agency acknowledges that "MDLs are not necessarily reproducible over time in a given laboratory, even when the same analytical procedures, instrumentation and sample matrix are used" (50 FR 46906,

November 13, 1985). As indicated in 52 FR 25699, the MDLs have had a tendency to be misunderstood by regulatory agencies developing policies for how low concentration standards (in this case, "detection of a contaminant") can be established. The use of MDLs may result in false positives, because (as the EPA has acknowledged) MDLs are ideal limits that cannot be reliably measured by even the best laboratories. Therefore, in its regulatory programs, the EPA has determined that the PQL is a more appropriate measure for compliance purposes.

While the EPA has defined PQLs, these limits are often based on consensus rather than operational definitions and experimental evidence. The actual PQL limit that may be achieved in a specific laboratory for a specific chemical may be higher or lower than the PQLs listed in SW-846 (EPA 1997). In contrast to the PQL, which is a measure of analytical precision, the MDL is a hypothesis test that leads to the binary decision of whether or not an analyte is present or absent in a sample. The MDL is defined by the EPA as the "minimum concentration of a substance that can be measured and reported with 99% confidence that the true value is greater than zero" (50 FR 46906, November 13, 1985).

#### **7.4 ANALYTICAL METHODS**

Table 7-1 and Table 7-2 summarize the analytical methodologies to be used by the laboratory for the routine analysis of groundwater and leachate, and list the sample containers, preservatives, and holding times for each analytical method. All methods are EPA-approved and are fully described in the laboratory method and standard operating procedure documents. The laboratory may substitute EPA-approved methods upon notification and approval of the DOH Environmental Protection Manager.

**Table 7-1: Groundwater Analytical Methods, Sample Containers, Volumes, Preservatives, and Holding Times**

Analytical Parameters	Method No.	Quantity	Container	Preservative	Holding Time
VOCs App. I (preserved)	SW846 8260B	3	40 mL Glass-VOA vial	HCl and Cool to 4 °C	14 days
VOCs App. I (unpreserved)	SW846 8260B	3	40 mL Glass-VOA vial	Cool to 4 °C	3 days
Metals, Dissolved	SW846 6020A/6010C	1	500 mL Polyethylene	HNO <sub>3</sub> pH<2	3 months
Metals, Total	SW846 6020A/6010C	1	500 mL Polyethylene	HNO <sub>3</sub> pH<2	3 months
TOC, Field Filtered	SM 5310B	1	500 mL Amber Glass	H <sub>2</sub> SO <sub>4</sub> pH<2	28 days
COD	EPA 410.4	1	500 mL Amber Glass	H <sub>2</sub> SO <sub>4</sub> pH<2	28 days
Nitrate-Nitrite as Nitrogen	EPA 353.2				
Ammonia as Nitrogen	EPA 350.1				
Alkalinity: Total, Bicarbonate & Carbonate	SM 2330B	1	1000 mL unpreserved Polyethylene	Cool to 4 °C	14 days
TDS	SM 2540C				7 days
Chloride, Sulfate, Bromide	EPA 300.1				28 days

°C degree Celsius  
H<sub>2</sub>SO<sub>4</sub> sulfuric acid  
HCl hydrochloric acid  
HNO<sub>3</sub> nitric acid  
mL milliliter  
VOA volatile organic analysis

**Table 7-2: Leachate Analytical Methods, Sample Containers, Volumes, Preservatives, and Holding Times**

Analytical Parameters	Method No.	Quantity	Container	Preservative	Holding Time
VOCs App. II (preserved)	SW846 8260B	3	40 mL Glass-VOA vial	HCl and Cool to 4 °C	14 days
VOCs App. II (unpreserved)	SW846 8260B	3	40 mL Glass-VOA vial	Cool to 4 °C	3 days
SVOCs App. II	SW846 8270D	8	1000 mL Amber Glass	Cool to 4 °C	7 days
Herbicides App. II	SW846 8151A				
Organochlorine Pesticides App. II	SW846 8081B				
Dioxin App. II	SW846 8280B				
PCBs as Aroclors App. II	SW846 8082A				
Total Metals and Mercury App. II	SW846 6020A/6010C/7470A	1	500 mL Polyethylene	HNO <sub>3</sub> pH<2	6 months
COD	EPA 410.4	2	500 mL I Amber Glass	H <sub>2</sub> SO <sub>4</sub> pH<2	28 days
TOC	SM 5310B				
Nitrate-Nitrite as Nitrogen	EPA 353.2				
Ammonia as Nitrogen	EPA 350.1				
Total Cyanide	SM 9012B	1	250 mL Poly	NaOH pH>12	7 days
Total Sulfide	SM 4500	1	250 mL Poly	ZnAcetate/NaOH	14 days
Alkalinity: Total, Bicarbonate & Carbonate	SM 2330B	1	1000 mL unpreserved Polyethylene	Cool to 4 °C	14 days
TDS	SM 2540C				7 days
Chloride, Sulfate, Bromide	EPA 300.1				28 days

NaOH sodium hydroxide  
 PCB polychlorinated biphenyl  
 SVOC semivolatile organic compound



## **8.0 DATA QUALITY REVIEW, REPORTING, AND RECORDKEEPING**

Prior to submittal of a monitoring report to the DOH, several data evaluation, reporting, and recordkeeping tasks will be implemented. The following sections describe the evaluation, reporting, and recordkeeping procedures that should be followed upon receipt of an analytical report.

### **8.1 DATA QUALITY REVIEW**

Each analytical report received from the laboratory shall undergo two levels of quality assessment. These quality assessment procedures are described below.

#### **8.1.1 Initial QA/QC Checks**

Before data are subjected to statistical analysis, a qualified hydrogeologist or groundwater scientist shall evaluate the data by examining the QC information accompanying the data report from the laboratory. Relevant QC data include measures of accuracy (percent recovery), precision (relative percent difference [RPD]), and sample contamination (blank determinations). Data that fail any of these checks should be flagged for closer evaluation and a DQR. Results of the DQR must be submitted with the analytical data in the routine monitoring report (see Section 7.2 for a description of DQR). A brief summary of relevant QC data follows. A more complete description should be contained in the laboratory QAPP.

Accuracy defines the relationship between the laboratory's measurement of a sample's concentration and the "true," but unknown concentration of the sample. Because the "true" concentration is unknown, accuracy must be measured indirectly by determining the percent recovery of a sample called the matrix spike (MS). The MS is analyzed under the same conditions as the groundwater sample and its concentration is determined. Because the MS has a known concentration, the percent recovery can be calculated. It is assumed that the groundwater sample behaves exactly like the MS and thus the "true" concentration of the submitted groundwater sample can be back-calculated. Control criteria for percent recovery are taken from regulatory method requirements.

Precision is the assessment of the variability that can be expected in data resulting from the analytical procedures employed. It provides a measure of the reproducibility, which is estimated through duplicate measurements of a MS. Two MS samples are prepared, an MS and a matrix spike duplicate (MSD). The MS and MSD samples are analyzed along with the unknown sample and the RPD between the two spikes is determined. Control criteria for RPDs are taken from regulatory method requirements.

The potential for sample contamination is assessed by measurements of "blank" samples. Blanks are samples of ultra-pure laboratory water that are not spiked with any analytes and are carried through the field sampling and laboratory environments. These samples are known as "field," "lab," and "equipment" blanks. It is assumed that any analytes that occur in the field or laboratory, which might add to the concentration of the analyte in the sample, will be picked up by the blank samples and measured. If any of the analytes of interest are found in the blank samples, it is an indication of potential contamination of the unknown sample.

#### **8.1.2 Qualitative Data Evaluation**

Following the initial QA/QC checks, all data will undergo a second level of review by graphing historical trends and comparing new results with these historical trends to flag visual outliers or other anomalous data. If a clearly anomalous result is found, a DQR will be initiated with the laboratory to ascertain whether laboratory error is involved. In addition, field information should be checked for anomalous occurrences or observations that might help to explain an outlier result.

### **8.2 DATA RECORDKEEPING REQUIREMENTS**

The laboratory maintains all analytical data indefinitely. The laboratory ensures that, at each stage of a process where a permanent data record is required, security measures are in place to guarantee

the integrity of the data. Standard operating procedures are in place for computer security, computer data storage, and data back-up.

### **8.3 DATA REPORTING REQUIREMENTS**

Monitoring data will be submitted in reports that summarize all monitoring activities that took place during the preceding time periods in accordance with state and federal regulations. A semi-annual/mid-year report will be submitted to the DOH detailing the results and events of the previous six months. The semi-annual report will include graphs of all analytical data from each monitoring point and background monitoring point, as required, except for those constituents for which no new data were collected since the previous submittal. Monitoring reports summarizing results, exceedances, and/or deficiencies in the sample data will be submitted to the DOH within 90 days of receipt of final data. Each report will include electronic files (e.g., laboratory data reports).

## 9.0 REFERENCES

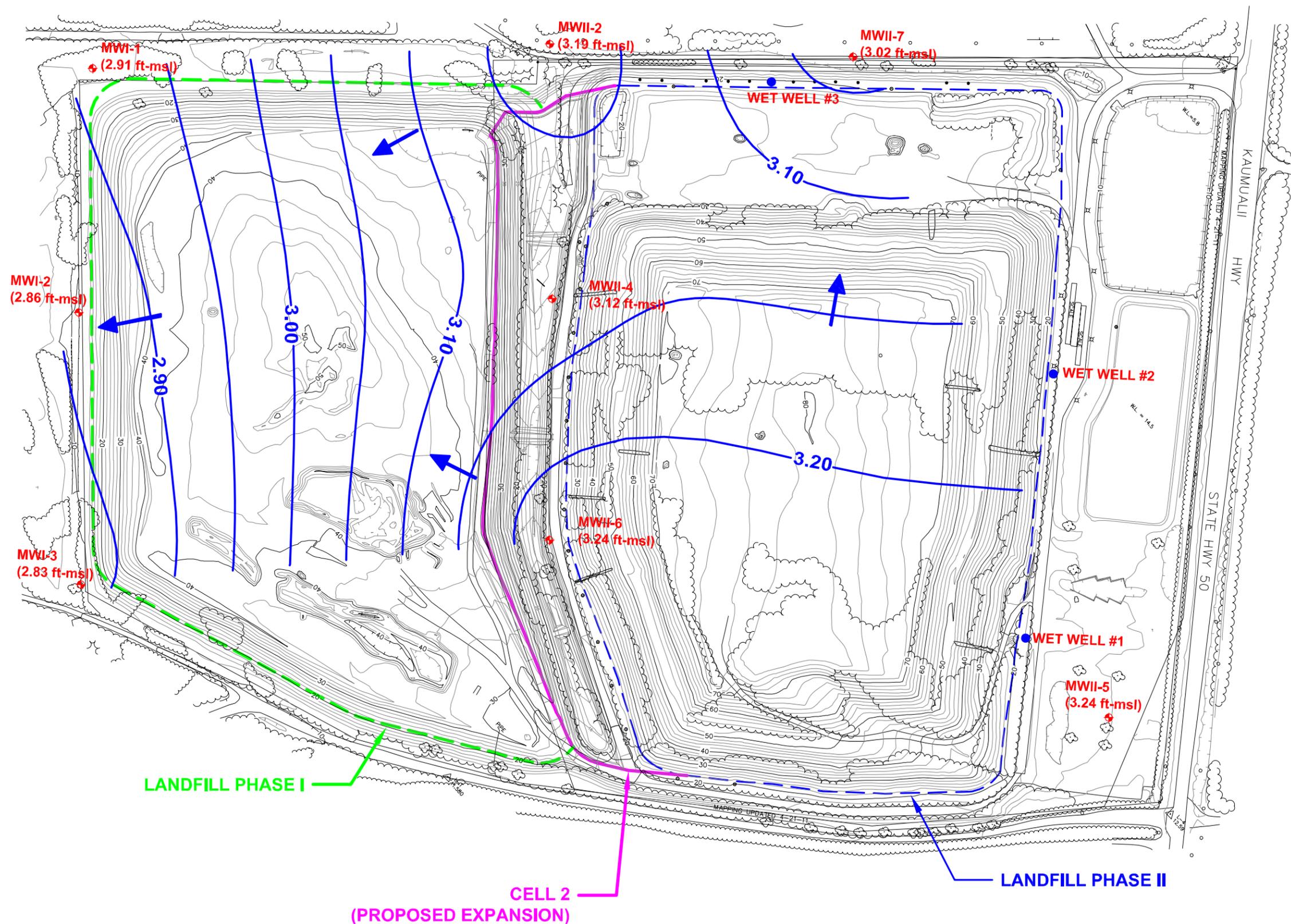
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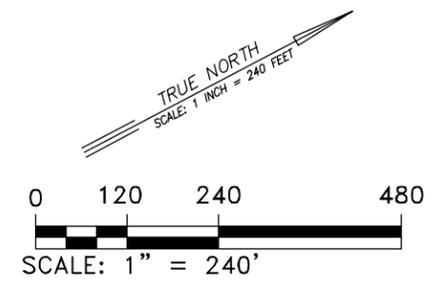
**Appendix A:  
KLF Historical Groundwater Table Contour Maps**



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LEGEND	
	MWII-4
	ELEV. ft-msl
	3.00
	GROUNDWATER POTENTIOMETRIC SURFACE

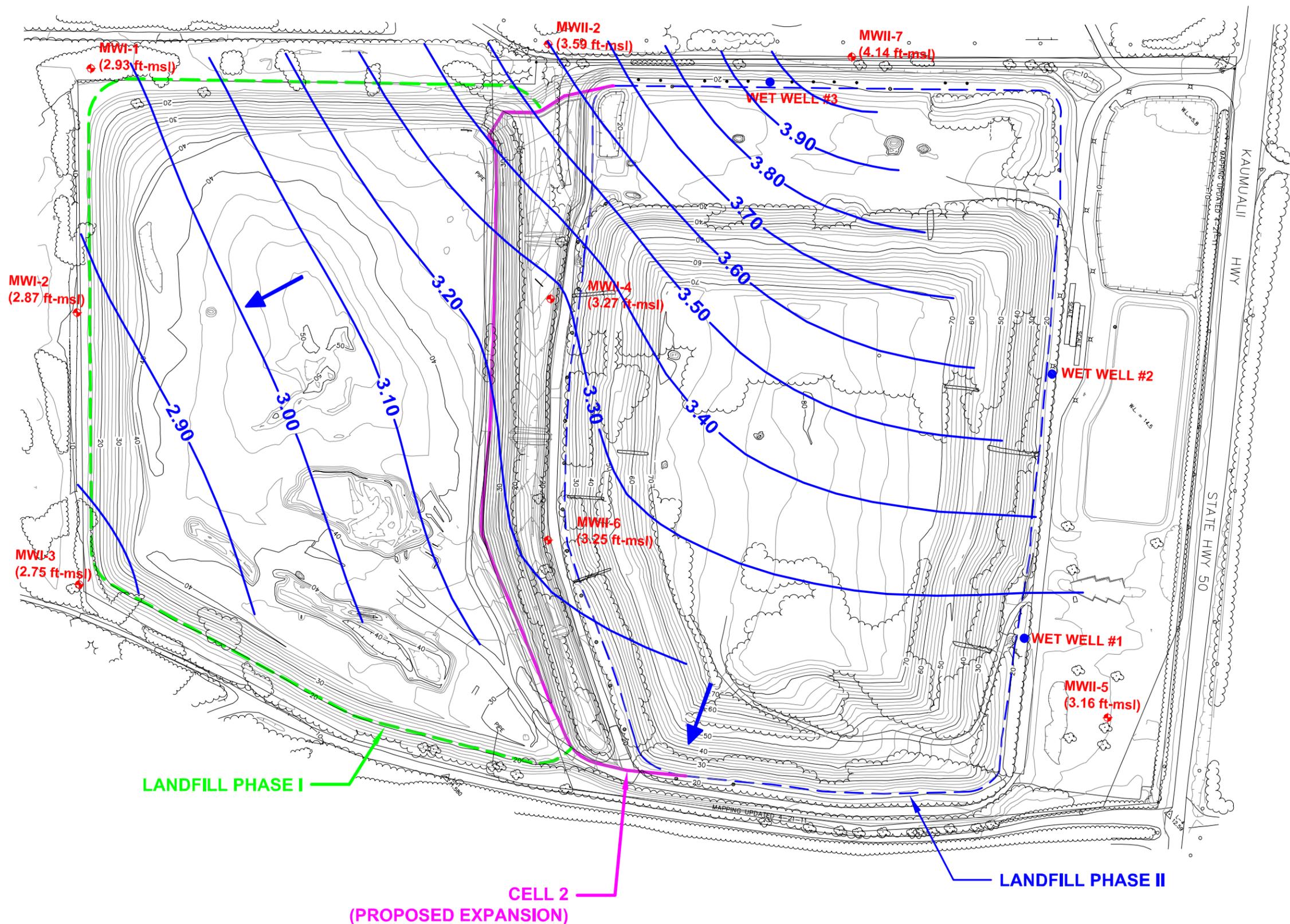


**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**  
**Kekaha Landfill Phase II**  
**(June 5, 2012)**  
**Kauai, Hawaii**

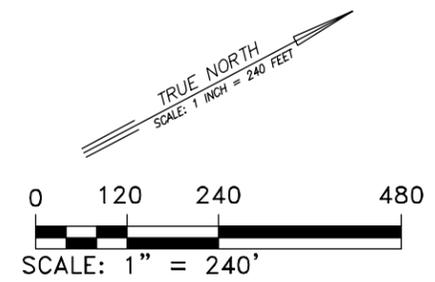




P:\ENV\2011\Waste Management of Honolulu\Veischo Landfill Phase II\Groundwater\2012\7.0 Deliverables\3rd Qtr. 2012\July-Sept\Reporting\GMI\_SiteLayoutMap\_27Aug2012.dwg 10/11/12 3:15 PM hamod



LEGEND	
	PHASE II GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
	GROUNDWATER POTENTIOMETRIC SURFACE

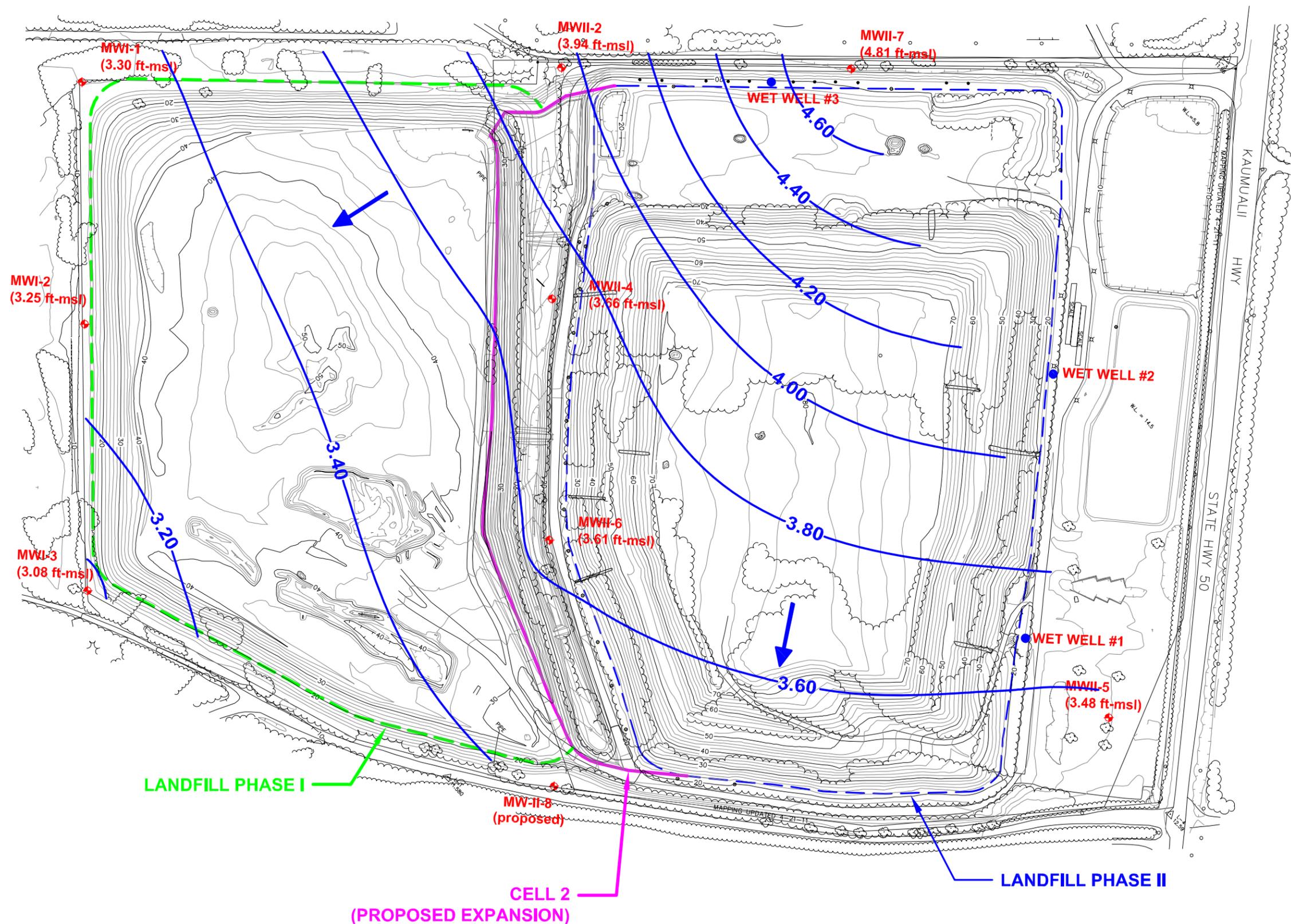


**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**  
**Kekaha Landfill Phase II**  
**(August 27, 2012)**  
**Kauai, Hawaii**

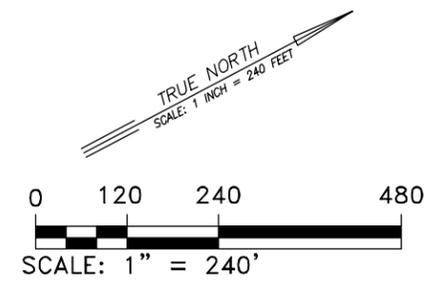




\\hawaii003\users\Project\ENV\ENR\Waste Management of Hawaii\Yokohama Landfill Phase II\Groundwater\2012\7.0 Deliverables\4th Draft\DWI\_Site\_Layout\Map\_13Nov2012.dwg 12/26/12 5:51 PM nmsol



LEGEND	
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	GROUNDWATER POTENTIOMETRIC SURFACE

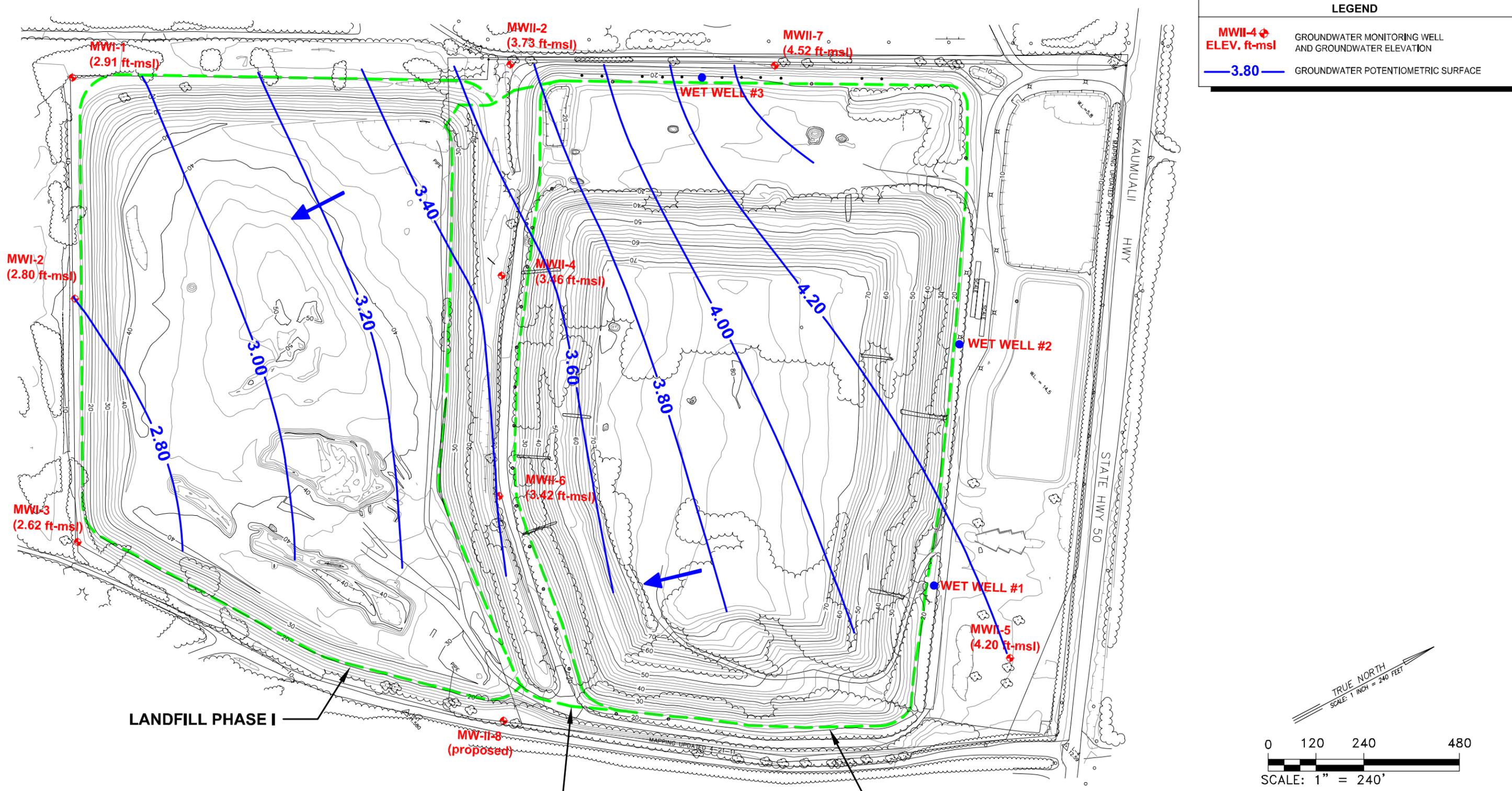


**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**  
**Kekaha Landfill Phase II**  
**(November 13, 2012)**  
**Kauai, Hawaii**





F:\ENR\ENR\Waste Management of Hawaii\Kekaha Landfill Phase II\Groundwater\2013\10 Data\msh\1st Oct. 2013 (1st-1st)\Report\Fig2\_GMW\_SiteLayoutMap\_24Feb2013.dwg 04/05/13 8:52 AM nmsoc

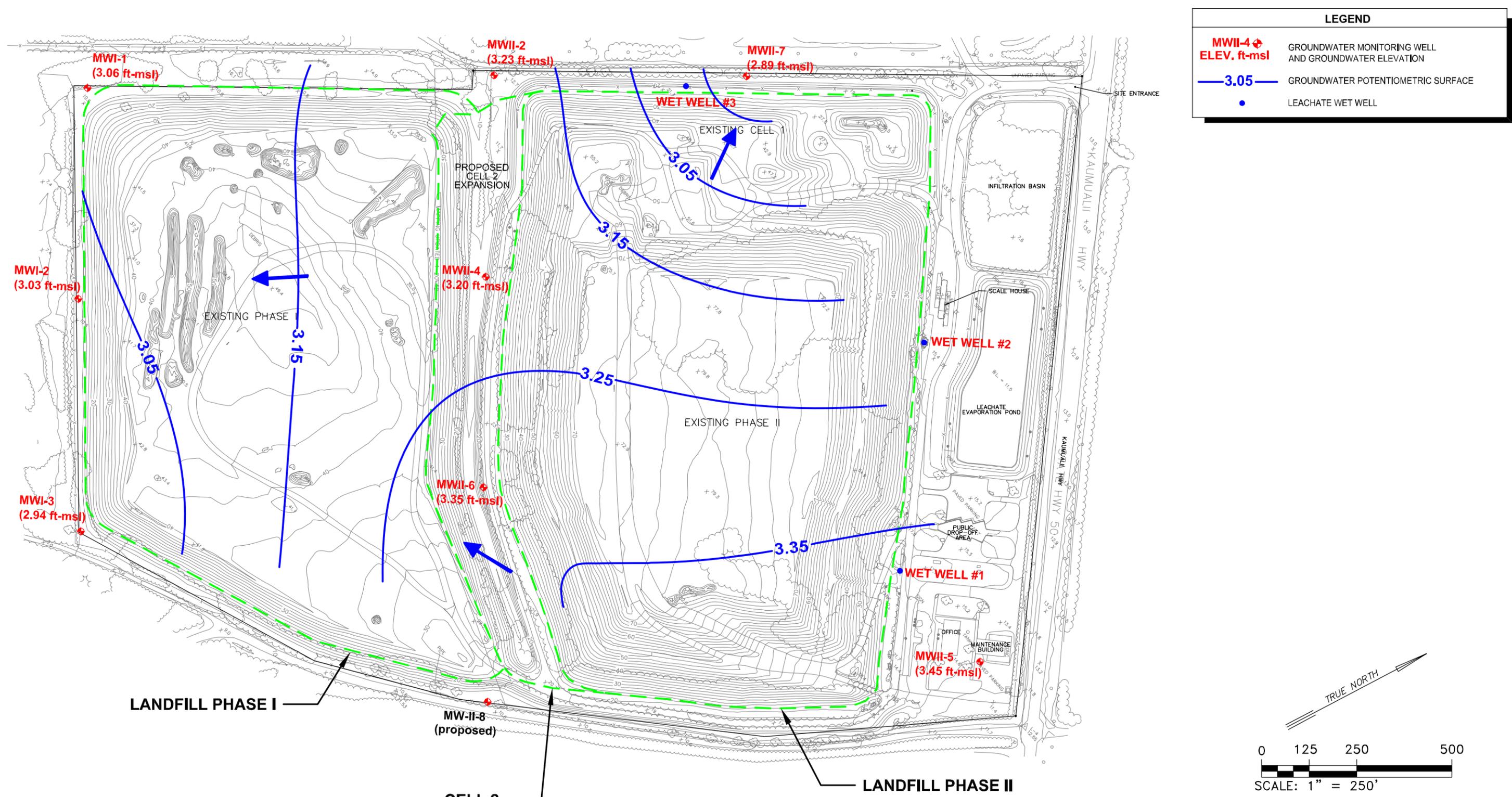


**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**  
**Kekaha Landfill Phase II**  
**(February 24, 2013)**  
**Kauai, Hawaii**





F:\ENR\ENR\Waste Management of Hawaii\LEF\Kekaha Landfill Phase II\Groundwater\2013\1.0 Data\enr\2nd Quarter 2013\Report\Figures\Fig\_04\_MW\_SiteLayoutMap\_04\_Apr2013.dwg 08/15/13 1:52 PM enrmod

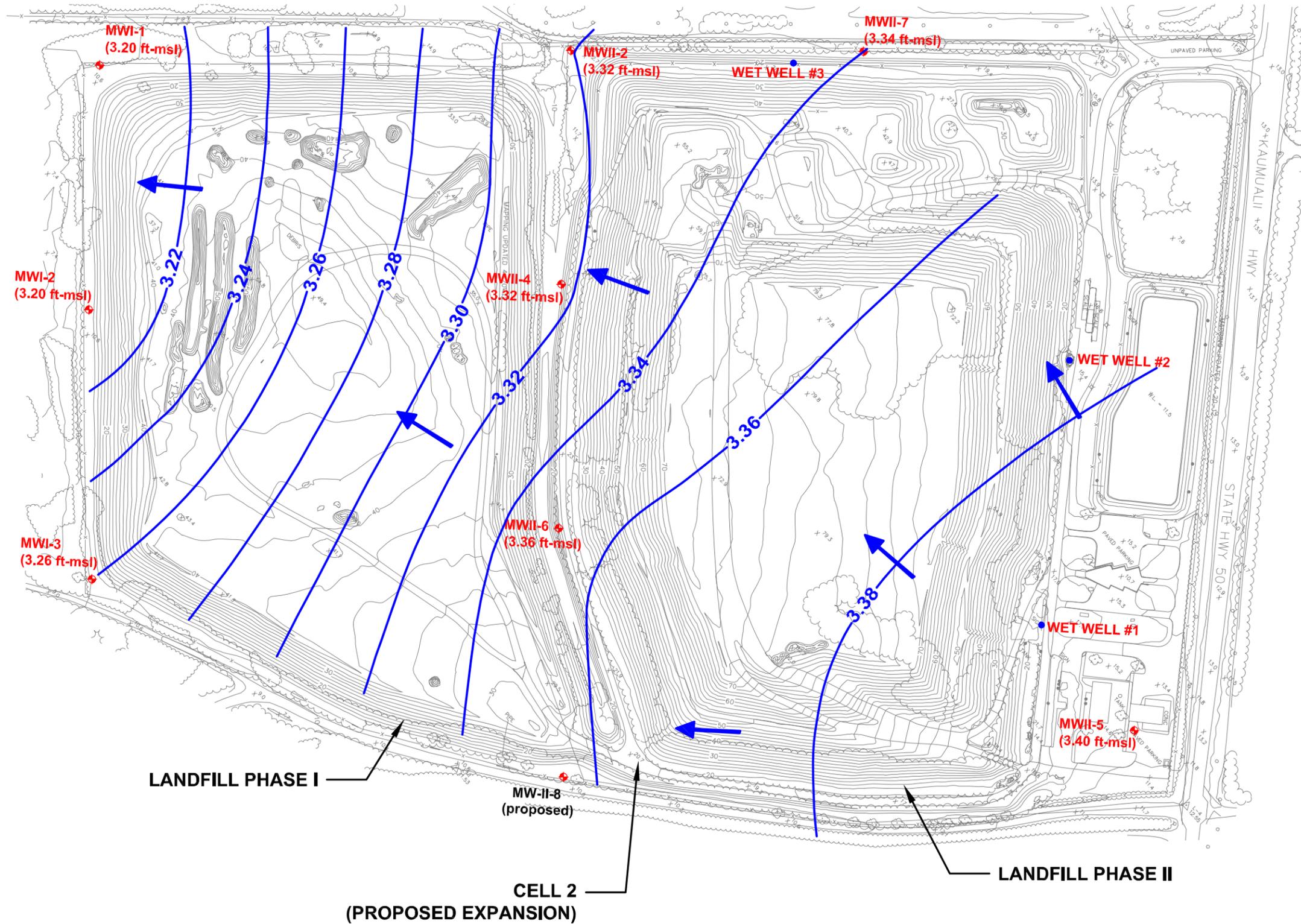


LEGEND	
<b>MWII-4</b>  <b>ELEV. ft-msl</b>	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
<b>3.05</b> 	GROUNDWATER POTENTIOMETRIC SURFACE
	LEACHATE WET WELL

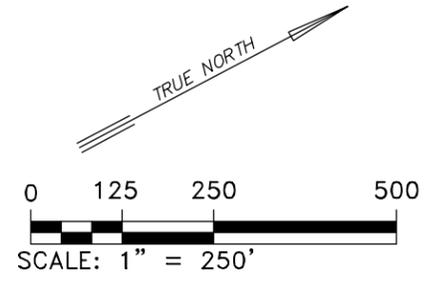
**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**  
**Kekaha Landfill Phase II**  
**(June 4, 2013)**  
**Kauai, Hawaii**







LEGEND	
MWII-4 ELEV. ft-msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
— 3.34 —	GROUNDWATER POTENTIOMETRIC SURFACE
•	LEACHATE WET WELL

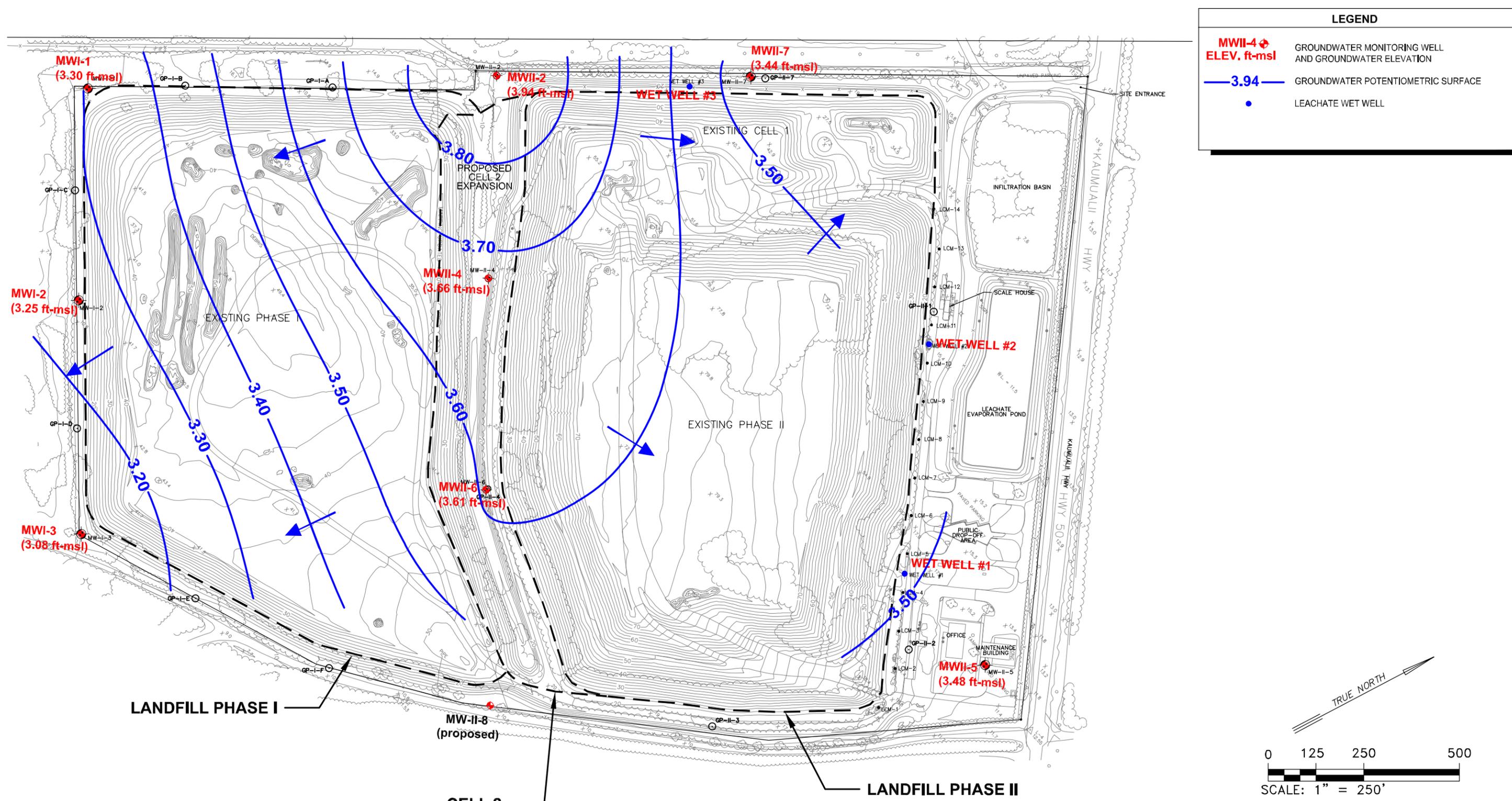


**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**  
**Kekaha Landfill Phase II**  
**(August 26, 2013)**  
**Kauai, Hawaii**

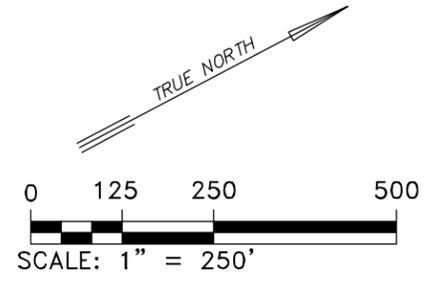




F:\ENR\Work-Federal\WMA\0315847\_WMA-HLE\_Env\_Services\_2014\Task 2\_Groundwater\Report\1st\_Gr\_2014\Figures\Native Files\Fig2\_GMW\_SiteLayoutMap\_2Feb2014.dwg 01/21/14 5:03 PM rnmood



LEGEND	
MWII-4 ELEV. ft-msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
— 3.94 —	GROUNDWATER POTENTIOMETRIC SURFACE
•	LEACHATE WET WELL

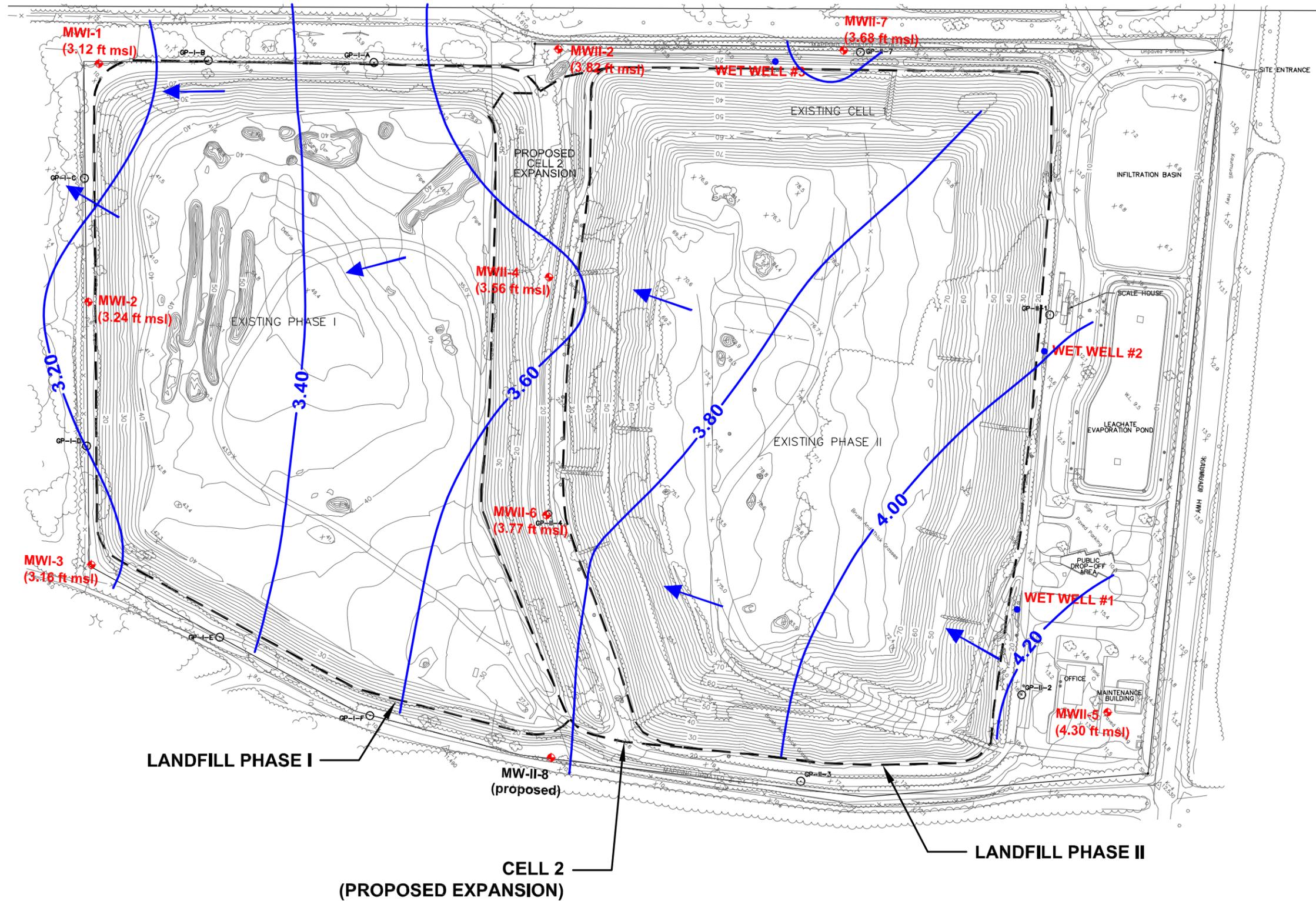


**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**  
**Kekaha Landfill Phase II**  
**(February 24, 2014)**  
**Kauai, Hawaii**





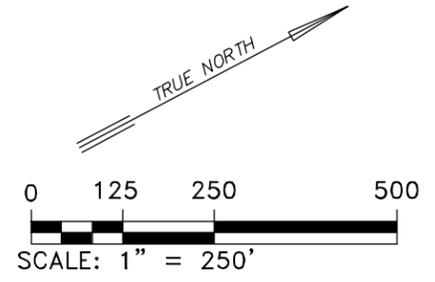
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LEGEND	
<b>MWII-4</b>  <b>ELEV. ft msl</b>	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
<b>3.60</b> 	GROUNDWATER POTENTIOMETRIC SURFACE
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

**NOTE**

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A MARCH 2014 AERIAL SURVEY.

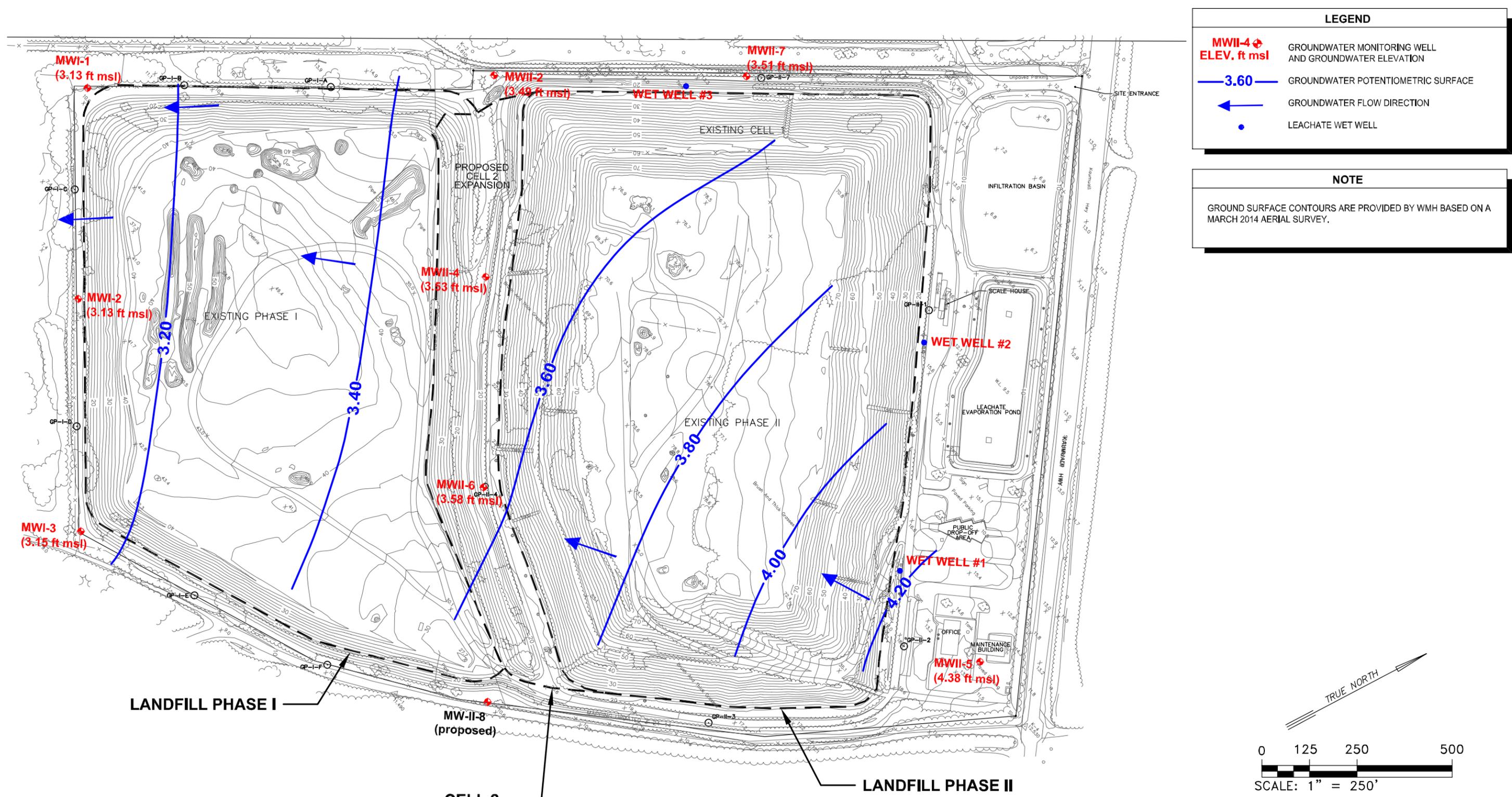


**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**  
**Kekaha Landfill Phase II**  
**(May 27, 2014)**  
**Kauai, Hawaii**





P:\ENR\War-Federal\WMA\0315847\_MW-HLE\_Env\_Services\_2014\Task\_2\_Groundwater\01\_Working\Figures\Fig\_2\_GM\_SiteLayoutMap\_28Aug2014.dwg 10/07/14 4:41 PM Hemond

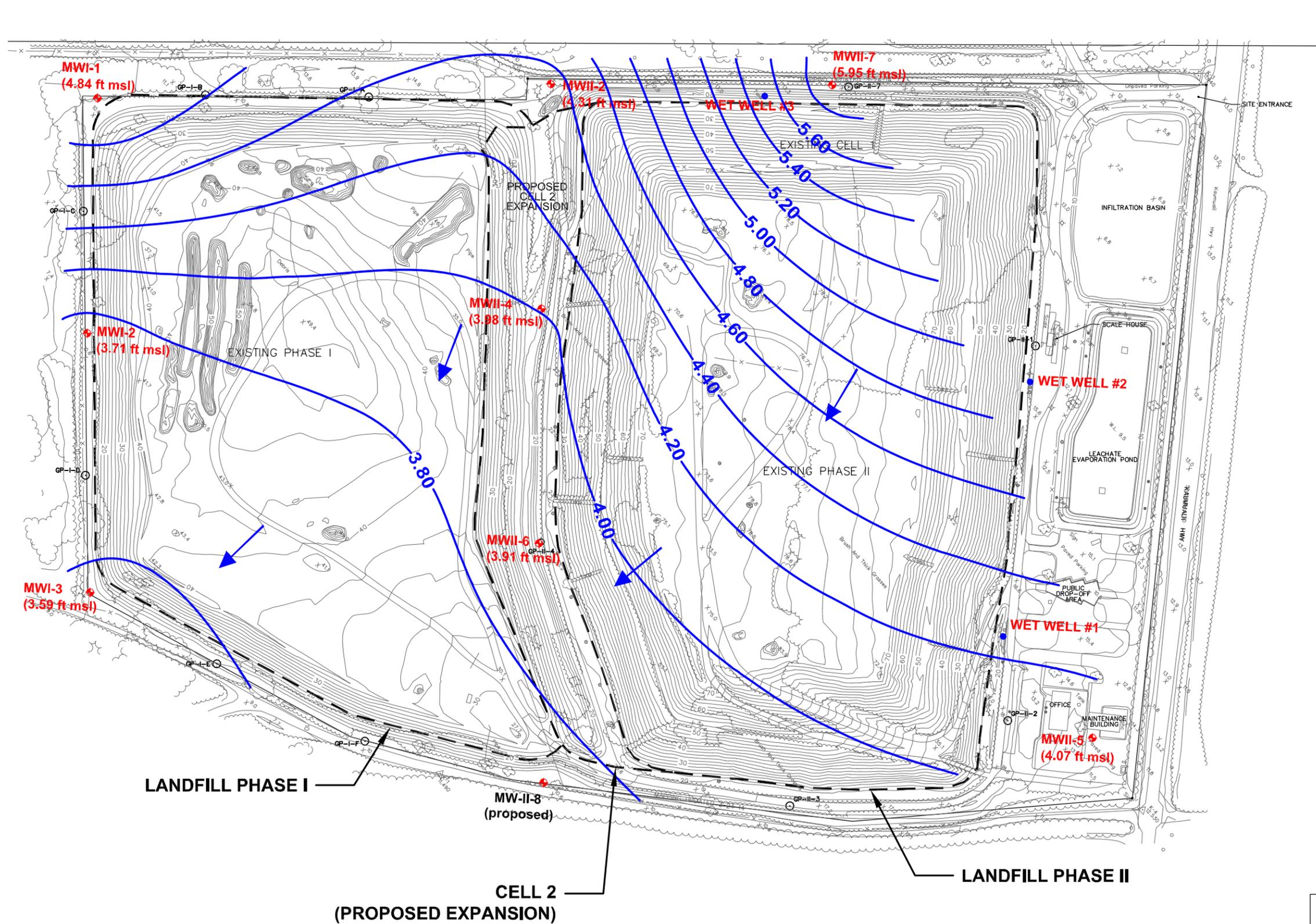


**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**  
**Kekaha Landfill Phase II**  
**(August 26, 2014)**  
**Kauai, Hawaii**





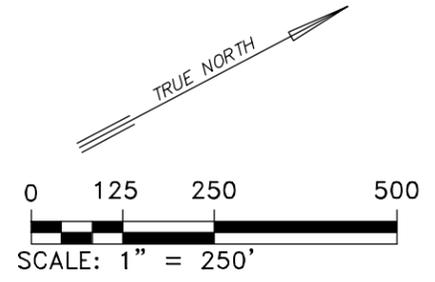
P:\ENR\War-Federal\WMA\0315847\_MH-HLE\_Env\_Services\_2014\Task\_2\_Groundwater\01\_Working Files\Figures\Figures\Fig2\_GMW\_SiteLayoutMap\_10Nov2014.dwg 12/18/14 4:44 PM nmsad



LEGEND	
MWII-4 ELEV. ft msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
—4.60—	GROUNDWATER POTENTIOMETRIC SURFACE
←	GROUNDWATER FLOW DIRECTION
•	LEACHATE WET WELL

**NOTE**

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A MARCH 2014 AERIAL SURVEY.

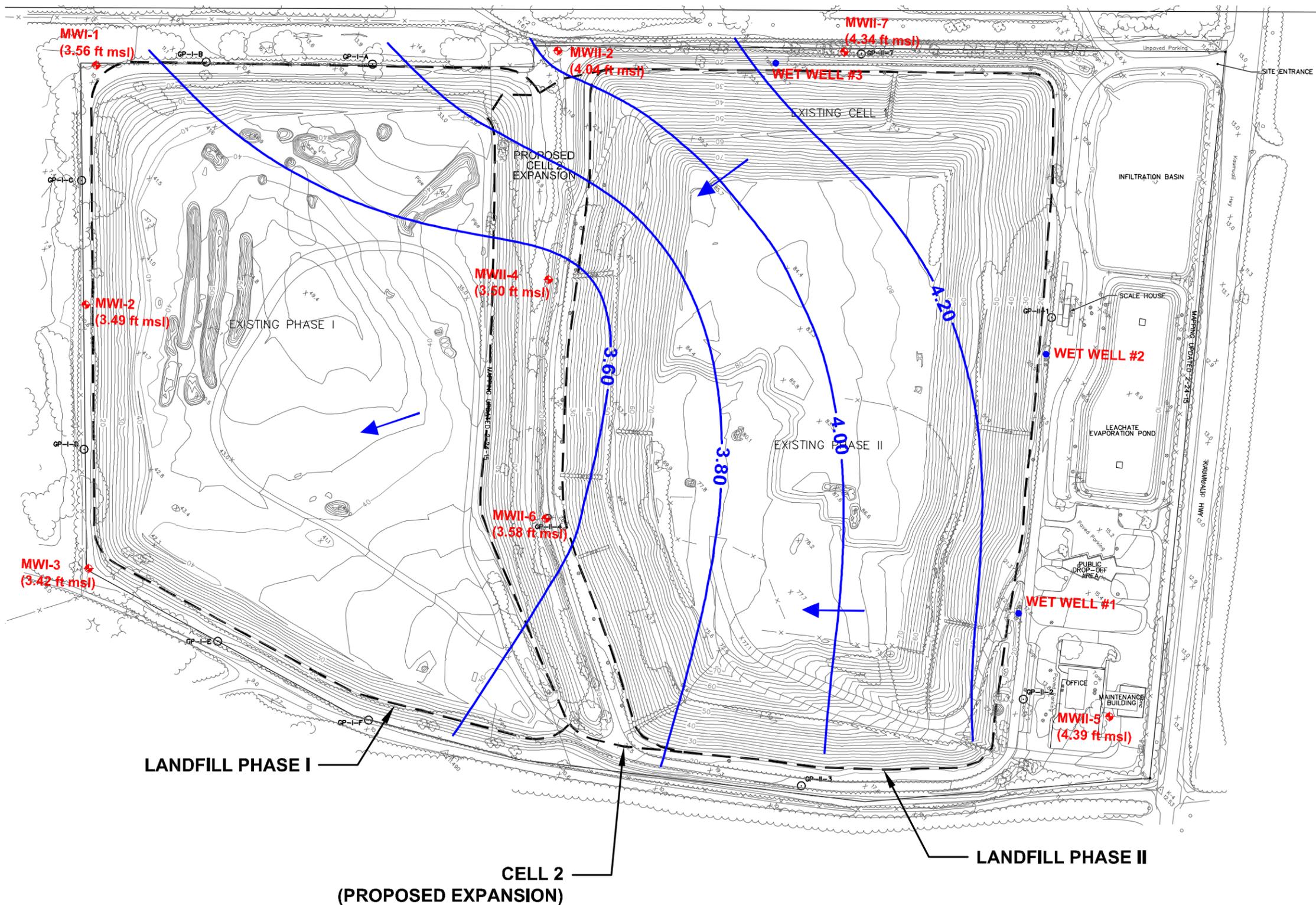


**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**  
**Kekaha Landfill Phase II**  
**(November 10, 2014)**  
**Kauai, Hawaii**





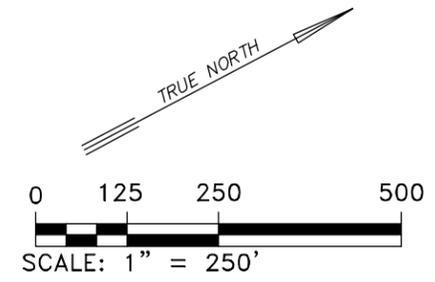
P:\DW\New-Federal\WMI\30338514 IM-KLF Env Service 2015\Task 2 Groundwater\1st Quarter Event\Report\Figures\Fig2\_GMW\_SiteLayoutMap\_23Feb2015.dwg 03/09/15 6:03 PM named



LEGEND	
<b>MWII-4</b> (3.50 ft msl)	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
<b>4.20</b>	GROUNDWATER POTENTIOMETRIC SURFACE
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

**NOTE**

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A FEBRUARY 2015 AERIAL SURVEY.

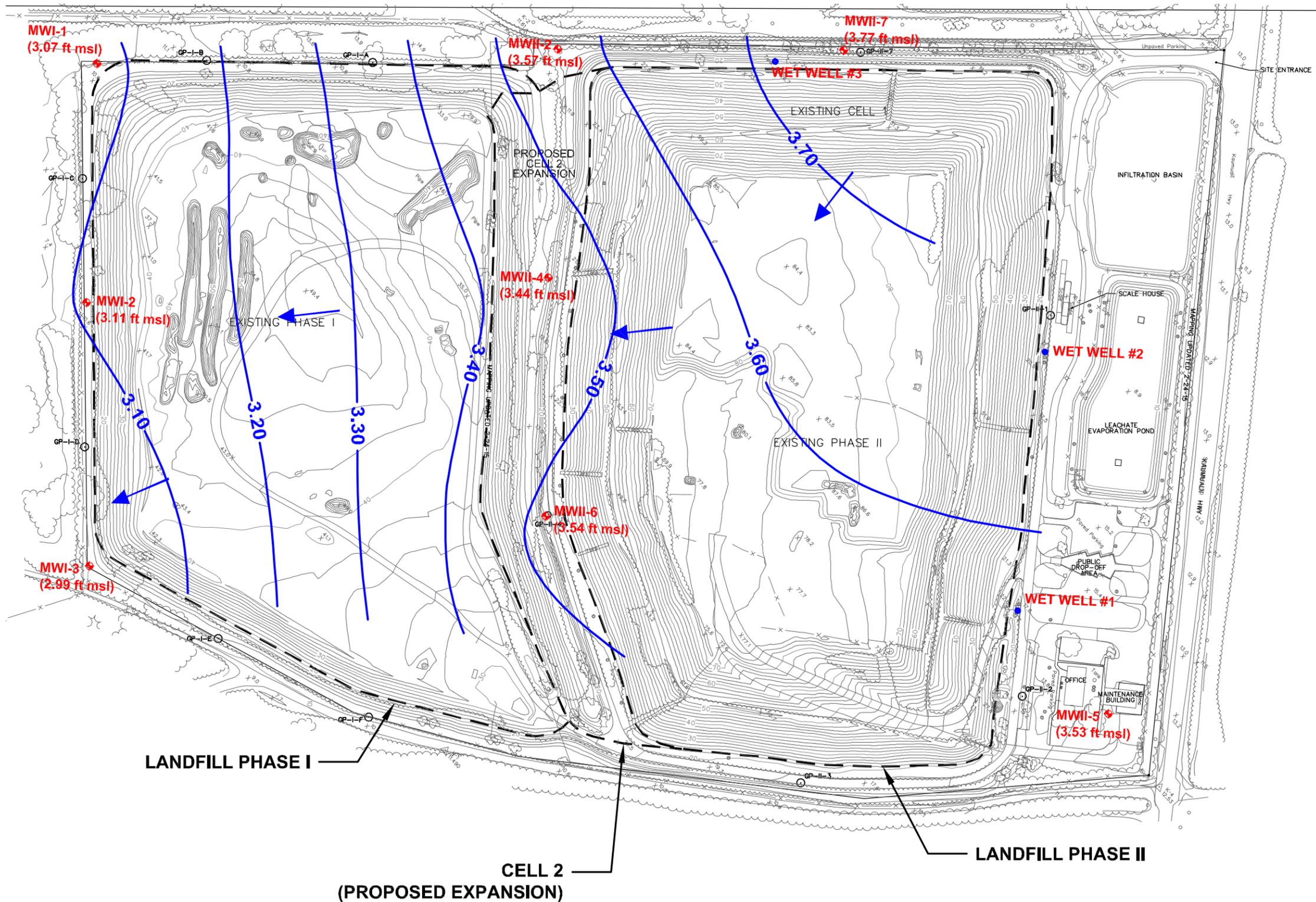


**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**  
**Kekaha Landfill Phase II**  
**(February 23, 2015)**  
**Kauai, Hawaii**





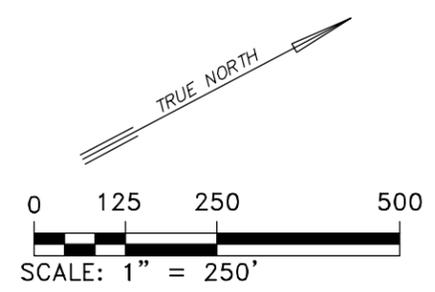
P:\ENV\Non-Federal\WMA\03338514\_ML-HLF\_Env\_Services\_2015\Task 2 Groundwater\2nd Quarter Event\Report\01 Working\Figure\Fig\_02\_GMW\_SiteMap\_31May2015.dwg 07/30/15 2:32 PM named



LEGEND	
MWII-4 ELEV. ft msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
—3.10—	GROUNDWATER POTENTIOMETRIC SURFACE
←	GROUNDWATER FLOW DIRECTION
•	LEACHATE WET WELL

**NOTE**

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A FEBRUARY 2015 AERIAL SURVEY.



**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**  
**Kekaha Landfill Phase II**  
**(May 31, 2015)**  
**Kauai, Hawaii**



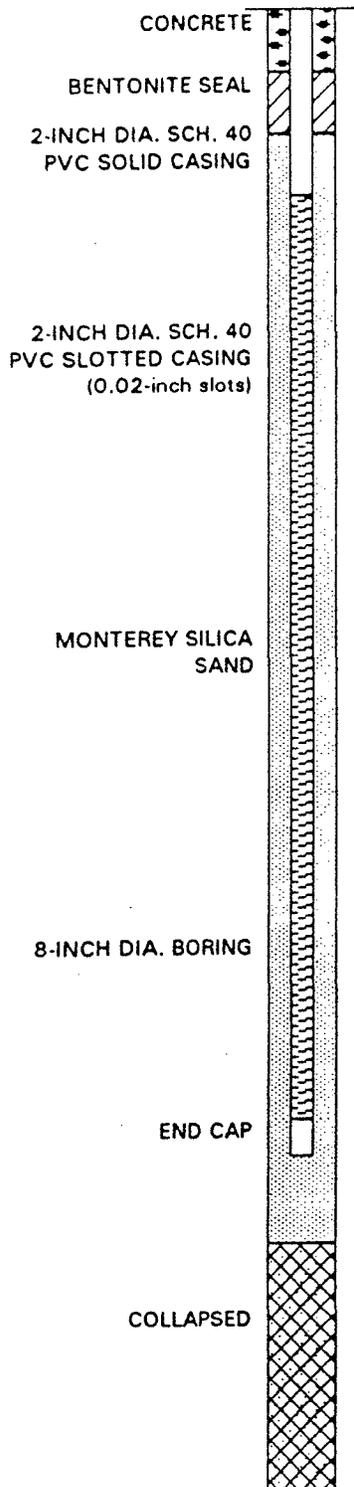


**Appendix B:  
KLF Well Installation Logs**

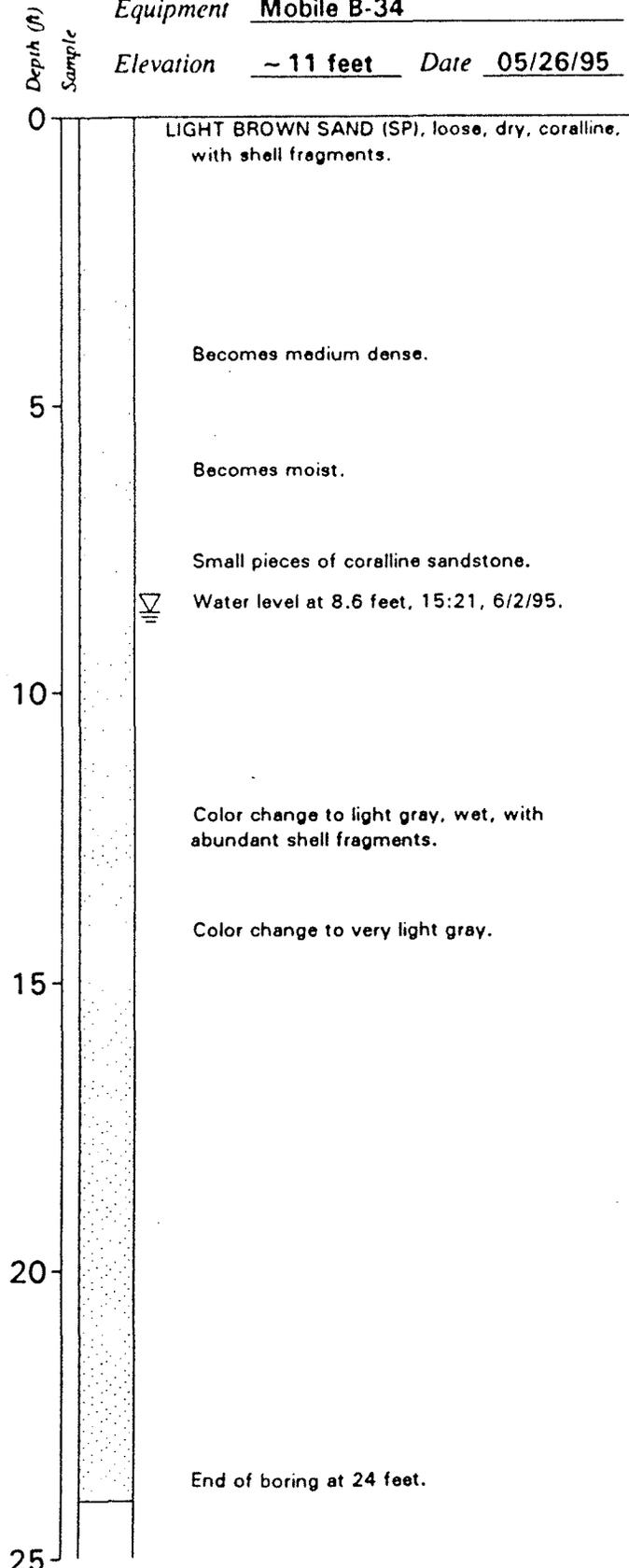


Top of Casing 12.98 ft (MSL)

LOCKED PROTECTIVE CASING EXTENDS 2' ABOVE GRADE



Equipment Mobile B-34  
Elevation ~ 11 feet Date 05/26/95



Harding Lawson Associates  
Engineering and  
Environmental Services

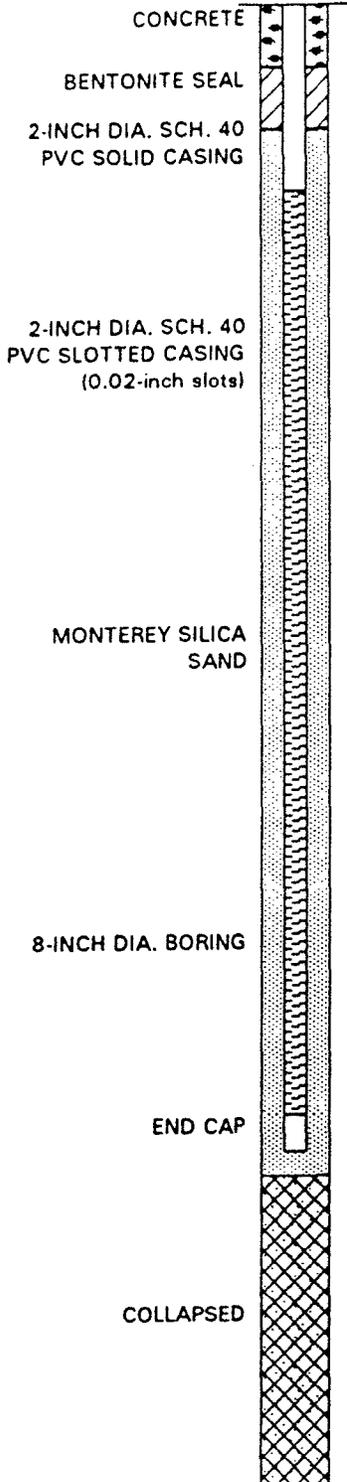
Log of Monitoring Well MW-I-1 (Sheet 1 of 1) FIGURE  
Kekaha Landfill Phase I  
Kekaha, Kauai, Hawaii

2

DRAWN	JOB NUMBER	APPROVED	FILE	DATE	REVISED DATE
kar	22924.804	<i>U</i>	KLFWI	6/95	

Top of Casing 11.67 ft (MSL)

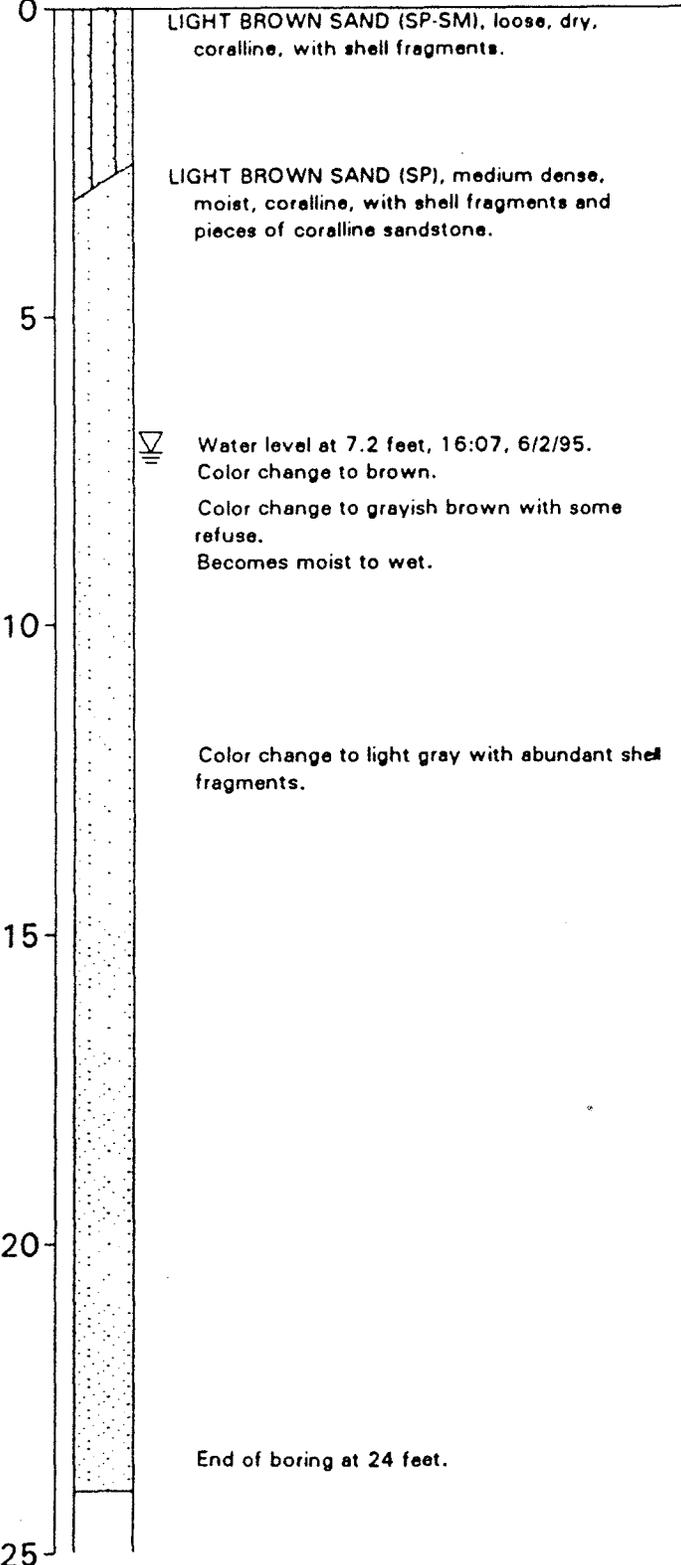
LOCKED PROTECTIVE  
CASING EXTENDS 2'  
ABOVE GRADE



Equipment Mobile B-34

Elevation ~9.5 feet Date 05/24/95

Depth (ft)  
Sample



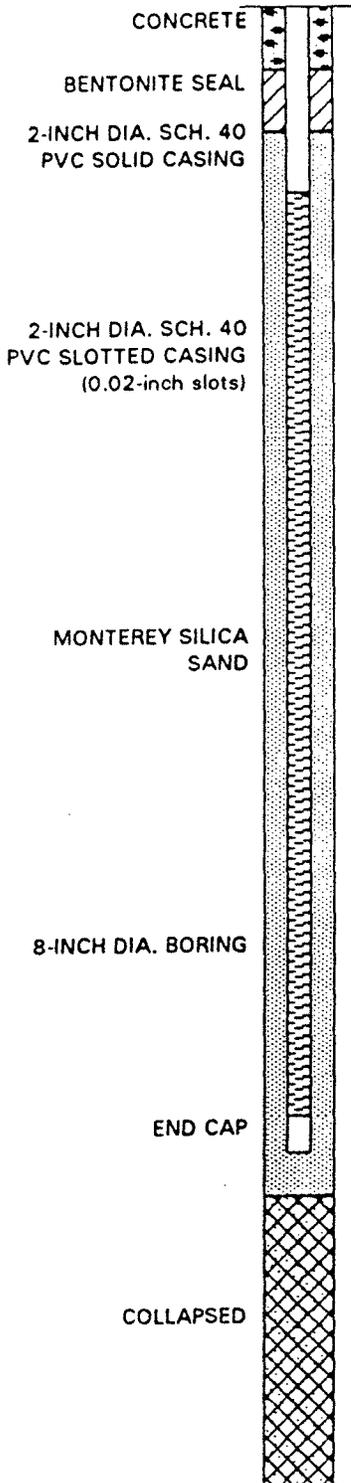
Harding Lawson Associates  
Engineering and  
Environmental Services

Log of Monitoring Well MW-I-2 (Sheet 1 of 1) **FIGURE 3**  
Kekaha Landfill Phase I  
Kekaha, Kauai, Hawaii

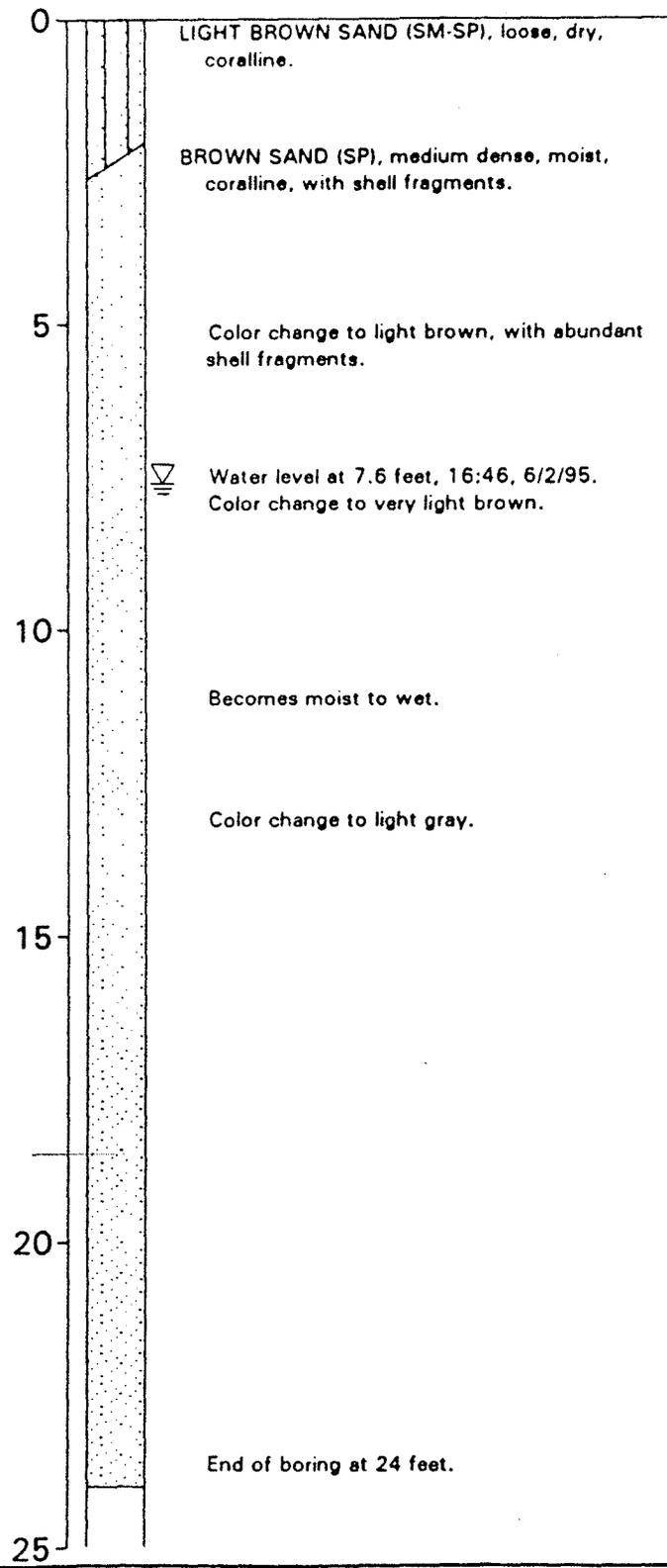
DRAWN	JOB NUMBER	APPROVED	FILE	DATE	REVISED DATE
kar	22924.804	<i>[Signature]</i>	KLFWI	6/95	

Top of Casing 12.08 ft (MSL)

LOCKED PROTECTIVE CASING EXTENDS 2' ABOVE GRADE



Equipment Mobile B-34  
 Elevation ~ 10 feet Date 05/25/95



Harding Lawson Associates  
 Engineering and  
 Environmental Services

Log of Monitoring Well MW-1-3 (Sheet 1 of 1) **FIGURE 4**  
 Kekaha Landfill Phase I  
 Kekaha, Kauai, Hawaii

DRAWN lps JOB NUMBER 20024-001 APPROVED llc FILE            DATE            REVISED DATE

Top of Casing feet

Laboratory Tests

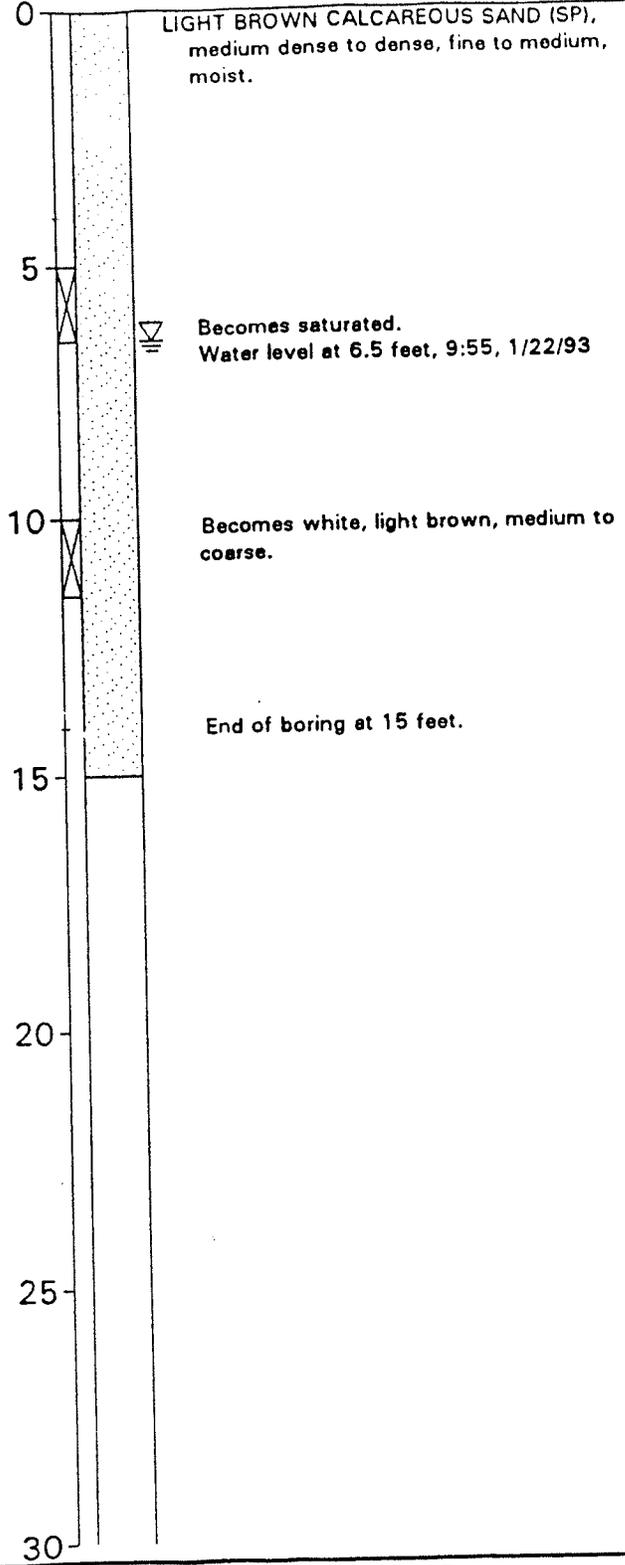
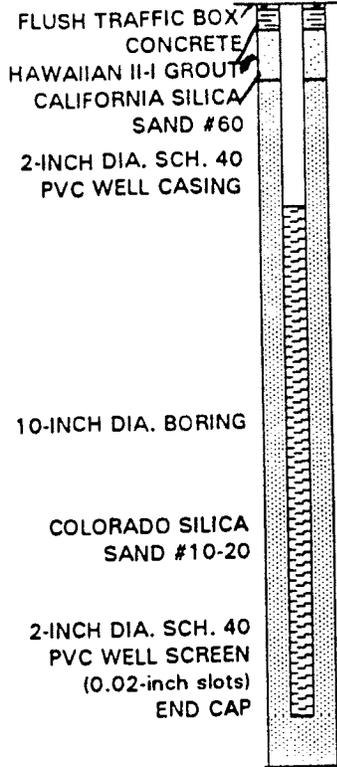
Moisture Content (%)

Blows/foot

Depth (ft)  
Sample

Equipment Mobile B-61

Elevation feet Date 01/22/93



PLATE

**Log of Monitoring Well MW-II-2**  
Kekaha Phase II Design  
Kekaha, Kauai, Hawaii

**A-2**



**Harding Lawson Associates**  
Engineering and  
Environmental Services

DRAWN  
kar

JOB NUMBER  
22897.204

APPROVED  
*PBC*

FILE  
KEKII

DATE  
2/93

REVISED DATE

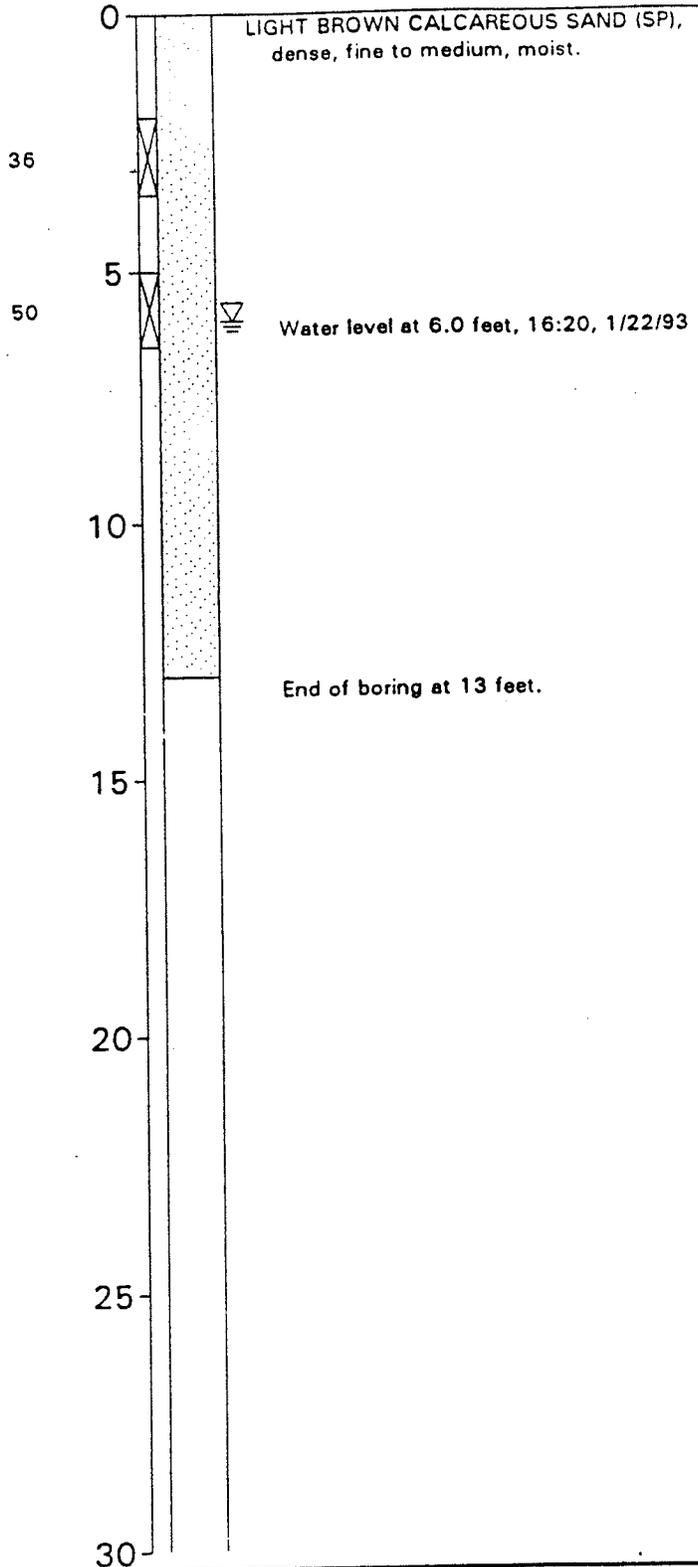
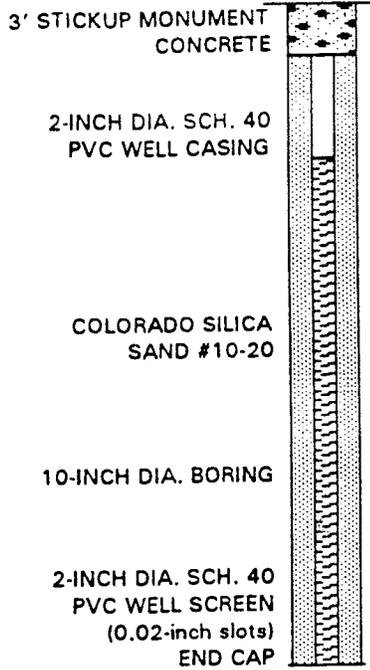
Top of Casing feet

Laboratory Tests  
Moisture Content (%)

Blows/foot

Depth (ft)  
Sample

Equipment Mobile B-61  
Elevation feet Date 01/22/93



Harding Lawson Associates  
Engineering and  
Environmental Services

Log of Monitoring Well MW-II-4  
Kekaha Phase II Design  
Kekaha, Kauai, Hawaii

PLATE

A-4

DRAWN kar JOB NUMBER 22897.204

APPROVED PBC

FILE KEKII

DATE 2/93

REVISED DATE

Top of Casing feet

Laboratory Tests  
Moisture Content (%)

Blows/foot

Depth (ft)  
Sample

Equipment Mobile B-61

Elevation feet Date 01/23/93

3' STICKUP MONUMENT CONCRETE

2-INCH DIA. SCH. 40 PVC WELL CASING

COLORADO SILICA SAND #10-20

10-INCH DIA. BORING

2-INCH DIA. SCH. 40 PVC WELL SCREEN (0.02-inch slots)  
END CAP

47

30

25

10

15

20

25

30

LIGHT BROWN CALCAREOUS SAND (SP), fine, moist.

Becomes saturated.

End of boring at 13 feet.



Harding Lawson Associates  
Engineering and Environmental Services

Log of Monitoring Well MW-II-5  
Kekaha Phase II Design  
Kekaha, Kauai, Hawaii

PLATE

A-5

DRAWN  
kar

JOB NUMBER  
22897.204

APPROVED  
PBC

FILE  
KEKII

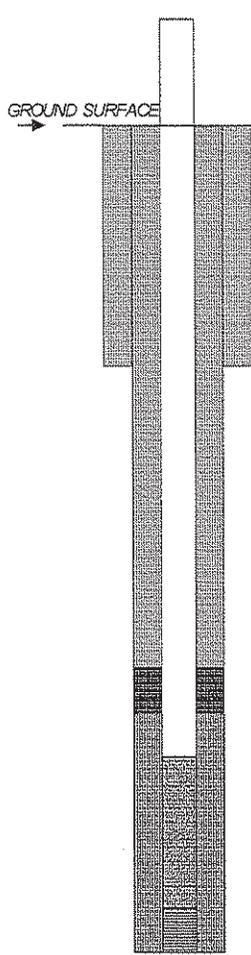
DATE  
2/93

REVISED DATE



# WELL COMPLETION RECORD

JOB NO.: \_\_\_\_\_ WELL NO. MW-11-07 HYDROGEOLOGIST: Jeremy Haney  
 CLIENT: City and County of Kauai DRILLER: Tim Robertson  
 WELL LOCATION: Kekaha Landfill DATE/TIME: Nov 20, 2008



Well Head Elevation +2ft  
 Ground Surface Elev. ?  
 Well Head Completion Method concrete monument + bollards

Drilling Method/Rig Type hollow stem auger

**DETAILS OF CONSTRUCTION**

Date Completed 11/19/08  
 Borehole Diameter (in.) 8in  
 Type and Size of Casing (in.) sch 40 PVC 2in  
 Type and Size of Screen (in.) 1" x 20ft  
 Screen Perforation Diameter (in.) 0.010  
 Screen Length (ft.) 20ft  
 Centralizer Depths (ft.) NA  
 Completion Technique  
 1. Type of Filter Pack and Placement Method  
Sand Monterey #3  
 2. Type of Bentonite and Placement Method  
pellets  
 3. Type of Grout Mixture and Placement Method  
Cement  
 Description of Potential Problems With Well:  
None

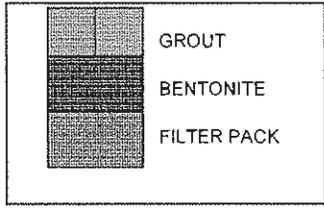
Surface Casing: monument Type Steel  
 Diameter 8 1/4  
 Length 5ft

**MATERIALS**  
 Cement (bags) 4  
 Sand (ft.<sup>3</sup>) 7 bsc  
 Casing Material (ft.) 5 ft  
 Bentonite (ft.<sup>3</sup>) 1 Bcg

2.0 Top of Bentonite 2.0 ft.  
 3.0 Top of Filter Pack 3.0 ft.  
 3.5 Top of Screen 3.5 ft.  
 5.0  
 23.5 Bottom of Screen 23.5 ft.  
 24.0 Bottom of Hole 24.0 ft.

NOTE: ALL DEPTHS ARE REFERENCED TO GROUND SURFACE

Development Technique Surge + pump





## **Appendix C: Field Forms**



# WELL CONDITION INSPECTION FORM

Site: \_\_\_\_\_

Personnel: \_\_\_\_\_

Date: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_

Well ID	Protective Casing	Well Casing	Label	Lock	Sample Equipment Type	General Turbidity	Well Yield	Comments/Observations *
	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Clear <input type="checkbox"/> Turbid	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	
	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Clear <input type="checkbox"/> Turbid	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	
	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Clear <input type="checkbox"/> Turbid	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	
	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Clear <input type="checkbox"/> Turbid	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	
	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Clear <input type="checkbox"/> Turbid	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	
	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Clear <input type="checkbox"/> Turbid	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	
	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Clear <input type="checkbox"/> Turbid	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	
	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Clear <input type="checkbox"/> Turbid	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	
	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Clear <input type="checkbox"/> Turbid	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	
	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Damaged	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Clear <input type="checkbox"/> Turbid	<input type="checkbox"/> OK <input type="checkbox"/> Inadequate	

\* Note ponding water, weep holes, or any other information pertaining to well condition. Provide additional details on listed items.

**Return this form to Site Manager and Groundwater Program Manager**

## Well Condition Summary Form

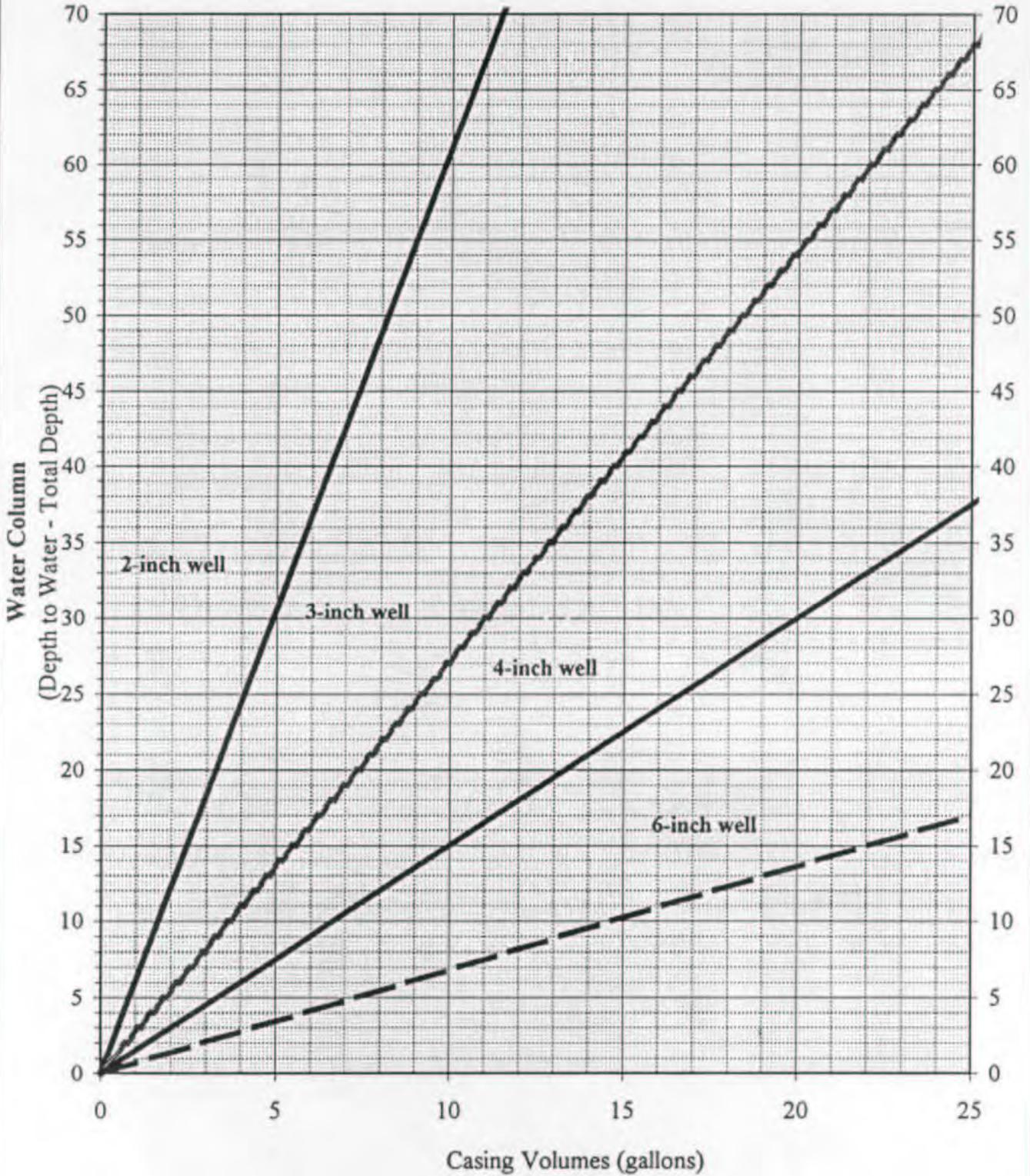
Facility: \_\_\_\_\_ Well/Piezometer Name: \_\_\_\_\_

Evaluator: \_\_\_\_\_ Evaluation Date: \_\_\_\_\_

	Y	N	N/A
Is the well's location appropriately shown on a facility map?			
Is the well adequately flagged if hard to find?			
Is the well elevation information inscribed at or on the well correct?			
Is the well: <input type="checkbox"/> flush with surface? <input type="checkbox"/> above ground?			
Is the well free of physical damage?			
Is the well labeled on the inside?			
Is the well labeled on the outside?			
Does the well have protective posts, if necessary?			
Do above ground wells have weep holes at the base of the protective casing?			
Does the area around the well appear clean?			
Is the casing secure (attempt to move along two perpendicular axes)?			
Is the surface seal void of differential erosion around and under the base?			
Is the surface seal free of cracks that might affect the integrity of the seal?			
Is the surface seal sloped to prevent ponding around the well?			
Is the well free from standing or ponded water?			
Is the well locked to prevent unauthorized access?			
Is the protective casing cap void of large gaps which would breach security?			
Is the locking cap free of rust?			
Is there a survey mark on the riser/wellhead assembly cap?			
Is the riser cap vented?			
Is the annular space free of animal/insect nests?			
Is the annular space appropriately filled with filtering material?			
If a pump, can it be lifted a few inches? (do not test prior to sampling)			
Is the well free of kinks or bends?			

COMMENTS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# Purge Table



$$\text{Casing Vol [gal]} = (3.142) * ((\text{well radius [in]} / 12 [\text{in/ft}])^2) * (\text{water col. [ft]}) * 7.5 [\text{gal/ft}^3]$$



## METER CALIBRATION LOG

PROJECT NAME: \_\_\_\_\_ DATE: \_\_\_\_\_  
 PROJECT NUMBER: \_\_\_\_\_ SAMPLER: \_\_\_\_\_  
 MODEL: \_\_\_\_\_ SERIAL NO.: \_\_\_\_\_

### pH METER

Time	pH 10 Buffer Check	pH 7 Buffer Check	pH 4 Buffer Check	Temp of Calibration Soln (°C)

Buffer Lot Numbers: pH 4: \_\_\_\_\_ pH 7: \_\_\_\_\_ pH 10: \_\_\_\_\_

### CONDUCTIVITY METER REDOX METER

Temp. of Calibration Soln	Corrected Cond. @ 25°C	Time

Temp (°C)	E <sub>H</sub> Reading (mV)	Time

Calibration Solution Lot Number: \_\_\_\_\_ Calibration Solution Lot Number: \_\_\_\_\_  
 Calibration Range for Solution \_\_\_\_\_ Calibration Range for Solution \_\_\_\_\_

MODEL: \_\_\_\_\_ SERIAL NO.: \_\_\_\_\_

### Turbidity Meter

Gel Value (NTU)	Reading (NTU)	Time
0 – 10 range		
0 – 100 range		
0 – 1,000 range		
0 – 10 range		
0 – 100 range		
0 – 1,000 range		

Problems/Corrective Actions: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

QC'd By: \_\_\_\_\_ Date: \_\_\_\_\_

**SECTION VII**

**PERIMETER GAS MONITORING PLAN**





**PERIMETER GAS MONITORING PLAN  
KEKAHA LANDFILL PHASE II  
KEKAHA, KAUA'I, HAWAII**

**County of Kaua'i**  
**Department of Public Works**  
4444 Rice Street  
Lihu'e, Kaua'i 96766

January 2016



**PERIMETER GAS MONITORING PLAN  
KEKAHA LANDFILL PHASE II  
KEKAHA, KAUA'I, HAWAII**

Prepared for:

**County of Kaua'i**  
**Department of Public Works**  
4444 Rice Street  
Lihu'e, Kaua'i 96766

Prepared by:

**AECOM Technical Services, Inc.**  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813-3698

January 2016



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## ACRONYMS AND ABBREVIATIONS

§	Section
bgs	below ground surface
CFR	Code of Federal Regulations
DOH	Department of Health, State of Hawaii
EPA	Environmental Protection Agency, United States
ft	foot or feet
GCCS	gas collection and control system
HAR	Hawaii Administrative Rules
ID	identification
KLF	Kekaha Landfill
LEL	lower explosive limit
LFG	landfill gas
Mg	megagram
msl	mean sea level
MSW	municipal solid waste
NMOC	non-methane volatile organic compound
PGMP	perimeter gas monitoring plan
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
SWS	Solid Waste Section
toc	top of casing



## 1.0 INTRODUCTION

AECOM has prepared this Perimeter Gas Monitoring Plan (PGMP) for the Kekaha Landfill (KLF) Phase II, located in Kekaha, Kaua'i, Hawai'i.

This PGMP summarizes the existing perimeter gas monitoring network and gas monitoring program for the monitoring of methane at the KLF Phase II. Furthermore, this PGMP presents procedures for the installation of additional perimeter gas monitoring probes as part of the proposed KLF Phase II Cell 2 Expansion. This PGMP complies with the landfill gas (LFG) monitoring requirements of the Federal Resource Conservation and Recovery Act (RCRA) Subtitle D regulations, Hawaii Administrative Rules (HAR), and the KLF Phase II Solid Waste Permit (No.LF-0053-09) that was issued by the State of Hawai'i Department of Health (DOH) Solid Waste Section (SWS).

### 1.1 OBJECTIVES

The objectives of this PGMP are:

- To summarize applicable LFG migration monitoring and regulatory requirements.
- To outline the existing perimeter gas monitoring network and current site conditions at the KLF Phase II.
- To specify upcoming modifications to the existing KLF Phase II perimeter gas monitoring network as part of the proposed KLF Phase II Cell 2 Expansion.

### 1.2 REGULATORY REQUIREMENTS

Pursuant to RCRA Subtitle D regulations 40 Code of Federal Regulations (CFR) Section (§)258.23, and HAR Title 11, Chapter 58.1-15(d) municipal solid waste (MSW) landfills must monitor methane gas in facility structures and around the landfill perimeter (DOH 1994). Owners or operators of all MSW landfills must ensure that:

- §258.23 (a)(1) & §11-58.1-15(d)(1)(A) "The concentration of methane gas generated by the facility does not exceed 25 percent of the lower explosive limit (LEL) for methane in facility structures (excluding gas control or recovery system components)" and,
- §258.23 (a)(2) & §11-58.1-15(d)(1)(B) "The concentration of methane gas does not exceed the lower explosive limit for methane at the facility property boundary."
- §258.23 (b)(1) & §11-58.1-15 (d)(2)(A) "The type and frequency of monitoring must be determined based on the following factors:
  - (i) Soil conditions;
  - (ii) The hydrogeologic conditions surrounding the facility;
  - (iii) The hydraulic conditions surrounding the facility; and
  - (iv) The location of facility structures and property boundaries."

These criteria were considered in developing the PGMP for the KLF Phase II.



## 2.0 SITE INFORMATION

This section consists of five subsections presenting site information pertinent to the KLF Phase II gas monitoring program:

- Site Description
- Landfill Structures and Surroundings
- Site Geology
- Site Hydrogeology
- LFG Collection and Control System (GCCS)

### 2.1 Site Description

The KLF Phase II is located near the southwest coast of the island of Kaua'i, approximately 1.5 miles northwest of the town of Kekaha, and approximately 2,000 feet (ft) from the Pacific Ocean shoreline. The facility is owned by the County of Kaua'i Department of Public Works and operated by Waste Management of Hawaii, Inc. The Phase II facility is bounded by Kaumuali'i Highway to the northeast, an unpaved access road and agricultural land to the southeast, aquaculture facilities to the northwest, and the KLF Phase I area to the southwest. The site is hydraulically upgradient of the KLF Phase I, which is a closed and unlined MSW landfill. No established natural streams or lakes exist within or near the facility. Streams on the inland edge of the coastal plain are diverted to the sugarcane plantation irrigation system (R.M. Towill Corp 1993). The site location is shown on Figure 1.

The KLF Phase II has been in operation as a permitted MSW landfill for disposal of non-hazardous solid wastes since October 9, 1993, and currently receives all MSW and demolition/construction debris generated on the island of Kaua'i. The KLF Phase II property covers approximately 63 acres. The permitted waste footprint for Phase II is approximately 32.1 acres subdivided into 14 smaller waste disposal sub-cells each about 2 acres, and the Cell 1 expansion, 6.4 acres subdivided into 4 smaller waste disposal sub-cells each about 1 acre.. The landfill base elevation of the KLF Phase II varies from approximately 7 ft above mean sea level (msl) to 12 ft above msl and surface runoff drains towards the northeast. The current waste disposal cells are composite-lined with geosynthetic clay liners overlain by 60-mil, high-density polyethylene geomembranes. The KLF Cell 2 expansion of Phase II will have a subbase liner elevation ranging from 11 to 21 ft above msl and a maximum final elevation of 120 above msl.

### 2.2 LANDFILL STRUCTURES AND SURROUNDINGS

The Phase II landfill facility constructed in 1993 is bounded by Kaumuali'i Highway to the northeast, an unpaved access road and agriculture to the southeast, aquaculture to the northwest, and the Phase I area to the southwest. The landfill office, scale house, and maintenance shop are located along the northeast property line. The existing site layout is shown on Figure 2.

### 2.3 CLIMATE AND TOPOGRAPHY

The Kekaha-Mana coastal plain is relatively arid compared to the rest of Kaua'i due to the "rain-shadow" effect. Average annual rainfall in the area averages between 10 to 40 inches per year, while areas near the center of the island average more than 280 inches of rain per year (Oregon Climate Services 1998).

### 2.4 SITE GEOLOGY

Borings have been advanced to more than 50 ft below existing grade without reaching the bottom of the coastal plain aquifer, and it is estimated that the thickness of the coastal plain aquifer may

exceed 400 ft beneath the landfill area (Sanifill and Baquerizo 1996). The upper 50 ft of these deposits consist of surficial alluvial sediments composed of loose, sand-size coral and shell debris. Below a depth of 50 ft, these deposits become increasingly consolidated and indurated, and represent the coralline and marl sedimentary rocks reported in regional investigations.

## 2.5 SITE HYDROGEOLOGY

Shallow groundwater underlying the KLF occurs within the surficial sedimentary deposits of the coastal plain aquifer; the water table ranges in depth from approximately 4 ft to 7 ft msl. The historical water level monitoring data indicate that groundwater typically flows toward the ocean in a west-southwest direction, with a hydraulic gradient of approximately 0.0005 feet per foot. The historical monitoring data indicate that the direction of groundwater flow at the site can periodically shift more than 90 degrees toward the north and more than 60 degrees toward the south relative to the typical west-southwest flow direction, and the gradient sometimes becomes nearly flat.

Several factors may contribute to periodic shifts in the groundwater flow direction at the landfill. The direction of the local hydraulic gradient is likely affected by variations in pumping rates for the groundwater management system wells and other production wells near the site. These nearby wells are used to supply water for irrigation and other non-potable purposes and to draw down the groundwater table to prevent saturation of surface soil by the brackish groundwater, thus allowing cultivation of sugarcane and other crops on the Mana Plain. Infiltration from leaks in the aquaculture (shrimp farm) ponds located immediately northwest of the Phase II landfill site may also contribute to periodic fluctuations in the hydraulic gradient. Similarly, the landfill's storm- and surface-water controls systems, particularly the infiltration basin, may affect localized groundwater patterns, especially after rain events. As discussed below, tidal study results suggest that tidal effects do not significantly influence the prevailing groundwater flow direction; however, short-term tidal effects may also contribute to the flow direction and gradient variations indicated by the historical monitoring data.

The vertical component of groundwater flow at the site is negligible; therefore, the groundwater flows horizontally beneath the facility, ultimately discharging to the ocean southwest of the site. The KLF monitoring wells will therefore target the upper interval of the coastal plain aquifer.

Table 1 presents the calculated groundwater elevations (relative to msl) and depth-to-groundwater measurements made at the KLF Phase II in August 2015. As shown in Table 1, groundwater elevations at the KLF Phase II monitoring wells ranged from 3.29 and 3.81 ft above msl on August 31, 2015. As shown on Figure 2, the August 31, 2015 water level data indicate that the hydraulic gradient sloped toward the south-southwest.

**Table 1: Recent Groundwater Level Summary**

Well ID	toc Elevation <sup>a</sup> (ft msl)	Measurement Date	Depth To Groundwater (ft below toc)	Groundwater Elevation (ft msl)
MWII-2	14.70	08/31/15	11.41	3.29
MWII-4	20.38	08/31/15	16.8	3.58
MWII-5	12.41	08/31/15	8.6	3.81
MWII-6	22.14	08/31/15	18.5	3.64
MWII-7	10.16	08/31/15	6.4	3.76

ID identification  
toc top of casing

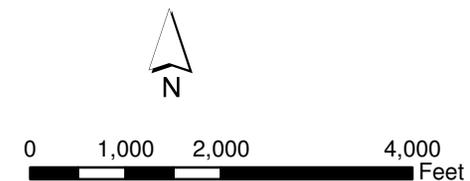
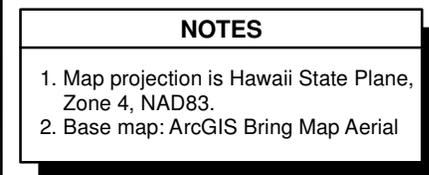
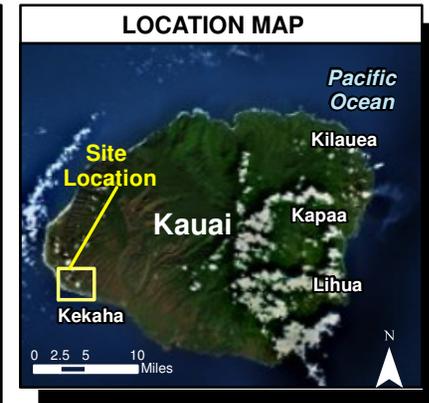
<sup>a</sup> toc elevations are from a December 2011 Survey by Honua Engineering, Inc.

## **2.6 LANDFILL GAS COLLECTION AND CONTROL SYSTEM**

As of the permitting of the latest Phase II vertical expansion, the KLF has a design capacity greater than 2.5 million Mg and 2.5 million cubic meters (including all of the Phase I and Phase II landfill areas). Therefore, the facility is subject to the Clean Air Act Title V requirements, and has submitted a gas collection and control system (GCCS) design plan for the entire site including Phase I and Phase II to the regulatory authorities. The GCCS design was submitted to DOH and EPA in May 2015. The plan will be amended to include Cell 2 within 12 months of the issuance of the solid waste permit for the expansion area. The GCCS consists of vertical gas extraction wells, associated header piping, condensate management and a flare. The Phase I landfill currently has passive vents because a gas collection system was not required until the recent vertical expansion, however, the Phase I area will transition to active extraction in accordance with the GCCS design plan.

The GCCS covering both Phases I and II is anticipated to be constructed by December 2016.

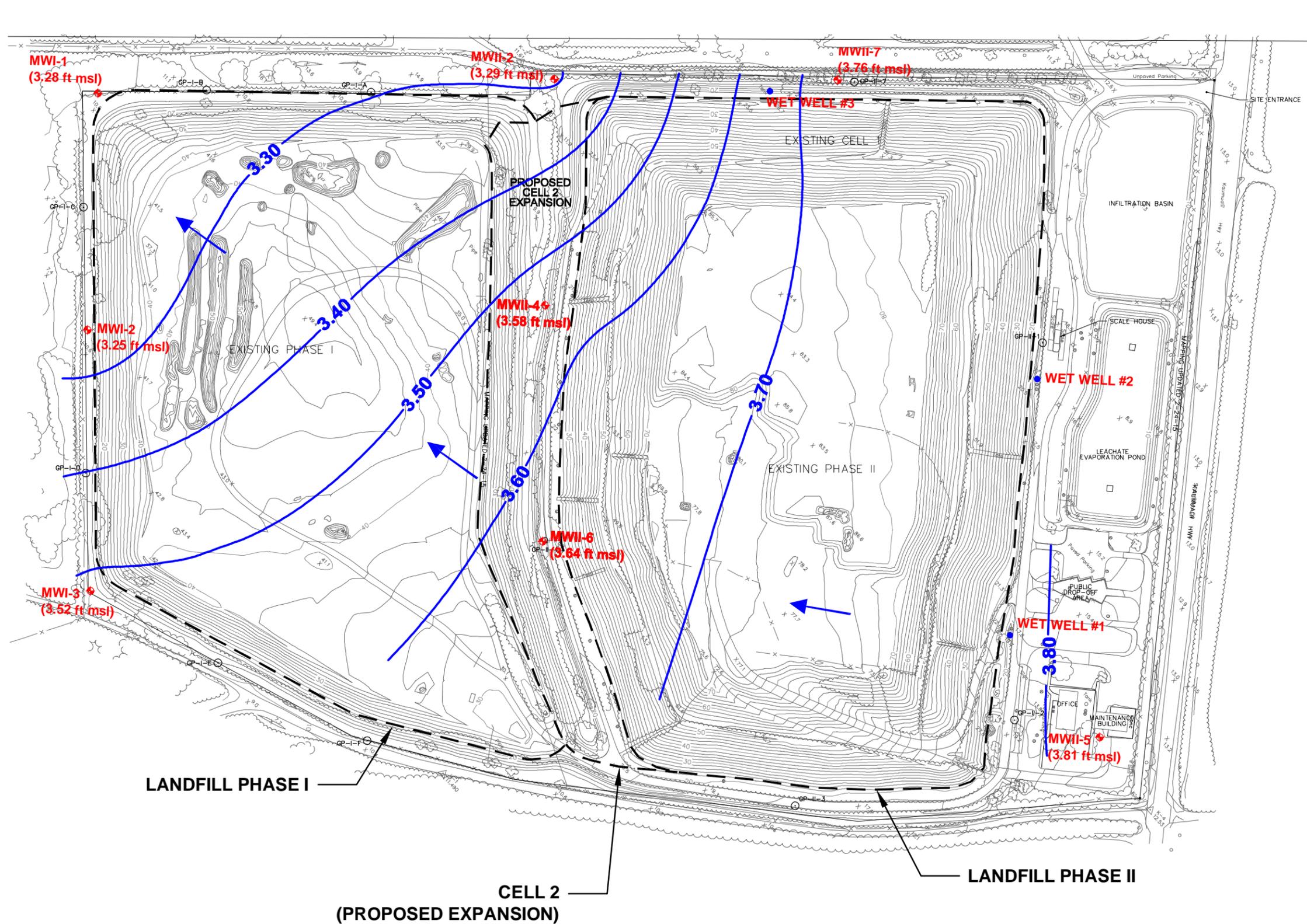




**Figure 1**  
**Site Location Map**  
**Kekaha Landfill**  
**Kauai, Hawaii**



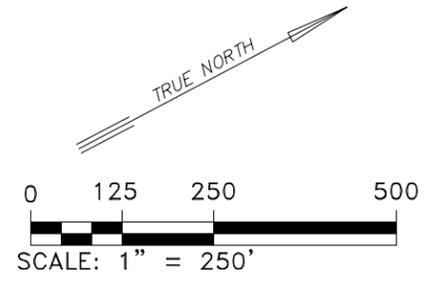
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LEGEND	
MWII-4 ELEV. ft msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
—3.30—	GROUNDWATER POTENTIOMETRIC SURFACE
←	GROUNDWATER FLOW DIRECTION
•	LEACHATE WET WELL

**NOTE**

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A FEBRUARY 2015 AERIAL SURVEY.



**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**  
**Kekaha Landfill Phase II**  
**(August 31, 2015)**  
**Kauai, Hawaii**





### 3.0 PERIMETER GAS MONITORING NETWORK

This section consists of three subsections that describe the current perimeter gas monitoring network and proposed modifications at the KLF Phase II:

- Current Perimeter Gas Monitoring Network
- Proposed Modifications to Perimeter Gas Monitoring Network
- Proposed Perimeter Gas Monitoring Probe Construction

#### 3.1 CURRENT PERIMETER GAS MONITORING NETWORK

The perimeter gas monitoring network at the KLF Phase II consists of permanent gas probes to detect any LFG migration from the KLF Phase II. The existing LFG monitoring system consists of six (6) permanent LFG monitoring probe locations (GP11-1, GP11-2, GP11-3, GP11-4, GP11-6 and GP11-7) installed around the perimeter of the site (See Figure 3). LFG migration compliance monitoring is performed on a quarterly basis.

#### 3.2 PROPOSED MODIFICATIONS TO PERIMETER GAS MONITORING NETWORK

The County of Kaua'i is proposing to laterally expand the KLF Phase II to provide additional air space volume to accommodate siting, designing, and construction of a future landfill facility. The Cell 2 lateral expansion component results from the extension of the permitted footprint of Phase II to the southwest "piggy backing" the northwest edge of the Phase I landfill area. As part of the expansion, gas probe GP11-4 and GP11-6, located along the existing southwestern limit of waste at the Phase II landfill will be abandoned and two additional gas probes (GP11-8 and GP11-9) will be installed.

The design of the additional permanent gas monitoring probes will be consistent with the *Kekaha Landfill Phase II Landfill Gas Migration Plan* (HLA 1993) and EPA requirements for a perimeter gas monitoring network, as detailed in the *Solid Waste Disposal Facility Criteria, Technical Manual*, which was prepared by the EPA to assist in the implementation of Subtitle D requirements. Specifically, the permanent gas probe design will meet the following criteria:

- *Location:* Permanent gas probe locations will be selected with consideration of site-specific characteristics, potential migration pathways, adjacent land use, and inhabitable structures in the vicinity of property boundary. The probe locations will also be selected to provide installation and sampling access, and to minimize impacts from site operations and future landfill construction.
- *Spacing:* Spacing of probes will be based on localized subsurface conditions and will comply with any applicable regulatory requirements.
- *Depth:* The design depths of the permanent gas probes will be based on documented groundwater surface depths. The construction depths may vary from proposed depths depending on actual conditions encountered during drilling.

#### 3.3 PROPOSED PERIMETER GAS MONITORING PROBE CONSTRUCTION

To complete the perimeter gas monitoring network of Phase II, two additional permanent gas probes (GP11-8 and GP11-9) are proposed at the KLF Phase II (see Figure 3). Additionally, gas probes (GP-1-A through GP-1-F) from the Phase I portion of the landfill will be monitored quarterly as part of Phase II activities. It is expected that the borings for the proposed gas probes of the Cell 2 expansion will be drilled using a 6-inch-diameter hollow-stem auger. The feasible depth of each boring will be determined in the field, based on first encountered groundwater (see Table 2). A geologist will supervise the drilling and observe drill cuttings for lithologic logging.

The borings will be converted to permanent gas monitoring probes by installing a 1-inch diameter Schedule 80 polyvinyl chloride (PVC) casing into each borehole. The casing will be provided with a full-length screened interval below the 3-ft top-seal depth. The annular space between the borehole and PVC well casing will be backfilled with pea-gravel filter pack to 1-ft above the top of the probe screen. A 1-ft bentonite separation layer will be placed above the pea-gravel filter pack. A 1-ft thick bentonite cement seal will be placed from the top of the bentonite separation layer to the ground surface. A 6-inch thick concrete sanitary seal will be cast-in-place at the ground surface. Each probe will be completed to approximately 3 ft above surface grade and fitted with a monitoring port, a locking cap, and a steel "stovepipe" monument.

**Table 2: Proposed Gas Probe Schedule**

Probe No.	Approx. Ground Surface Elev. (ft msl) <sup>a</sup>	Approx. Groundwater Elevation (ft msl) <sup>b</sup>	Approx. Depth to Water (ft bgs)	Approx. Borehole Depth (ft bgs) <sup>c</sup>	PVC Pipe Length	
					Perforated (ft)	Solid <sup>d</sup> (ft)
GPII-8	15	4.5	10.5	10	7	6
GPII-9	20	4.5	15.5	15	12	6

bgs below ground surface

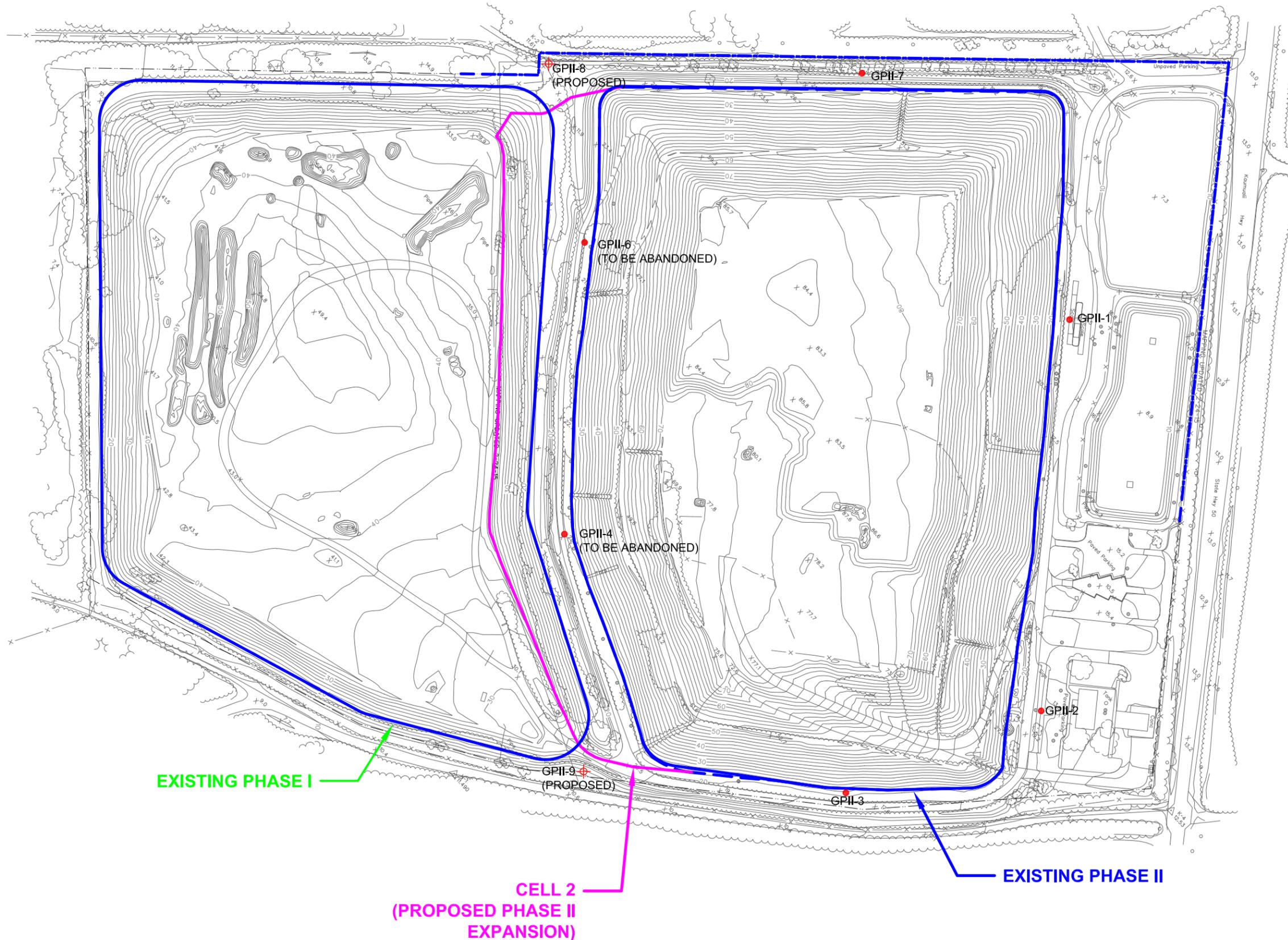
<sup>a</sup> Approximate ground surface elevation base on aerial photogrammetric mapping dated 5-19-06 topographical fly over. Ground surface elevations at the time of probe construction will likely change due gaining access to the probe location including; roads, gravel pads, and/or alterations to the landscape (i.e., the visual barrier berm) to permit placement of the probe.

<sup>b</sup> Groundwater elevation is estimated from historical groundwater contour maps for the site.

<sup>c</sup> Total borehole depths are equal to the depth to lowest elevation groundwater elevation near the proposed gas monitoring probe.

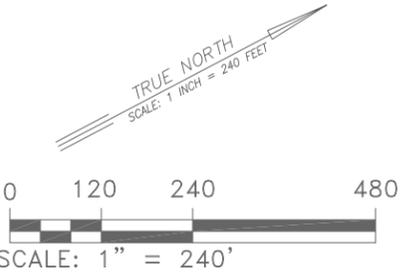
<sup>d</sup> Solid pipe length includes 3 ft stickup.

\\Hawaii\Hawaii\Projects\Legis\BHV\Non-Federal\County of Kauai\Kekaha\Task 15 Cell 2 DeFigure 3\_GMPLoc\_06012015.dwg 10/05/15 11:19 AM memod



**LEGEND**

- EXISTING GAS MONITORING PROBE
- ⊕ PROPOSED GAS MONITORING PROBE



**Figure 3**  
**Gas Monitoring Probe Locations**



Kekaha Municipal Solid Waste Landfill  
Kekaha, Kaua'i, Hawai'i



## 4.0 GAS MONITORING PROGRAM

This section consists of eight subsections summarizing gas monitoring program at the KLF Phase II:

- Perimeter Gas Probe Monitoring
- Monitoring Equipment
- Monitoring Procedures
- Perimeter Probe Methane Compliance Monitoring
- Structure Compliance Monitoring System
- Documentation and Reporting
- Responses for Exceedances
- Inspection and Maintenance

### 4.1 PERIMETER GAS PROBE MONITORING

The perimeter gas network is monitored quarterly, as required by RCRA Subtitle D regulations, HAR Chapter 11-58.1-15(d) (DOH 1994), and the KLF Phase II Solid Waste Permit. The following subsections describe the monitoring equipment and procedures, the compliance threshold level for methane, documentation and recording procedures, the response to be conducted in an event of an exceedance of compliance threshold level, and inspection and maintenance procedures to be followed by KLF Phase II.

### 4.2 MONITORING EQUIPMENT

A portable gas-monitoring instrument (*Land Tec GEM 2000* or equivalent) calibrated to detect methane at concentrations of 5 percent or less is used to monitor the perimeter gas probes. The gas-monitoring instrument is calibrated before and after each monitoring day, using an appropriate standard calibration gas. Calibration information for the meter is entered into the *Landfill Gas Meter Calibration Certificate* (Appendix A). Maintenance and calibration of all monitoring instruments are in accordance with manufacturer instructions.

### 4.3 MONITORING PROCEDURES

On a quarterly basis, trained personnel will monitor the perimeter gas probes using a calibrated portable gas-monitoring instrument (as described in above in Section 4.2).

#### **Methane**

The proposed permanent gas probes will contain a capped 1/4-inch monitoring port installed at the top of the probe casing. Tygon tubing that is attached to the portable gas-monitoring instrument will be connected onto the monitoring port. Once the connection between the instrument and the casing space has been established the gas probe pressure will be recorded. The technician will then turn on the instrument pump and allow gas through the instrument for a period of at least 2 minutes, until readings have stabilized. Following stabilization the technician will record the methane concentration in percent LEL and percent by volume. These results, in addition to ambient temperature and barometric pressure readings will be recorded electronically directly into the memory of the portable gas monitoring instrument or transcribed onto a *Perimeter Gas Monitoring Field Report Form* (see Appendix B), which will be retained on-site in the KLF Phase II Operating Files.

#### 4.4 PERIMETER PROBE METHANE COMPLIANCE MONITORING

If methane levels within any probe are detected at or above 5 percent by volume, a response action will be conducted in accordance with Subtitle D regulations, HAR standards, and the KLF Phase II solid waste permit. These actions are outlined in procedures listed in Section 4.5 below.

#### 4.5 STRUCTURE COMPLIANCE MONITORING SYSTEM

Building structures at the KLF Phase II are monitored quarterly. Combustible gas is most likely to accumulate within corners, baseboards, crawlspaces, or any location where air movement is restricted and in areas of potential leaks.

If methane levels are detected at or above 1.25 percent by volume, methane levels will be verified using an infrared gas detector, flame ionization detector, or equivalent instrument, with a minimum detection level of 0.1 percent methane by volume or less. If methane levels are verified to be 1.25 percent by volume or greater, the KLF Phase II will take steps to ensure worker safety. In addition, KLF Phase II will institute controls to bring the level of methane within buildings below 1.25 percent in the structure.

#### 4.6 DOCUMENTATION AND REPORTING

In accordance with Subtitle D regulations, HAR standards, and the KLF Phase II solid waste permit, perimeter gas probe monitoring results are recorded electronically within the memory of the portable gas-monitoring instrument and/or transcribed on to the *Perimeter Gas Monitoring Field Report Form* (Appendix C) and retained onsite in the KLF Phase II Operating Record. The monitoring reports include:

- Methane concentrations and pressure at each probe
- Documentation of site conditions at the time of monitoring, including date, time, barometric pressure, atmospheric temperatures, and general weather conditions
- Personnel names, instrumentation, and a brief description of methods used in the monitoring

All monitoring data will be maintained through the closure and post-closure periods. A monitoring report with the above mentioned information will be submitted to the DOH SWS within 60 days of each monitoring event.

#### 4.7 RESPONSES FOR EXCEEDANCES

If methane is detected at levels exceeding 1.25 percent by volume in facility structures or 5 percent by volume in perimeter gas monitoring probes, then the owner or operator may conduct a verification monitoring event, provided that the event be conducted within 1 hour of measuring the initial exceedance. The exceedance limits specified above correspond to explosive gas (methane) control limits specified in RCRA Subtitle D regulations 40 CFR §258.23, HAR Title 11, Chapter 58.1-15(d) (DOH 1994), or the KLF Phase II Solid Waste Permit (No. LF-0104-04).

If verification monitoring indicates that gas concentrations are below the regulatory limits, the owner or operator shall place the results in the operating record and send written notification of the exceedance and verification monitoring event to the DOH within 7 days.

If verification sampling is not performed within 1 hour of measuring the initial exceedance, and/or the verification sampling confirms an exceedance, the owner or operator shall perform the following:

- Immediately take all necessary steps to ensure protection of human health.
- Immediately notify the DOH of the exceedance.

- Within three (3) days of detection, place in the operating record and submit to the DOH, the type of gas detected, gas levels detected and a description of the steps taken to protect human health.
- Within 60 days of detection, implement a remediation plan for the combustible gas releases, place a copy of the plan in the operating record, provide a copy of the plan to the DOH, and notify the DOH that the plan has been implemented. The plan shall describe the nature and extent of the problem and the proposed remedy.
- Within 30 days after the remediation plan has been completed, submit a report to the DOH documenting the actions taken, additional monitoring results, and plans to prevent future recurrences

The DOH may modify the reporting and implementation schedule, as necessary to protect human health and the environment.

#### **4.8 INSPECTION AND MAINTENANCE**

The owner or operator shall inspect and maintain the gas monitoring probes. In the event that a probe is unusable, KLF Phase II shall repair the probe or install a new probe prior to the next monitoring event.

If a probe is repaired, the owner or operator will submit documentation to the DOH SWS indicating the reason for the repair, type of repairs completed, and evaluations performed to ensure the probe is acceptable for use.

If a probe is replaced, then the owner or operator will comply with the following requirements:

1. The owner or operator will update the PGMP to show the new probe location and identification number within 30 days. The update shall also document the reason for replacing the probe.
2. The owner or operator will submit an installation report for the new probe within 60 days to the DOH SWS. The documentation shall include, but is not limited to, geologic logs of each probe location, surveyed locations and elevations of probes, and as-built drawings of each monitoring probe.
3. The owner or operator will properly abandon the unusable probe, and submit associated documentation to the DOH SWS.



## 5.0 REFERENCES

- 40 Code of Federal Regulations (CFR) 51. *Requirements for Preparation, Adoption, and Submittal of Implementation Plans.*
- 40 Code of Federal Regulations (CFR) 52. *Approval and Promulgation of Implementation Plans.*
- 40 Code of Federal Regulations (CFR) 60. *Standards of Performance for New Stationary Sources.*
- 40 Code of Federal Regulations (CFR) 258. 2006. *Criteria for Municipal Solid Waste Landfills.*
- Department of Health, State of Hawaii (DOH). 1994. Hawaii Administrative Rules, Title 11, Chapter 58.1: *Solid Waste Management Control.* January.
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- Oregon Climate Service. 1998. *Average Annual Precipitation, Kaua'i, Hawai'i.* August.
- R. M. Towill Corp. 1993. *Revised Environmental Impact Statement, Kekaha Sanitary Landfill Expansion Project.* Report prepared for the County of Kauai, Department of Public Works, December.
- Sanifill, Inc. and Baquerizo, Ed. A. 1996. *Monitoring and Reporting Program, Kekaha Landfill Phase II Facility, Kauai, Hawaii.* March.



**Appendix A**  
**Landfill Gas Meter Calibration Certificate**



**Landfill Gas Meter Calibration Certificate**  
KEKAHA LANDFILL PHASE II, KEKAHA, KAUAI, HAWAII

<b>Calibration Gas</b>	<b>Calibration Gas Concentration</b>	<b>Readings After Calibration</b>	<b>Calibration Verification After Probe Readings</b>
<b>Methane:</b>	%	%	%
<b>CO<sub>2</sub>:</b>	%	%	%
<b>Oxygen:</b>	%	%	%

**Instrument:** LandTec GEM 2000  
**Serial #**

**Calibrated by:**

**Signature:**

**Date:** \_\_\_\_\_



**Appendix B**  
**Perimeter Gas Monitoring Field Report Form**



**GAS MONITORING  
FIELD REPORT FORM  
KEKAHA LANDFILL PHASE II, KEKAHA, KAUAI, HAWAII**

Monitoring Technician: \_\_\_\_\_ Date: \_\_\_\_\_

Sampling Time: Start: \_\_\_\_\_ Finish: \_\_\_\_\_

Instrument Type: \_\_\_\_\_ Instrument Calibrated: Yes

Make: \_\_\_\_\_ Yes \_\_\_\_\_ No \_\_\_\_\_

Model: \_\_\_\_\_ Battery Condition:

Serial #: \_\_\_\_\_ OK \_\_\_\_\_ Low \_\_\_\_\_

Barometric Pressure: \_\_\_\_\_

Gas Probe	CH <sub>4</sub> (% LEL)	CO <sub>2</sub> (% Vol. in Air)	O <sub>2</sub> (% Vol. in Air)	Time
GP-II-1				
GP-II-2				
GP-II-3				
GP-II-4				
GP-II-6				
GP-II-7				

CH<sub>4</sub> = Methane; CO<sub>2</sub> = Carbon Dioxide; O<sub>2</sub> = Oxygen

Comments:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Technician's Signature: \_\_\_\_\_



**Appendix C**  
**Combustible Gas Monitor Log/Calibration Log**



*KEKAHA LANDFILL PHASE II*  
COMBUSTIBLE METHANE GAS MONITOR  
*Quarterly Calibration Log*

LOCATION	SERIAL NUMBER	1st Qtr. CALIBRATION DATE / BY	2nd Qtr. CALIBRATION DATE / BY	3rd Qtr. CALIBRATION DATE / BY	4th Qtr. CALIBRATION DATE / BY
Office					
Scale House					
Kitchen					

**NOTES:**



**SECTION VIII**

**SUBSURFACE LANDFILL GAS, TEMPERATURE MONITORING, AND CONTINGENCY  
PLAN**



**Kekaha Sanitary Landfill**  
**Subsurface Landfill Gas**  
**Temperature Monitoring and**  
**Contingency Plan**  
**Phase 1 Landfill Disposal Area**

**Kekaha, Kaua'i, Hawai'i**

Prepared for:

County of Kaua'i  
Department of Public Works  
4444 Rice Street  
Lihu'e, Kaua'i 96766

Prepared by:

AECOM Technical Services, Inc.  
1001 Bishop Street, Suite 1600  
Honolulu, Hawai'i 96813

And



Environmental Information Logistics, LLC  
130 East Main Street  
Caledonia, Michigan 49316

Rev. 2

October 2017

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- 3. Data Collection & Analysis ..... 3
- 4. Contingency ..... 4
- FIGURES ..... 8

Figure 1 – Landfill Fire Detection System

Appendix A – Calculation of Probe Spacing

## **1. Introduction**

The proposed Cell 2 horizontal expansion includes the installation of a modern, lined waste cell above the mauka sideslope of the existing Phase I Kekaha Landfill. To reduce differential settlement of the Cell 2 liner system, the Phase I waste mass, which has undergone more than 20 years of consolidation, must remain intact. The subsurface landfill gas temperature monitoring and contingency plan, as described herein, is among the several proposed systems and management plans developed to ensure the integrity of the Cell 2 liner and Phase I cover system.

While the presence of the Cell 2 liner above the Phase I waste mass in this area will inhibit the intrusion of oxygen, and thus decrease the likelihood of subsurface oxidation events, this plan proposes the implementation of a landfill gas temperature monitoring system (Figure 1) to identify potential future subsurface landfill oxidation events under the Cell 2 liner system in a timely fashion, in order to allow for appropriate response actions. The system is designed to minimize infrastructure that can impact facility operations, while still providing data indicative of oxidation events, and also provide a mechanism to extinguish such events, if necessary.

In landfills, minimizing the potential sources of oxygen intrusion into the waste mass prevents landfill fire generation and propagation. The use of an impermeable geosynthetic liner in the construction of Cell 2 and the existing geosynthetic capping material on Phase 1 will be an effective barrier to oxygen intrusion. Furthermore, additional impermeable cap material is planned to be installed on Phase I beyond the cell 2 footprint, to further inhibit oxygen intrusion. To enhance this system, a detection system will be installed as described in the following.

## **2. Monitoring System Installation**

Prior to installing probes, the area will be prepared by compacting the existing Phase I side slope cover soils (which do not have geosynthetic material) and grading the area. This work is already contemplated as part of the Cell 2 liner installation and will establish a safe working zone by ensuring that no pre-existing sub-surface cavities are present that could collapse while installing the probes.

The Cell 2 liner preparation work also seals any potential sources of air that might be present in the soil side slope cap (erosion rills, etc.). An active landfill gas collection system is installed in Phase 1 with gas directed towards an enclosed flare located near the site office. Vacuum currently applied to this system could pull oxygen into the waste mass if pathways are present. To minimize this during construction of the monitoring probes, the existing landfill gas extraction wells on Phase 1 closest (within 200 feet) to the probe will be temporarily closed.

A network of monitoring probes will be installed along the north slope of Phase I to a depth of 30 feet. A 2-inch diameter perforated pipe will be installed in each bore, backfilled to a depth of 10 feet with granular material not smaller than 1/2 inch in diameter. A bentonite seal will be installed on top of the gravel and the remainder of the trench will be filled with cover soils.

Although gas generation creates positive pressure (once active gas extraction is stopped in nearby wells) that would prevent oxygen from entering the waste mass during drilling of the bores, only one probe will be drilled at any given time. This will limit exposure and ensure that

oxygen source pathways are minimized. Each probe will be temporarily capped when completed prior to drilling another bore.

The perforated casing will allow sufficient gas to enter the piping for monitoring while providing adequate crush resistance to forces generated by the approximately 30 feet of waste above it. Table 1 presents the force calculations and the equivalent waste mass.

Table 1 – Pipe Crushing Force Calculation

CPVC Pipe, Schedule 80			
Diameter	2.375	in.	
Wall thickness	0.218	in.	
Dimension Ratio - DR	10.8945		
Maximum Service Temperature	200	Deg. F	
Minimum Modulus of Elasticity	360000	psi @ 73.4 Deg. F	
Temperature Correction Factor	0.12		
Modulus of Elasticity @ Service Temperature	41544	psi	
System Design	-60	in. water column	
Vacuum Service Derating	-2.16606	psi	
Poisson's Ratio	0.27		
$2 * \text{Modulus of Elasticity} / (1 - \text{Poisson's Ratio}^2) =$	89621.4		
$1 / (\text{DR}(\text{DR} - 1)^2) =$	0.000938		
Critical Collapse Pressure	84.0	psi	
Vacuum Service Collapse Pressure	81.9	psi	
Waste Density	72	lbs/cf	
Internal Angle of Friction for waste	33	degrees	
$\sin(20 \text{ degrees}) =$	0.544639		
Maximum Allowable Probe Depth	300.6	feet	
<u>Adjustment for Perforations</u>			
Number of Holes	4		
Hole Diameter	0.375	inches	
Hole Area	0.441786	sq. in.	
OD	2.375	inches	5.640625 1.410156
Wall Thickness	0.218	inches	3.759721 0.93993
Cross-Sectional Area Reduction	0.299		
Screen Correction Factor			0.77
Adjusted Maximum Depth			231.4 feet
Factor of Safety			2
Maximum Depth			115.7 feet

Table 1 demonstrates that the piping proposed for the monitoring probes can resist forces generated by more than 115 feet of waste at a standard safety factor of 2. The Phase I waste depths will yield a safety factor of almost 8 regarding the collapse depth of the proposed piping.

The 2" CPVC pipes will be fitted with a removable cap to allow for the insertion of a thermocouple to allow for real time monitoring of gas temperatures under the Cell 2 liner. A port installed in the side of the casing will allow for gas quality measurement.

The monitoring probes will be installed to a depth of 30 feet below the Phase 1 surface. Since oxygen sources are typically near surface, the perforations will begin at 10 feet to allow for the detection of oxygen close to the landfill surface. A probe spacing of 40 feet will allow for effective monitoring along the Phase 1 / Cell 2 interface (see Appendix A).

### **3. Data Collection & Analysis**

The Phase I temperature monitoring probes will be sampled monthly. A temperature of 131 degrees F will be used as the threshold for establishing whether more investigation is warranted. Note that use of this threshold, within the context of this plan, does not purport to establish a correlation between 131 degrees F and oxidation. It is only used as a criterion for conducting additional investigations.

A type k thermocouple with a corrosion resistant conductor, to allow for long-term use in landfill gas, will be extended down the monitoring probe in 5 foot intervals during sampling to provide data of potential elevated temperatures near the liner of Cell 2. The temperatures will be recorded and compared against the temperature threshold.

If the probe is under vacuum while sampling, a rubber stopper, cap or equivalent mechanism will be used to prevent air from entering the landfill through the probe. If a probe has a measured maximum gas temperature above the threshold, the following additional investigation will be triggered:

#### **Determination of Carbon Monoxide Concentration**

A sample pump or other device capable of purging landfill gas for a minimum of 5 minutes will be used prior to sampling for carbon monoxide. A sample will be collected using a Landtec GEM 2000 plus meter or equivalent<sup>1</sup>. Prior to measurement, the landfill gas will be passed through a device constructed and designed to cool the gas so that the condensate can be removed. This will ensure that condensation does not interfere with the CO sensor of the meter or stain tube.

A review of the CO data will provide information about potential incomplete combustion that is typical of SOEs. Note that landfills will naturally have a small amount of CO present, reflecting normal biological reactions. Concentrations greater than 1000ppm are generally considered to be indicative of a subsurface oxidation event. Lower concentrations may or may not reflect ongoing oxidation, but will require a more in depth analysis, if encountered, to ascertain whether conditions exist for an oxidation event or have the potential to create one in the future.

---

<sup>1</sup> Stain tubes with a suitable scale to measure concentrations less than 100 ppm and at least 5,000 ppm should be used. Multiple tubes with differing scales may be necessary depending on manufacturer.

## Determination of Oxygen Concentration

Similar to the CO concentration determination, a sample pump or other device capable of purging landfill gas for a minimum of 5 minutes will be used prior to sampling for oxygen. A sample will be collected using a Landtec GEM 2000 plus meter or equivalent. Gas quality data will include concentrations of oxygen, methane, carbon dioxide, and balance gas. The oxygen data will provide information about the potential for an oxidation event to propagate.

## **4. Contingency Plan**

This section outlines the steps to be taken if monitored conditions indicate the presence of a subsurface oxidation event (SOE).

### **4.1 Plan Basis**

Typically, SOEs are relatively small and involve only 100 – 500 square feet of landfill surface area. Often only a single gas extraction well is involved. The most common method of controlling an SOE is to reduce or cutoff the oxygen supply either by shutting off gas extraction wells in the affected area or by increasing cover thickness or a combination of both. Applying water to the cover, which fills the soil pores, can also be effective restricting further air intrusion.

This Plan has been developed based on this control philosophy. For purposes of this plan, the following definitions apply:

“Operator” – means the gas collection and control system operator or other designated site personnel.

“CO concentration” – means the concentration of carbon monoxide (CO) measured by field instruments (stain tubes by Sensidyne or Draeger or other appropriate apparatus designed to measure CO in the field)

### **4.2 Action Level Triggers**

When any of the following conditions are observed, it will be presumed that an SOE has begun and the procedures in this section will be implemented:

- “CO concentration” exceeds **1,000 ppmv** in one or more monitoring probes installed along Cell 2 and Phase I,
- Temperature exceeds **200° F** and “CO concentration” exceeds **400 ppmv** in one or more gas monitoring probes, or
- Actual observation of evidence of an SOE (e.g., smoke, smoldering ash, or burnt materials).

These action levels will similarly apply to Phase I landfill gas extraction wells to address areas not immediately impacting Cell 2, but which could do so, if not managed in a timely manner.

### 4.3 Actions for SOE

If, as the result of monitoring under the previous section or from other indicators (e.g., smoke), the action levels set forth in Section 4.2 are triggered, the following procedures will be implemented to mitigate the SOE:

1. DOH will be notified of the SOE. A notification will be submitted to DOH within **24 hours** of the start of the implementation of the Contingency Plan as described in this section **via email**. A follow-up letter within 7 business days will be prepared and placed in the facilities operating record.
2. The nearest landfill gas extraction well(s) to the affected monitoring probe(s) and any adjacent landfill gas extraction well(s) with a “CO concentration” > 400 ppmv will be closed within **24 hours** of detecting a SOE. Specifically, the “Operator” will shut off landfill gas extraction well(s) within 200 feet of the affected area and any adjacent landfill gas extraction well(s) with a “CO concentration” over 400 ppmv. The affected well will not be operated under vacuum until the SOE has been corrected or an engineering evaluation dictates a different course of action. DOH will be notified of alternative actions within 7 days of their implementation.
3. Within **72 hours**, the “Operator” will reduce, by a minimum of 50%, the vacuum applied to adjacent landfill gas extraction wells with a “CO concentration” between 200 ppmv and 400 ppmv and gas temperatures over 150° F. The vacuum on these adjacent wells will not be increased until the SOE has been corrected or an engineering evaluation dictates a different course of action. The “Operator” may reduce the applied vacuum further depending on conditions and the severity of the SOE.
4. Within **96 hours**, the “Operator” will check the flare flame arrestor and condensate knockout pot for ash to establish if the SOE has impacted flare operation and performance. Any ash found during this investigation will be removed and future inspections conducted. This assessment will require shutdown of the flare, but no longer than necessary.
5. The “Operator” will inspect all landfill gas extraction well seals and any nearby landfill cap penetrations for cracks or obvious indications that air can enter the Phase I landfill.
6. The “Operator” will inspect the landfill cover in close proximity to the SOE area to confirm that the cover is not extensively cracked (indicating subsidence), has not been washed away exposing the geomembrane, or the geomembrane has not been visibly damaged (tears or punctures). For purposes of this plan, the impacted area includes all adjacent wells with “CO concentrations” over 400 ppmv and the area between these wells and adjacent wells with “CO concentrations” below 400 ppmv).
7. In addition to inspecting and confirming the integrity of the cap near the SOE, the “Operator” will place additional cover soil if it shows signs of cracking or has been washed away. The additional cover soils will be spread to extend at least 50 feet beyond the identifiable perimeter of the SOE, but not beyond the lateral limits of the landfill. A 6-mil or thicker geomembrane covered with a minimum of 6 inches of earthen material cover will be installed as a temporary barrier to air intrusion in areas where the geomembrane cap has been damaged. After the SOE has been extinguished, the

damaged geomembrane will be repaired to the originally designed Phase I cap specifications.

8. The “Operator” will monitor for subsidence. If subsidence other than normal landfill settlement is detected, the “Operator” may apply additional cover to the affected area to provide a safe work zone.
9. To ensure safety, all site personnel and the public, except those authorized to be in the SOE area, should be restricted a minimum of 150 feet from the affected area and, if subsidence is detected, all personnel are to be barred access until an engineering review can establish suitable protocols for safe management of the SOE.
10. The “Operator” will measure gas composition including CO, O<sub>2</sub>, and balance gases in gas extraction well(s) in the affected area after first purging the well(s). Temperature measurements will also be taken. These measurements will be reviewed regularly by designated personnel to assess the progress of mitigation efforts.
11. All actions will be summarized in a memo at least monthly and placed in the facility operating records.
12. After implementing the above actions, the “Operator” will monitor the affected probes in the area of the SOE weekly. If the “CO concentrations” trend downward for a minimum consecutive 3-week period<sup>2</sup> and landfill gas temperatures decrease or remain constant, Kekaha Landfill will assume that the SOE has been controlled.
13. DOH will be notified within 30 days of successfully extinguishing the SOE in writing advising that the gas extraction well(s) have been returned to normal operation.

**Other Potential Options** – SOEs are not the same in every instance. If continued monitoring does not show decreases in CO levels or if temperatures continue to increase, Kekaha Landfill will not consider the SOE to have been controlled. At that point, Kekaha Landfill will prepare a detailed plan for submittal to the DOH for review and approval. The plan will include different alternatives for controlling the SOE, including the feasibility of and procedures for injecting biodegradable foam and/or CO<sub>2</sub> or others as listed below. Upon approval, Kekaha Landfill will implement the approved plan. In exigent or emergency circumstances, Kekaha Landfill reserves the right to take any actions necessary for safe operation of the Landfill in advance of consultation with DOH and that may differ from the tasks outlined in this section.

- **Vent Probes.** This option assumes that gas temperatures will naturally decline by conduction to levels consistent with other portions of the landfill. This approach will take a long time and may allow for a subsequent event if cover materials allow air to enter the facility.

---

<sup>2</sup> Note: as an SOE is brought under control, carbon monoxide levels may spike as the SOE’s oxygen supply decreases. This is the result of an uptick of incomplete combustion. Consequently, this spike in CO is an indication that the SOE is being controlled provided that it is not accompanied by a similar temperature spike. This scenario would not require additional action, but would prolong weekly monitoring to confirm that the SOE is extinguished.

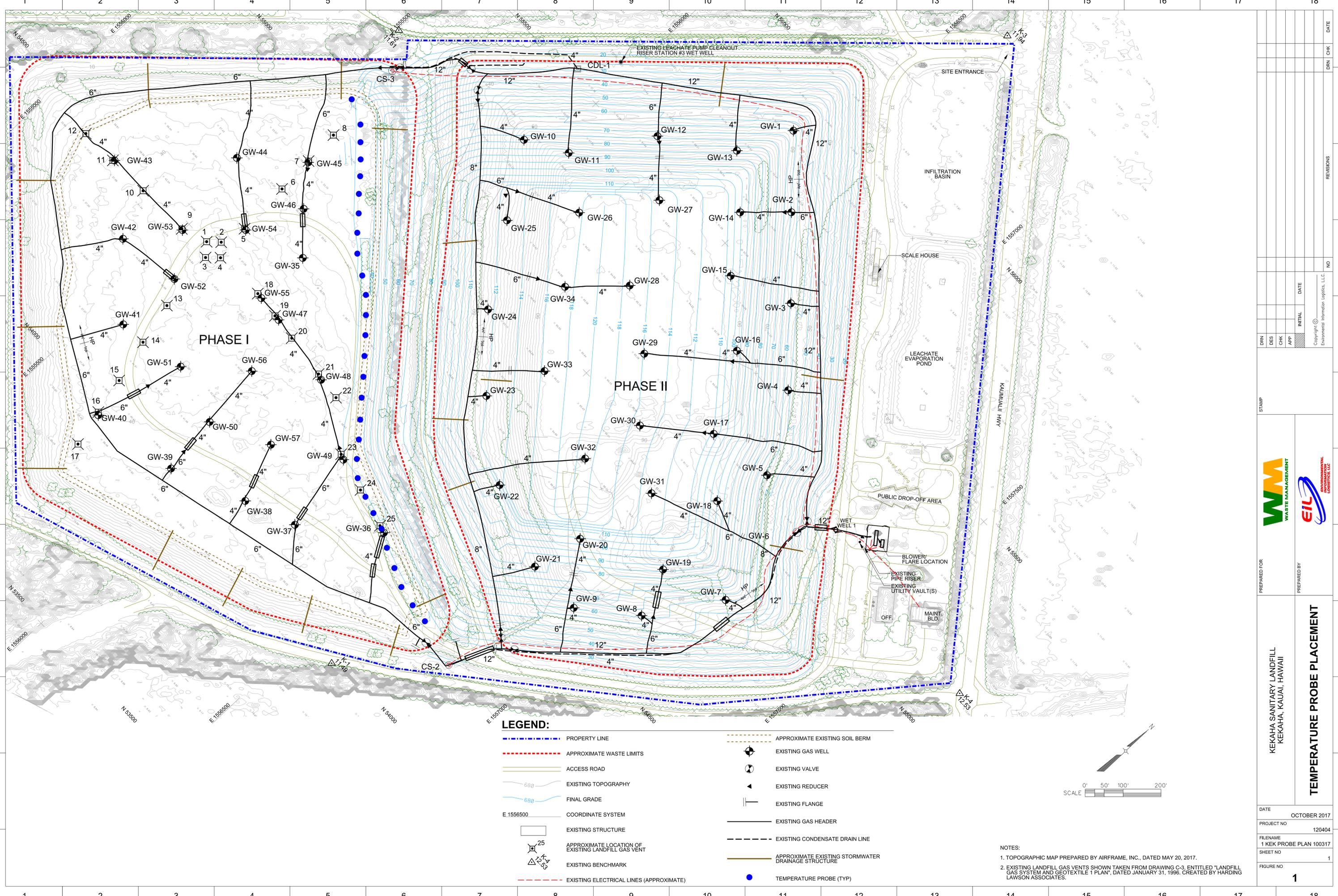
- Vent probes to allow temperature to dissipate (static pressure created within the waste would prevent air from entering the landfill while allowing heat to escape to the atmosphere).
- Continue to take follow-up gas quality and temperature measurements to ascertain whether venting measures are adequate for temperature dissipation.
- Maintain adequate cover. Fill and compact any low areas that may have been a result of settlement due to the oxidation below.
- ***Inject Liquid Carbon Dioxide into Probes*** - While it cannot prevent future events, this option will immediately result in a drop in temperatures to near normal ranges and resolve the issue. This will ensure that there is no continued propagation and reduce the potential that future air intrusion will restart the oxidation.
  - Inject liquid carbon dioxide into probes. This would completely saturate the region, displacing oxygen, and cutting off the oxidation process.
  - The carbon dioxide would also carry heat away from the oxidation zone.

If Kekaha Landfill personnel determine or develop a better option(s), plan, or program, DOH will be notified.

#### **4.4 Waste Acceptance**

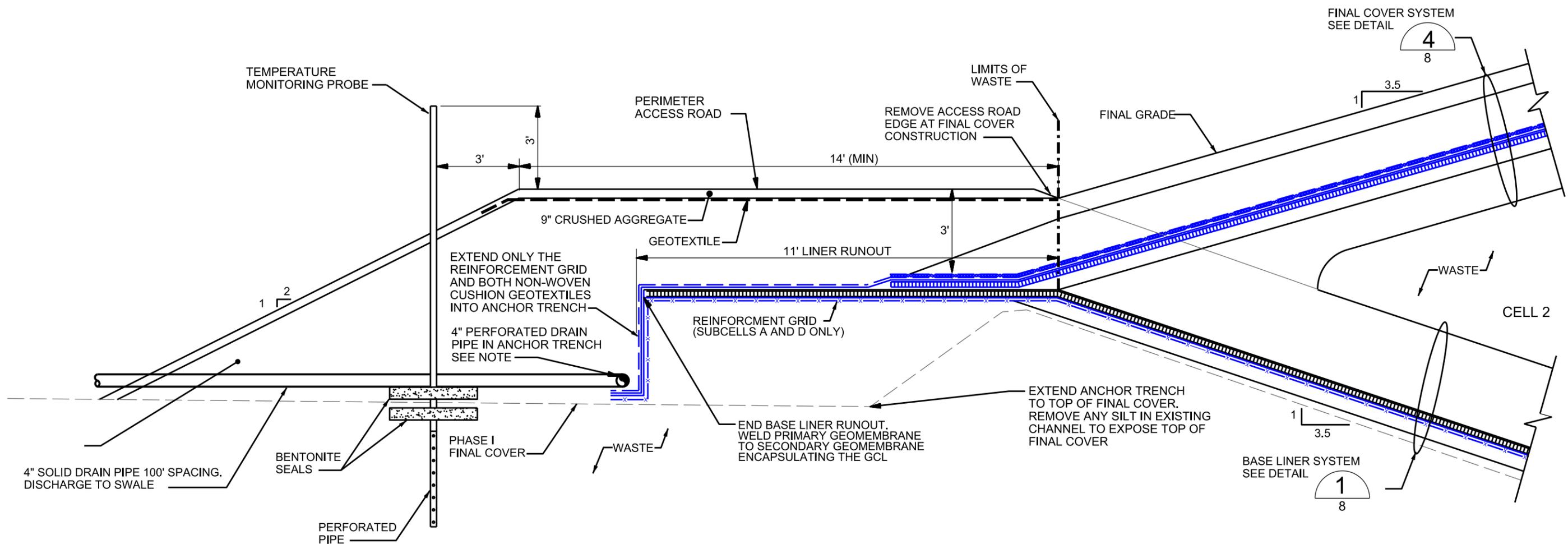
While addressing potential subsurface oxidation conditions, unless Kekaha Landfill personnel determine otherwise, waste will continue to be accepted and placed at the landfill. Landfilling placement procedures and conditions will continue to be monitored and adjusted as necessary per the direction of site personnel and DOH.

## **FIGURES**



DRN	DES	CHK	APP	INITIAL	DATE	NO
Copyright © Environmental Information Logistics, LLC. Environmental Information Logistics, LLC.						
STAMP						
PREPARED FOR	KEKAHA SANITARY LANDFILL KEKAHA, KAUAI, HAWAII					
PREPARED BY	 					
<b>TEMPERATURE PROBE PLACEMENT</b>						
DATE	OCTOBER 2017					
PROJECT NO	120404					
FILENAME	1 KEK PROBE PLAN 100317					
SHEET NO	1					
FIGURE NO	1					

NOTES:  
 1. TOPOGRAPHIC MAP PREPARED BY AIRFRAME, INC., DATED MAY 20, 2017.  
 2. EXISTING LANDFILL GAS VENTS SHOWN TAKEN FROM DRAWING C-3, ENTITLED "LANDFILL GAS SYSTEM AND GEOTEXTILE 1 PLAN", DATED JANUARY 31, 1996. CREATED BY HARDING LAWSON ASSOCIATES.



**OVERLAY BASE LINER TERMINATION ON PHASE I** 7  
 NTS

NOTE:  
 1. SLOPE PERFORATED COLLECTION DRAIN TO BOTH EDGES OF LANDFILL FROM HIGH POINT.

PREPARED BY  <b>EIL</b> <small>ENVIRONMENTAL INFORMATION LOGISTICS, LLC</small>	PREPARED FOR  <b>AECOM</b>	<b>FIGURE 2</b> <b>PROBE PLACEMENT RELATIVE TO CELL 2 LINER</b> KEKAHA SANITARY LANDFILL KEKAHA, KAUAI, HAWAII OCTOBER 2017
090605		

## MATERIAL LIST

1. CPVC CAP - SLIP
2. CPVC PIPE - SCH. 80
3. SOIL BACKFILL - CLEAN
4. BENTONITE LAYER
5. CPVC COUPLING
6. GRAVEL: 1/2 - 1 " WASHED GRAVEL
7. CPVC END CAP
8. 1/4 " MONITORING PORT

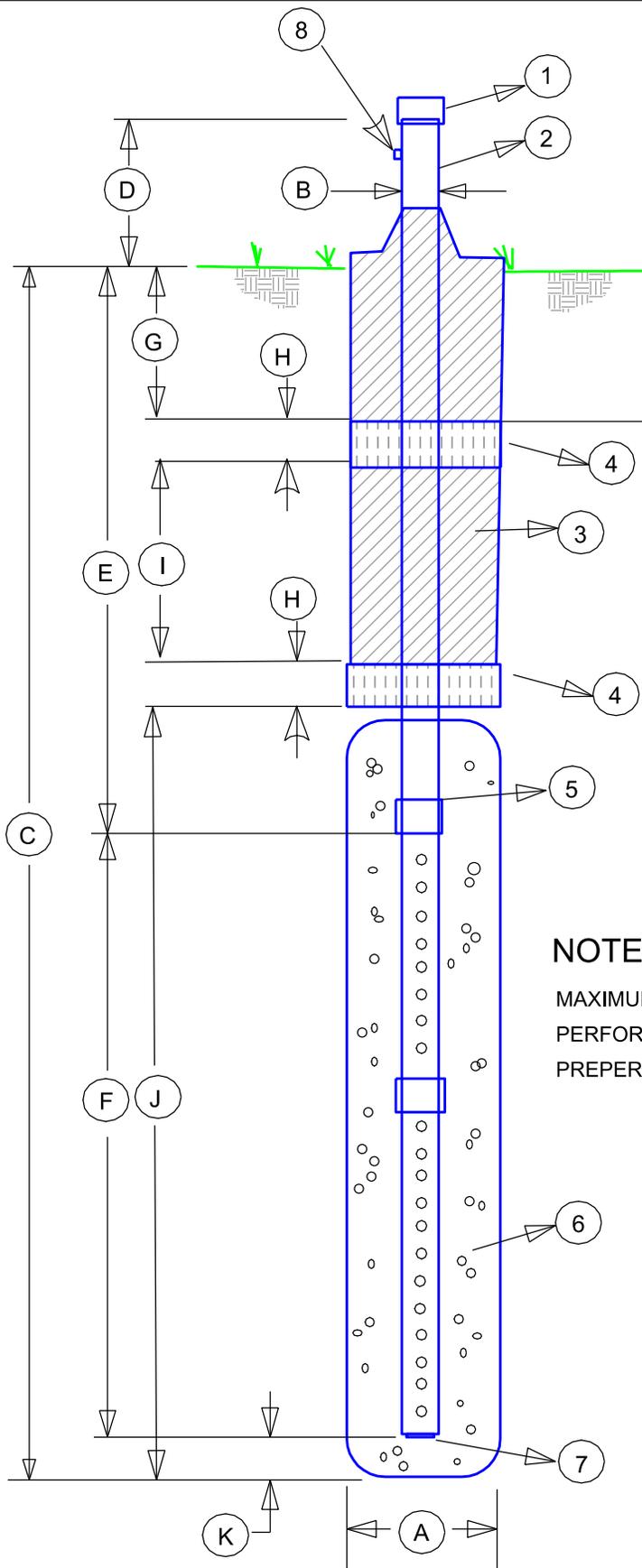
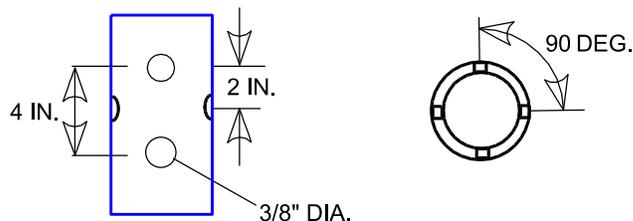
## SPECIFICATIONS

A.	BORE SIZE	<u>8</u>	in.
B.	PIPE SIZE	<u>2</u>	in.
C.	BORE DEPTH	<u>30</u>	ft.
D.	SOLID PIPE ABOVE GROUND	<u>4</u>	ft.
E.	SOLID PIPE BELOW GROUND	<u>29.5</u>	ft.
F.	PERFORATED PIPE LENGTH	<u>19.5</u>	ft.
G.	COVER DEPTH	<u>3</u>	ft.
H.	BENTONITE LAYER	<u>6</u>	in.
I.	SOIL BACKFILL	<u>7</u>	ft.
J.	GRAVEL PACK	<u>20</u>	ft.
K.	GRAVEL BASE	<u>6</u>	in.

## NOTES

- MAXIMUM PROBE SPACING - 40 FEET  
 PERFORATIONS: 3/8" DIAMETER  
 PREPERFORATED PIPE CAN BE USE IN PLACE OF FABRICATING IN FIELD.

### PERFORATIONS



## **APPENDIX A**

## CALCULATION SHEET

**SUBJECT:** Sample Calculation for Determining Probe Spacing

**Prepared By:** MN

**Date:** 3/26/13

### TASK

Calculate the spacing for a monitoring probe at the Kekaha Sanitary Landfill Cell 2 / Phase 1 interface.

### REFERENCES

Darcy's Law

EPA, Method 2E

### METHOD

Using widely accepted Darcy's Law (Equation A) describing fluid transport through a porous media and the accepted calculation method of the EPA, Method 2E (Equation B), determine an appropriate probe spacing. Critical parameters (gas flow, well pressure and gas temperature) are determined based on Bernoulli's equation, typical subgrade temperatures and a minimum vacuum and used in the analysis to yield probe-specific results. Two equations (Equations A and B) are first used to solve for K (Absolute permeability of soil) by setting the equations equal to each other. Second, the equations are simultaneously solved for the radius of influence of the probe and gas transport rate (conservatively assumed to be consistent with gas generation rate within landfill assuming AP-42 emissions factors) such that the radius is equal for both equations. Subsequently, this data was used to compute probe spacing.

### DEFINED TERMS

- $P_s$  = standard pressure = 14.7 (psia) = 2,116.8 (lb<sub>F</sub>/ft<sup>2</sup>)
- $P_l$  = pressure/vacuum at extreme radius ( $r_l$ ) of influence convention pressure gradient = 0 (inches of water column)
- = 0 (psig) = 14.7 (psia) absolute = 2,116.8 (lb<sub>F</sub>/ft<sup>2</sup>) absolute
- $T_s$  = standard temperature = 60(°F) = 520(°R)
- $g_c$  = acceleration of gravity = 32.2 (lbm·ft / lb<sub>F</sub>-sec<sup>2</sup>)
- dG/dt = gas generation rate (cu. ft. / lb yr) = 0.0304
- K = absolute permeability of refuse (ft<sup>2</sup>)
- V = waste volume (ft<sup>3</sup>)
- r = the radius of influence of well (ft)
- h = depth of waste (ft) = h<sub>T</sub> + depth off cell floor
- q<sub>s</sub> = measured gas flow (cu. ft/min)
- $\rho$  = waste density (lbm/cu. ft)
- 525600 = minutes/year
- L<sub>o</sub> = cubic meters methane/ megagram. = 100
- k = decay constant (1/yr)

**CALCULATION SHEET**

**SUBJECT:** Sample Calculation for Determining Probe Spacing

**Prepared By:** MN

**Date:** 3/26/13

Published Absolute Viscosity Reference Values:

Vargaftik N.B., Tables on Thermodynamic Properties of Liquids and Gases, second edition, John Wiley & Sons, New York, 1975

Methane	0.010708	centipoise	7.1E-06	lbm/ft.sec
CO2	0.01439	centipoise	9.8E-06	lbm/ft.sec
Air	0.0179	centipoise	1.2E-05	lbm/ft.sec

centipoise\*0.000672 = lbm/ft.sec

**CALCULATIONS:**

Darcy's Law

$$r_i = \left[ \frac{2 g_c K T_s ( h_s / h_T )}{P_s ( d G / d t ) \rho \mu T} ( P_i^2 - P_o^2 ) + r_o^2 \right]^{1/2} \quad \text{equation (A)}$$

EPA, Method 2E

The following equation is based on the calculations used in EPA Method 2E and represent gas flow from a cylindrical volume.

$$dG/dt = q_s * 525600 / (V \rho) \quad \text{equation (B)}$$

where

$$V = \pi r^2 h \quad (\text{based on geometry of ROI (a cylinder)})$$

$$h = \text{depth of waste (ft)} = h_T + (\text{depth off cell floor - inert daily cover soil material})$$

$$525600 = \text{minutes/year}$$

Determination for Specific Probe:

Probe ID:		FDP-1
$h_T$	=	Estimated Probe Depth = 30 feet
$h_s$	=	Estimated Slotted Pipe = 20 feet

$$h_s/h_T \text{ ratio} = 20 / 30 = 0.67$$

Specific probe under conservative field conditions:

$P_o$	=	Minimum Pressure	= 0.01 " wc = 0.00036 (psig)	Conversion: 1.0 (psig) = 27.7 (inches of water column)
$P_o$	=	0.05 (lb <sub>F</sub> /ft <sup>2</sup> ) gauge	= 0.00036 psig x 144 inches/ft <sup>2</sup>	
$P_o$	=	2,116.75 (lb <sub>F</sub> /ft <sup>2</sup> ) absolute		

**CALCULATION SHEET**

**SUBJECT:** Sample Calculation for Determining Probe Spacing      **Prepared By:** MN      **Date:** 3/26/13

$q_s$  = Pump Flow = 500 cc/min = 0.017 scfm; hour purge will result in 1.08 scf  
 $T$  = Measured Gas Temperature = 100 (°F) = 560 (°R)  
 $\rho$  = Conservative Waste Density = 72 lbm/ cubic feet

Gas composition:		<u>mole %</u>	<u>grams</u>	<u>mass%</u>
percent methane (CH <sub>4</sub> )	=	50.0 %	8.0	27.35%
percent carbon dioxide (CO <sub>2</sub> )	=	45.0 %	19.8	67.69%
percent air (N <sub>2</sub> /O <sub>2</sub> )	=	<u>5.0 %</u>	<u>1.45</u>	<u>4.96%</u>
Total	=	100 %	29.25	100.00%

Based on measured site-specific landfill gas composition, calculate site-specific landfill gas viscosity:

$$\mu = \text{landfill gas viscosity} = (0.2735)(7.1 \times 10^{-6}) + (0.6769)(9.8 \times 10^{-6}) + (0.0496)(1.2 \times 10^{-5}) = 9.17 \times 10^{-6} \text{ (lbm/ft.sec) [at 60(°F)]}$$

**Solution**

First equation A and B are used to determine K (Absolute permeability of waste (ft<sup>2</sup>))

**Step 1 – Darcy’s Law Using Equation A**

$$r_1 = \left[ \frac{2 g_c K T_s ( h_s / h_T )}{P_s ( d G / d t ) \rho \mu T} ( P_1^2 - P_0^2 ) + r_0^2 \right]^{1/2} \quad \text{equation ( A )}$$

Based on a concentric cylindrical surface at distances  $r_1$  and  $r_0$ , perpendicular gas flow across the surface at  $r_1$  must be much greater than that across the surface at  $r_0$ . Since  $r_0 \ll r_1$ , then  $r_0$  is negligible.

Inputting the measured and known values established above and to make the units work, dG/dt must be converted to cu. Ft/ lb sec. The conversion factor from year to seconds is 31,536,000 seconds/year.

The equation becomes:

$$r_1 = \left[ \frac{K}{( d G / d t )} * 1.98 E + 11 \right]^{1/2} \quad \text{(Equation A)}$$

**Step 2 – Method 2E Using Equation B**

$$dG/dt = q_s * 525600 / (V \rho) \quad \text{(Equation B)}$$

Inputting the measured and known values established above, this equation becomes:

## CALCULATION SHEET

**SUBJECT:** Sample Calculation for Determining Probe Spacing

**Prepared By:** MN

**Date:** 3/26/13

$$dG/dt = 13.949 / r^2 \quad (\text{Equation B})$$

Thus, there are now two equations (A and B) that can be used to solve for the remaining unknown parameters.

Rearranging equation B for r yields:

$$r = [13.949/dG/dt]^{1/2}$$

Since  $r_i$  in equation A equals r in equation B (since both equations relate to the same radius of influence for the specific well), the equations can be combined and solved in terms of K (permeability of refuse). For the specific parameters associated with the probe,

$$K = 13.949/1.98E+11 = 7.0E-12$$

### **Solve for radius of influence for each vent**

The equations (A and B) are simultaneously solved for the radius of influence of the vent such that the radius is equal for both equations. Both equations represent the same radius of influence for the specific probe. Therefore, the solution can be solved by iteration (similar to the process described in EPA Method 2E).

The results of this calculation for the specific parameters for probe FDP-1 yields a radius of influence of 21 feet.

This approach is used for all of the monitoring probes proposed at the facility.

**SECTION IX**  
**CLOSURE / POST CLOSURE PLAN**





**CLOSURE/POST-CLOSURE PLAN  
KEKAHA LANDFILL PHASE II  
KEKAHA, KAUA'I, HAWAII**

**County of Kaua'i**  
**Department of Public Works**  
4444 Rice Street  
Lihu'e, Kaua'i 96766

May 2016



**CLOSURE/POST-CLOSURE PLAN  
KEKAHA LANDFILL PHASE II  
KEKAHA, KAUA'I, HAWAII**

Prepared for:

**County of Kaua'i**  
**Department of Public Works**  
4444 Rice Street  
Lihu'e, Kaua'i 96766

Prepared by:

**AECOM Technical Services, Inc.**  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813-3698

May 2016



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## ACRONYMS AND ABBREVIATIONS

%	percent
§	Section
C/PC	closure/post-closure
cf/ac	cubic foot per acre
CFR	Code of Federal Regulations
CQA	construction quality assurance
DOH	Department of Health, State of Hawaii
EPA	Environmental Protection Agency, United States
ft	foot/feet
GCCS	Gas Collection and Control System
GCL	geosynthetic clay liner
HAR	Hawaii Administrative Rules
HDPE	high density polyethylene
HELP	hydrologic evaluation of landfill performance
in.	inch
LDPE	low density polyethylene
LFG	landfill gas
m <sup>3</sup>	cubic meter
Mg	mega grams
msl	mean sea level
NMOC	non-methane organic compound
NSPS	New Source Performance Standards
ppm	part per million
RCRA	Resource Conservation and Recovery Act
U.S.	United States
yd <sup>3</sup>	cubic yard



## 1.0 INTRODUCTION

Kekaha Landfill Phase II, located at 6900-A Kaumuali'i Highway, Kekaha, Hawai'i, consists of 14 subcells under the original landfill footprint, 3 vertical expansions, and 2 lateral expansions. The lateral expansions include the 6.4-acre Cell 1 and the proposed 6.6-acre Cell 2. The entire Phase II landfill must be properly closed when it reaches its permitted capacity. State regulations for landfill closure are specified in the Hawaii Administrative Rules (HAR), Title 11, Chapter 58.1, Section 1-17(DOH 1994), which applies to municipal solid waste landfills that accepted waste after October 9, 1991, and which are based on the federal Resource Conservation and Recovery Act (RCRA), Subtitle D requirements. Final cover will be placed within 30 days of the final receipt of waste.

At the request of the County of Kaua'i, AECOM Technical Services, Inc. has prepared this Closure/Post-Closure (C/PC) Plan for the entire Phase II landfill. A C/PC Plan is required to address surface water management, landfill gas (LFG) management, leachate management, maintenance and monitoring requirements, and provide recommendations for the final cover system to fulfill State of Hawai'i Department of Health (DOH) regulations and guidelines for landfills.

The purpose of this C/PC Plan is to ensure long-term protection of the environment and public health. This is accomplished in part by the specification of an environmentally responsible cover and appurtenances, which prevent erosion of the cover materials and infiltration of surface water into the waste mass, and facilitate the minimization of leachate generation as well as the collection and extraction of LFG and leachate. The post-closure maintenance and monitoring requirements are intended to ensure proper functioning of the landfill systems during the 30-year post-closure care period. The findings and recommendations of this C/PC Plan, after review and approval by the DOH, will form the basis of design for the landfill closure construction plans and specifications.

### 1.1 SITE BACKGROUND

Kekaha Landfill is located near the town of Kekaha in the coastal area on the southwest side of the island of Kaua'i as shown in Figure 1. The Phase I, which was closed by 1993, with a maximum elevation of 45 feet (ft) above mean sea level (msl), is located a short distance southwest of the existing Phase II landfill. The existing Phase II landfill was constructed in 1993, and is bounded by Kaumuali'i Highway to the northeast, an unpaved access road and agriculture land to the southeast, aquaculture to the northwest, and the Phase I area to the southwest. The land surrounding the site is generally flat, with a gentle slope toward the sea. Land in site vicinity is approximately 8 to 10 ft above msl. The landfill basegrade elevation of Phase II varies from approximately 7 to 12 ft above msl, and drains toward the northeast. The existing Phase II landfill side-slopes are 3.5:1 (horizontal:vertical), with a 3 percent (%) top-slope.

The existing Phase II landfill consists of approximately 63 acres, with 38.5 acres designated for waste disposal and the remainder used for various site facilities including support buildings, roads, and buffer zones. The 38.5 acres includes the original 32-acre Phase II landfill constructed in 1993, which is subdivided into 14 lined subcells (each approximately 2.3 acres), and the 6.4-acre Cell 1 waste disposal area, which is subdivided into 4 subcells (each approximately 2.6 acres). The Cell 2 lateral expansion includes an additional 6.6-acre cell, subdivided into 4 subcells. The Phase II landfill accepts municipal non-hazardous waste from residential, commercial, and industrial sources, and is also permitted to receive specific special wastes, including, but not limited to, wastewater treatment sludge, industrial process wastes, treated medical waste, asbestos materials, and petroleum contaminated soils. Placement of refuse is ongoing.

The permitted final elevation of the landfill after placement of the final cover is 120 ft. Revised final grades are shown on Drawing 4: *Final Cover Grading Plan* and 7: *Cross Sections*. After closure, the landfill will look like a grassy hill with a relatively flat top and somewhat steep sideslopes. Views of Kekaha Landfill Phase II will be limited by visual buffers. The Kekaha Landfill is owned by the County of Kaua'i, and Phase II is operated by Waste Management of Hawaii.



## 2.0 LANDFILL CLOSURE

### 2.1 CLOSURE ACTIVITIES

Final closure will be completed once the landfill reaches design grades. Closure will start within 30 days of the last receipt of waste. The landfill will be graded to the final elevations, and long-term settlement of the waste will allow for placement of the final cover. A minimum of 12 inches of intermediate cover will be installed after waste placement activities are complete to provide vector and odor control. Major closure activities include the placement of cover; establishment of vegetative cover; completion of LFG management features and surface water control features; integrating the landfill gas collection and control system (GCCS) into the final cover; and inspection, documentation, and certification of these activities. Existing perimeter fencing will remain in place to provide security during the 30-year post-closure care period.

The top of refuse will be graded with a minimum slope of 3%. The landfill maximum side-slopes will be 3.5 to 1 (28%). The final cover surface will maintain the same grades, as shown on Drawing 4: *Final Cover Grading Plan*.

Surface drainage systems at the Phase II landfill consist of diversion berms, down drains, culverts, and perimeter infiltration ditches as shown on Drawings 5: *Surface Water Management Plan*, and 12: *Surface Water Management Details*. Additionally, a subsurface geocomposite drainage layer in the cover will route water to a drain along the toe of the landfill side slopes and then discharge through various outlet points to the perimeter infiltration ditches. Landfill settlement, erosion, and excessive vegetation/debris can negatively impact the capacity of these features.

The GCCS will be in place well before closure, and will be integrated into the final cover during closure, as detailed in Section 2.3. The LFG collection and control system Basis of Design Report is included as Appendix A

### 2.2 FINAL COVER DETAILS

This section discusses the proposed design of the final cover, which follows the HAR design requirements, and evaluates surface water infiltration through the proposed cover and infiltration through the bottom liner.

#### 2.2.1 HAR Design Requirements

HAR 11-58.1-17(a)(1) (DOH 1994) requires that landfill covers have an 18-inch infiltration layer with a permeability of less than or equal to the permeability of any bottom liner system or  $1 \times 10^{-5}$  centimeters per second, whichever is less permeable, overlain by a minimum 6-inch-thick erosion layer that can sustain native plant growth, or equivalent alternatives. The existing landfill bottom liner consists of a prepared subgrade, geosynthetic clay liner (GCL), and a 60-mil high density polyethylene (HDPE) liner. The HAR requirements are met if less water infiltrates the cover than passes through the bottom liner. Section 2.2.3 and Appendix B include an evaluation of the infiltration through the proposed final cover and bottom liner, including supporting calculations.

#### 2.2.2 Proposed Design

The proposed cover system is shown in Detail 4 on Drawing 8, *Details*. The intermediate cover is anticipated to be in place at the time of final cover placement, and will be used as a soil foundation layer under the proposed final cover system, to provide firm and uniform support for the final cover. Overlying the intermediate cover will be a 6-inch grading layer to obtain the grade and surface upon which the GCL and 40-mil linear low density polyethylene (LDPE) geomembrane will be installed. The GCL and geomembrane will be the primary barriers to impede infiltration of moisture into the landfill, minimizing leachate production and inhibiting gas emissions.

A geocomposite drainage layer will be placed over the geomembrane to promote lateral drainage of surface water, reducing the potential for ponding on the cap and promoting overall slope stability. Finally, a topsoil rooting zone will provide a medium to establish and maintain a vegetative layer. The grass surface will promote evapotranspiration of storm water, and will stabilize the cover, decreasing the potential for erosion. The complete landfill cover also removes the pathways for exposure to the landfill.

The composite final cover system will cover the entire landfill, and will tie into the bottom composite liner system, as shown in Detail 7 on Drawing 8, *Details*. As shown in Detail 4 on Drawing 8, *Details*, the proposed cover system and other material layers, from top to bottom, are as follows:

- 18-inch vegetative/protective soil layer
- Geocomposite drainage layer
- 40-mil linear LDPE liner
- Geosynthetic Clay Liner
- 6-inch minimum grading layer
- 12 inches of intermediate cover material
- Top of waste

**18-inch Vegetative/Protective Soil Layer.** The proposed vegetative/protective soil layer is sufficiently thick to protect the geosynthetic materials. The 18-inch vegetative/protective soil layer will include a minimum of 6 inches of topsoil or soil capable of sustaining growth of vegetation with minimal irrigation. The vegetative cover to be established on the vegetative layer surface will be a mixture of native grasses. The mixture of grasses will be selected to be amenable to the soil quality, thickness, slopes, and moisture conditions that are anticipated for the Phase II landfill, and to minimize the need for continued maintenance. Mulch may also be used as necessary to provide erosion control. Due to the use of the geomembrane in the final cover system, root penetration from the vegetation into the waste is not expected.

**Geocomposite Drainage Layer.** The drainage layer in the final cover system will contain a geocomposite drainage layer designed to divert any water infiltrating the surface to a sub-drain system at the toe of final cover slopes. The sub-drain system will consist of a network of 2-inch pipe outlets spaced to provide free drainage from the geocomposite. The transmissivity of the proposed geocomposite system was evaluated using a seepage stability calculation, and the resulting safety factors were protective for the site (Appendix C).

**40-mil Linear LDPE Liner and GCL.** The 40-mil linear LDPE liner will be placed on the GCL, which will overlay the grading layer. The 6-inch-minimum grading layer will be placed on top of the intermediate cover on the landfill. The grading layer will be free from stones, waste, sticks, or any other deleterious material that may damage the GCL or geomembrane. The construction quality assurance plan will be prepared prior to construction, and will address the geomembrane placement and grading layer requirements in further detail.

The selection of the final cover materials, especially geosynthetic materials, must meet the minimum interface friction angles defined on the Final Cover Drainage Layer Analysis and Slope Stability calculation in Appendix C.

### 2.2.3 Cover System Evaluation

The proposed cover system was evaluated for performance-based surface water infiltration through the cover and permitted bottom liner systems using the Hydrologic Evaluation of Landfill Performance (HELP) model. The HELP model is a computer analysis tool developed by the United

States (U.S.) Army Corps of Engineers that computes runoff, evapotranspiration, percolation, and lateral drainage based on characteristics of the site and components of the cover system. This model was used to compare performance of the proposed cover and the permitted bottom liner. The permitted bottom liner consists of a 60-mil HDPE and GCL over a prepared subgrade. Table 2-1 summarizes the results of the cover evaluation, showing the calculated average annual percolation through the cover and liner systems, and indicating that the infiltration through the final cover is less than through the bottom liner, as required. Site-specific data, when available, was input for evapotranspiration, weather, and precipitation data. A detailed discussion of the input assumptions and parameters and complete output is included in Appendix B. The HELP modeling analysis of the cover and permitted liner systems shows that the proposed cover system should be effective in maintaining infiltration of surface water into the landfill at rates below the exfiltration of liquids through the permitted bottom liner, thereby meeting the requirements of HAR and providing protection against excessive leachate generation.

**Table 2-1: Final Cover System Evaluation**

Parameter	Evaluation Results
Average Head on the Final Cover Geomembrane (in.)	0.017 in.
Infiltration Through Final Cover (cf/ac)	6.755 cf/acre
Average Head on the Bottom Liner Geomembrane (in.)	11.450 in.
Infiltration Through Bottom Liner System (cf/ac)	8.019 cf/acre

**Notes:**

Evaluation is based on average annual HELP model results, see Appendix B.

in. inch

cf/ac cubic foot per acre

## 2.3 LFG COLLECTION SYSTEM BASIS OF DESIGN

The existing Phase II landfill has a design capacity greater than 2.5 million Mg and 2.5 million cubic meters (including all of the Phase I and Phase II landfill areas). Therefore, the facility is subject to the Clean Air Act Title V requirements, and has submitted a GCCS design plan to the regulatory authorities. Design of the GCCS is currently underway, with operation scheduled to begin by December 2016.

### 2.3.1 Non-major Initial Covered Source Air Permit

On September 10, 2014, DOH issued a Covered Source permit (0802-01-C) for the landfill that addresses air emissions and gas collection and control from the facility. The site is in compliance with the current applicable provisions of the permit.

### 2.3.2 Gas Collection System Implementation Schedule

A gas collection and control system designed in accordance with the NSPS will be installed and operational prior to December 2016. The facility may also elect to install an energy recovery facility at some point in the future.

### 2.3.3 Gas Collection System Design

A gas collection system was designed to cover the entire existing site, including Phase I and Phase II, with provisions to incorporate the anticipated Cell 2 expansion. The GCCS plan was submitted to DOH and EPA in May 2015, and will be amended to include Cell 2 within 12 months of the issuance of the solid waste permit for the Cell 2 expansion. The GCCS consists of vertical gas extraction wells, associated header piping, condensate management, and a flare. A gas recovery system may be pursued at some future date.

The current landfill gas collection system design in the site's Closure Plan has been modified to incorporate the GCCS design plan and the Cell 2 expansion. The system design and calculations are consistent with the requirements for the NSPS. The expansion will add gas extraction wells in the Cell 2 area and change gas pipe routing to conform to the new slopes. No other significant changes to the previous design will be necessary.

The proposed gas collection wells, gas collection piping, and control device will meet the requirements listed in 40 CFR §60.759 as follows:

- Air intrusion will be minimized by ensuring the well screen is no closer than 15 ft to the surface.
- Damage to underlying liners will be avoided by insuring the well bore does not extend closer than 10 ft to the material.
- Corrosion resistant materials, such as polyvinyl chloride (PVC) and HDPE will be used.
- Extraction wells will have connector assemblies (closing valves, sampling ports, etc.) suitable for NSPS monitoring.
- There will be a sufficient density of extraction devices to ensure gas is collected from all areas warranting control.
- The gas system will allow for expandability and accessibility: blind flanges have been incorporated into the design in order to allow for future gas system expansions; in addition, HDPE pipes can be cut and new components fused in place to expand the system as required.
- The flexibility of the material and the modulus of elasticity of both HDPE and PVC are sufficient to prevent collapse due to settlement and to withstand planned overburden and traffic loads.
- The active gas extraction system will be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control, over the intended use period of the gas control system equipment.
- An enclosed flare (installed as part of the current GCCS prior to the Cell 2 expansion) will be used for control and will be designed and operated in accordance with 40 CFR 60, Subpart WWW – the New Source Performance Standard for Municipal Solid Waste Landfills, and will accommodate the gas collection from Cell 2.

## 2.4 CLOSURE/POST-CLOSURE PROCEDURES

The sequence of tasks below will allow the County of Kaua'i to complete landfill closure construction and begin post-closure care in accordance with State of Hawai'i, HAR 11-58.1 (DOH 1994) and RCRA Subtitle D. The items below may be modified depending on specific construction activities utilized and the Construction Quality Assurance (CQA) plan.

1. Complete the C/PC Plan and prepare detailed construction drawings as necessary to allow the start of construction.
2. Prepare a comprehensive CQA plan.
3. Obtain permits and approvals needed to start construction.
4. Start closure construction including structure removal and site security.
5. Perform mobilization, clearing, and grubbing.
6. Install the gas collection pipes and other appurtenances within the limits of waste.

7. Grade the intermediate cover to provide a smooth surface and place the 6-inch minimum grading layer at the necessary elevations.
8. Inspect the grading layer for irregularities and items detrimental to geosynthetic placement.
9. Place geosynthetics (GCL, geomembrane, and geocomposite).
10. Place topsoil/rooting zone soil layer and construct surface water features (diversion berms, channels, etc.) while taking care to protect the geosynthetics from damage.
11. Complete closure construction and establish vegetation on the final cover.
12. Complete landfill closure documentation report (including Contaminant Release Log). The contaminant release log will document reportable spills, as defined under the NCP, CERCLA, HEER, and other similar regulations.
13. Begin post-closure monitoring in accordance with C/PC Plan, HAR 11-58.1, and RCRA Subtitle D.
14. Evaluate the monitoring results to evaluate the need for corrective action or repairs.
15. If monitoring results indicate the need, implement corrective action (e.g., repair liner, install additional gas wells, etc.) and repairs as necessary. After corrective action and repairs are carried out, or if they are not necessary, continue with the monitoring program.

## **2.5 MAXIMUM CLOSURE AREA**

The final cover will likely be placed incrementally as areas of the landfill reach final grade. Until final cover is placed in areas that have reached final grade, the maximum closure area is the entire Phase II landfill, including expansion Cells 1 and 2, comprising approximately 45.0 acres. As landfill areas reach final grade and final cover is placed, the maximum closure area remaining to be closed when the landfill reaches capacity, as well as anticipated closure costs, can be reduced accordingly.

## **2.6 CLOSURE SCHEDULE**

The KLF Phase II landfill is currently permitted to receive municipal solid waste from residential, commercial, and industrial sources to a maximum height of 120 ft. Based on current and recent landfilling rates, and the remaining permitted capacity, the existing Phase II landfill is expected to reach capacity in approximately June 2020. With the 6.6-acre lateral expansion of Cell 2, an additional 7.5 years of capacity is anticipated. Therefore, the Kekaha Landfill is expected to reach capacity in approximately December 2027.

Placement of the final cover will begin 30 days after full capacity is reached or within 1 year of the most recent receipt of wastes if airspace remains unless approved by the Director of the DOH. Closure construction will be completed within 180 days unless approved by the Director of the DOH.

## **2.7 CLOSURE NOTIFICATION REQUIREMENTS**

Throughout the life of the landfill, the County of Kaua'i will maintain the closure plan in the landfill operating record. The County must inform the Director of the DOH when the following items have been added to the operating record: the closure plan; any notice of intent to close the landfill; and closure certification(s) performed by a registered professional engineer. The County must also notify the Director, in writing, 18 months prior to the projected date of attainment of full-permitted capacity, and the projected closure date. In addition, after closure activities are completed for all landfill cells, the County must submit a notation on the deed to the landfill property to advise any potential purchaser of the property that the property has been previously used as a landfill facility and that the use of the land is restricted. The Director will also be notified when this notation has been placed on the deed and in the landfill operating record. The schedule of required notification is as follows:

- |                                      |  |
|--------------------------------------|--|
| 1. C/PC Plan Notice                  | After preparation of C/PC Plan and placement of plan in operating record |
| 2. Notice of Intent to Begin Closure | Prior to beginning closure   |
| 3. Full-Permitted Capacity           | Anticipated approximately December 2027                                  |
| 4. Closure Certification             | Following Closure  |
| 5. Deed Restriction                  | Following Closure  |

## 2.8 PROJECT COST ESTIMATE

Table 2-2 presents the estimated construction costs for the proposed closure cover system for the entire Phase II landfill, including expansion Cells 1 and 2. Table 2-3 presents the estimated annual costs for post-closure care.

**Table 2-2: Estimated Cost for Closure Construction**

Item	Quantity	Unit	Unit Cost (\$)	Amount (\$)
Mobilization/Demobilization	1	LS	\$400,000	\$400,000
6-inch Grading Layer	36,300	yd <sup>3</sup>	\$44.00	\$1,597,200
GCL	1,960,000	ft <sup>2</sup>	\$0.80	\$1,568,000
Geomembrane (40-mil LDPE, Textured)	1,960,000	ft <sup>2</sup>	\$0.88	\$1,724,800
Geocomposite Drainage Layer	1,960,000	ft <sup>2</sup>	\$1.35	\$2,646,000
18-inch Vegetative/Protective Soil Layer	108,900	yd <sup>3</sup>	\$44.00	\$4,791,600
Tie then-existing GCCS into cover liner	1	LS	\$967,000	\$967,000
Access Road with Geotextile	5,512	yd <sup>2</sup>	\$19.50	\$107,484
Turf Establishment	1,960,000	ft <sup>2</sup>	\$0.26	\$509,600
Diversion Berms	7,665	yd <sup>3</sup>	\$113.07	\$866,682
Erosion Control Matting Along Diversion Berm	4,024	yd <sup>2</sup>	\$3.12	\$12,555
Surface Water Drainage (Drains/Outlets)	1,580	LF	\$110.00	\$173,800
Site Access Control	1	LS	\$17,000	\$17,000
Subtotal				\$15,381,721
Contingency @ 15%				\$2,307,258
Construction Cost				\$17,688,979
Administrative, Legal, & Engineering @ 10%				\$1,768,898
State General Excise Tax @ 4.166%				\$736,923
Closure Cost <sup>a</sup>				\$20,194,800

LF linear feet  
 LS lump sum  
 ft<sup>2</sup> square foot  
 yd<sup>2</sup> square yard

Assumptions:

<sup>a</sup> Costs are in present worth dollars.

Post-closure monitoring (as required by RCRA Subtitle D and HAR 11-58.1) will provide the data needed to ensure that the landfill does not pose unacceptable risks to human health or the environment. By default, post-closure landfill monitoring (i.e., groundwater and LFG monitoring) is required for 30 years under HAR 11.58.1 and RCRA. The DOH Director may reduce the length of the post-closure care period, the latter if the County of Kaua'i can demonstrate to the Director's satisfaction that the reduced period is sufficient to protect human health and the environment, or may extend the period, if necessary. Table 2-3 shows the cost estimates for post-closure monitoring and other anticipated requirements.

**Table 2-3: Estimated Cost of Annual Post-Closure Care**

Activity	Cost/Event	Events/ Year	Cost (\$)
Final Cover Inspection	\$497	2	\$994
Vegetative Cover Inspection	\$600	2	\$1,200
Final Grade Inspection	\$600	2	\$1,200
Final Cover Maintenance	\$7,449	2	\$14,898
Surveys	\$3,400	1	\$3,400
Surface Drainage Inspection	\$600	2	\$1,200
Surface Water Control Feature Operation and Maintenance	\$1,957	2	\$3,914
Leachate Management System Inspection	\$400	4	\$1,600
Leachate Management System Operation and Maintenance	\$783	52	\$40,710
Gas System Inspection; LFG Probe Measurement	\$620	4	\$2,480
LFG Management System Operation and Maintenance	\$16,000	12	\$192,000
Groundwater and Leachate Sampling	\$26,192	4	\$104,768
Miscellaneous Maintenance (fencing, groundwater monitoring wells, etc.)	\$2,900	1	\$2,900
Annual Monitoring Report Preparation	\$45,000	1	\$45,000
Subtotal			\$416,264
Contingency @ 15%			\$62,440
<b>Total Annual Post-closure Cost</b>			<b>\$478,704</b>

## Assumptions:

Hourly rate for a staff engineer of \$65/hour was used for calculations.

Costs are in present worth dollars.



### **3.0 POST-CLOSURE PLAN**

#### **3.1 MONITORING AND MAINTENANCE ACTIVITIES**

Post-closure maintenance and monitoring will be necessary to ensure the long-term integrity of the closed landfill and its associated environmental control systems. The objective of post-closure care will be to maintain and monitor the following closure features at the Phase II landfill:

- Final cover system
- Surface Water Drainage Control Features
- GCCS
- Leachate Collection System
- Groundwater Monitoring Wells

The following sections identify requirements for maintenance and monitoring at the Phase II landfill.

##### **3.1.1 Post-Closure Requirements**

The post-closure requirements for landfills defined by HAR 11-58.1-17 (b) are applicable to the Phase II landfill. Accordingly, this post-closure plan includes:

- A description of the monitoring and maintenance activities required, and the frequency of the activities.
- Name, address, and telephone number of the person or office to contact during the post-closure period.
- A description of the planned use of the property during the post-closure period.

The length of the post-closure care period is expected to be 30 years. However, the length of the period may be decreased if the County of Kaua'i demonstrates to the DOH that a reduced period is sufficient to protect human health and the environment, and the DOH may extend the period under certain conditions. Any reduction in the post-closure care would have to be approved by the DOH prior to implementation. An annual post-closure monitoring report will be prepared and submitted to the DOH during the post-closure care period. Following completion of the post-closure care period, notification will be sent to the DOH verifying that post-closure care has been completed.

##### **3.1.2 Inspection Plan**

A qualified individual will inspect the closed landfill and surrounding areas on a routine, semi-annual basis throughout the 30-year post-closure care period. Semi-annual inspections will allow any defects (i.e., settlement, subsidence, erosion) in the landfill systems to be detected and repaired before they develop into major problems. The frequency of inspections, which are noted above in Table 2-3, may be changed during the 30-year post-closure care period. A written record of the inspections will be made and retained (see example Inspection Form in Appendix D).

Inspections will consist of the inspector walking throughout the site and documenting observations. Defects that are detected will be addressed at a minimum of annually or as necessary to prevent more significant problems from developing. The inspections will focus on the integrity and operability of the various landfill systems. Likewise, the condition, accessibility, and visibility of all monitoring wells will be judged. The cover will be inspected for signs of erosion damage and any settlement, subsidence, or displacement.

- *Final Cover System:* All surveyed benchmarks will be evaluated as to their integrity and visibility. The cover will be inspected for signs of erosion damage and any settlement, subsidence, displacement, or vegetative distress.
- *Surface Water Control Features:* The system will be inspected for erosion, scouring, clogging, excess vegetation, and differential settlement. The surface water control features will be repaired as necessary and be kept free of debris and sediment that may prevent the system from operating correctly. Conveyance pipes will be cleaned out as necessary. Diversion berms and perimeter infiltration ditches will be regraded, if necessary, to provide continued drainage of surface water runoff.
- *LFG Control System:* Inspection will include ensuring that the gas collection system is operational. The gas collection system will be inspected for proper operation of or damage to valves, emergency switches, wellheads, flares, and any other applicable components. See Appendix A for additional discussion of the gas management system.
- *LFG Monitoring System:* Inspection will include checking the gas monitoring probes for damage, water submersion, or other defects that prevent monitoring.
- *Leachate Collection Systems:* The system will be inspected to ensure it is operational. The leachate collection and treatment system inspection will include, but not be limited to: checking for sediment buildup within wet wells, collection lines, and the evaporation lagoon; testing level switches and control devices; testing operation of pumps, aerators, and lagoon level switches; recording leachate pumped quantities as measured by the flowmeter; and testing backup pumps and emergency systems.
- *Groundwater Monitoring Wells:* The wells will be inspected to ensure the wells are functional. Inspection will include judging the condition, accessibility, and visibility of all monitoring wells. Current groundwater monitoring well locations are shown on Figure 2.

### 3.1.3 Monitoring Plan

- *LFG Control System:* The GCCS will be inspected regularly in conjunction with the scheduled monitoring tasks. The explosive gas and LFG monitoring program contained in the Operating Plan will continue to be implemented during the 30-year post-closure care period. Following design and construction of the LFG system, a site-specific monitoring and maintenance plan will be prepared.
- *LFG Monitoring System:* The LFG monitoring system will be inspected regularly in conjunction with the scheduled monitoring tasks. The explosive gas and LFG monitoring program contained in the 2016 Operating Plan (AECOM 2016) will continue to be implemented during the 30-year post-closure care period. The gas probes should be monitored for methane concentrations. The concentration of methane gas should not exceed 5% methane by volume in air at the landfill boundary. LFG concentrations should be measured with a meter capable of detecting gases at the following levels:
  - Methane (CH<sub>4</sub>) up to 100% by volume in air
  - Oxygen between 19.5 to 23.5% by volume in air
  - Hydrogen sulfide (H<sub>2</sub>S) with a minimum detection level of 10 ppm
  - Carbon monoxide with a minimum detection level of 100 ppm

If gas monitoring of the perimeter probes shows the presence of methane exceeding the lower explosive limit (5% by volume), remedial action may be required. Additional vents may be required. Evidence of dead grass, an indication of LFG migration, should be noted during quarterly inspections.

- *Leachate Collection System Monitoring:* System monitoring includes leachate levels in the evaporation lagoon and on the bottom liner. Leachate levels on the liner will be maintained at less than 1 foot of head throughout the 30-year post-closure care period. Additionally, the leachate collection system will be inspected regularly in conjunction with the scheduled monitoring tasks. Monitoring of the leachate collection system includes:
  - Visual inspection of leachate pump stations to ensure proper operational function
  - Manual pumping of leachate if automatic controls are temporarily inoperative
  - Visual inspection of leachate levels and aerator operation in the evaporation pond
  - Recording leachate pumped quantities
  - Exercising pump station sumps to verify operational function
- *Groundwater Monitoring System: A Final Monitoring and Reporting Program* (Sanifill and Baquerizo 1996) was prepared for the Phase II landfill and approved by the State prior to closure of the landfill. The *Final Monitoring and Reporting Program* was prepared in accordance with applicable sections of HAR §11-58.1-16 and with the *State of Hawaii Landfill Groundwater Guidance Document* (DOH 2002). An updated groundwater monitoring plan was prepared in conjunction with the recent vertical expansion, and approved by the DOH (AECOM 2013). A further update to the groundwater monitoring plan has been submitted as part of the Cell 2 Expansion solid waste permit application; upon approval this 2016 plan will entirely replace all previous plans. The groundwater will continue to be monitored through the entire post-closure care period. Statistical analyses will be performed on collected data to determine whether a statistically significant increase in any parameter has occurred.

### 3.1.4 Maintenance Plan

Maintenance and repairs will be carried out annually, or more frequently, if necessary to prevent further damage to landfill systems. Minor repairs may be required to ensure the integrity and proper function of fencing and monitoring points. The primary landfill systems are discussed in the following paragraphs.

- *Final Cover System:* Defects that may require corrective action include erosion, differential settlement resulting in ponding water, odor, cracks, slope failure, and any other defects that could impair the performance of the final cover. Cracks greater than 1-inch wide or gullies 6 inches or deeper in the final cover will be repaired. Any erosion damage, which may occur as a result of extremely heavy rainfall, will be repaired. Repairs will be made in accordance with the type and extent of defect. During all cover construction activities, temporary berms, ditches, and straw mulch will be used as needed to prevent further erosion damage until site conditions permit repair, or repairs have reestablished vegetation. Such action should minimize problems associated with increased surface water infiltration, LFG venting through the cover, and the attraction of vectors. Recently filled and covered areas will require the most maintenance; however, the landfill should stabilize over time such that less maintenance would be required each year. Generally, a 3- to 5-year stabilization period is anticipated. Residual settlement of the closed landfill is anticipated, but it is expected to be minimal and confined to localized areas.
- *Surface Water Drainage Control Features:* Defects in the surface water control system can result in accelerated erosion of the landfill cover. Defects identified during the site inspection will be repaired using proper maintenance procedures as necessary to ensure proper functioning of the surface water control system. Periodic maintenance during the 30-year post-closure care period is expected to clean out excessive vegetation, accumulated silt, and debris from drainage features. Erosion or scouring repairs may also be needed. It is

expected that maintenance can be performed by a small crew of laborers, or with a small backhoe.

- *LFG Collection and Monitoring System:* The system components will be repaired and replaced as required to maintain full system operation. Preventative maintenance will be performed on all mechanical equipment at manufacturer-recommended intervals. Preventative maintenance includes cleaning, lubricating, and replacing worn parts. The gas collection piping will be thoroughly inspected annually for potential failure points, and necessary repairs will be noted and implemented. System failures, such as pipe leaks or breaks, which reduce gas collection efficiency and control effectiveness, will be addressed in a timely manner to conform to operating permit conditions.
- *Leachate Collection System:* Leachate will be pumped into the evaporation lagoon where it will be aerated and allowed to evaporate. Maintenance and operation of the leachate collection system will be in accordance with the requirements of HAR §11-58.1-14. Maintenance of the leachate management system during the 30-year post-closure care period will include inspection of the system, repair as warranted, and periodic replacement of pumps and lagoon aerators. Periodic cleaning of leachate collection pipes may also be required. Leachate generation rates are expected decrease over time following landfill closure.
- *Groundwater Monitoring Wells:* Any required maintenance or repairs noted during inspection or monitoring will be carried out. Required maintenance may include repair and replacement of locks, pipes, and other appurtenances. If monitoring wells are damaged beyond repair or are otherwise unable to be monitored, the wells may have to be abandoned and re-installed.

### 3.1.5 Summary of Post-Closure Activities

The frequency of monitoring and maintenance activities will be in accordance with the Operating Plan, the final groundwater monitoring plan, and a schedule approved by the Department of Health. The proposed frequency is semi-annual monitoring events. Table 3-1 provides a summary of post-closure activities, including potential problem areas.

**Table 3-1: Post-Closure Inspection Requirements**

Item	Frequency of Inspection/Monitoring	Potential Problems to Guard Against
Final Cover	Semi-annually	Erosion, cracks, exposed or damaged geocomposite or geomembrane, surficial cover soil failures
Vegetative Cover	Semi-annually	Dead plants, vegetative overgrowth at drainage structures
Final Grades	Semi-annually	Standing water
Surface Drainage System	Semi-annually	Debris/vegetation, or erosion that hamper water flow away from the site
LFG Monitoring and Vent Inspection	Quarterly	Odors, high readings in perimeter monitoring probes, vent "leaning"
Groundwater Monitoring Sampling	To be determined	Leachate release, damaged wells, inoperable sampling equipment, leachate levels

## 3.2 POST-CLOSURE CONTACT

The contact during the 30-year post-closure care period will be the site owner:

Solid Waste Coordinator (or equivalent)  
County of Kaua'i  
Department of Public Works  
Solid Waste Division  
4444 Rice Street, Suite 275

Lihu'e, HI 96766  
Phone: (808) 241-6880

### **3.3 POST-CLOSURE LAND USE**

After construction of the cover system, the planned use is a "closed landfill" or greenspace. This planned use will not impact or jeopardize the designed cover, surface water, leachate, or other landfill systems. The Phase II landfill may be suitable for recreational uses during the post-closure period, if pre-approved by the DOH. Post-closure use of the landfill site will not disturb the integrity of the final cover, liner, or any other closure system components.



#### 4.0 REFERENCES

AECOM Technical Services, Inc. (AECOM). 2016. *Updated Monitoring and Reporting Program, Kekaha Landfill Phase II Facility, Kauai, Hawaii*. Forthcoming.

Department of Health, State of Hawaii (DOH). 1994. Hawaii Administrative Rules, Title 11, Chapter 58.1: *Solid Waste Management Control*. January.

DOH. 2002. *State of Hawaii Landfill Groundwater Monitoring Guidance Document*. Ver. 1.8. Honolulu: Solid and Hazardous Waste Branch. September.

AECOM 2013. *Closure/Post Closure Plan Kekaha Landfill Phase II, Kekaha, Kaua'i, Hawai'i*. Honolulu. December.

AECOM 2013b. *Groundwater Monitoring Plan Kekaha Landfill Phase II, Kekaha, Kaua'i, Hawai'i*. Honolulu. August.

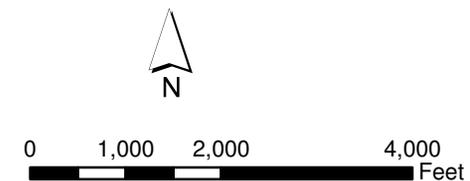
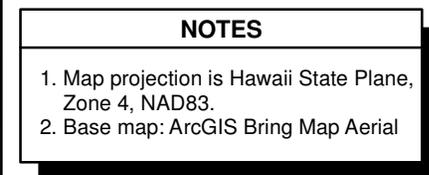
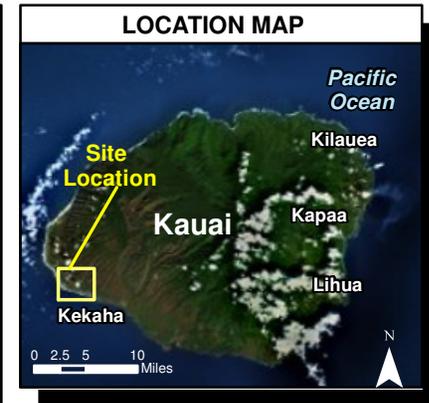
Sanifill, Inc. and Baquerizo, E. 1996. *Monitoring and Reporting Program, Kekaha Landfill Phase II Facility, Kauai, Hawaii*. San Rafael and San Francisco, CA. March.

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## FIGURES

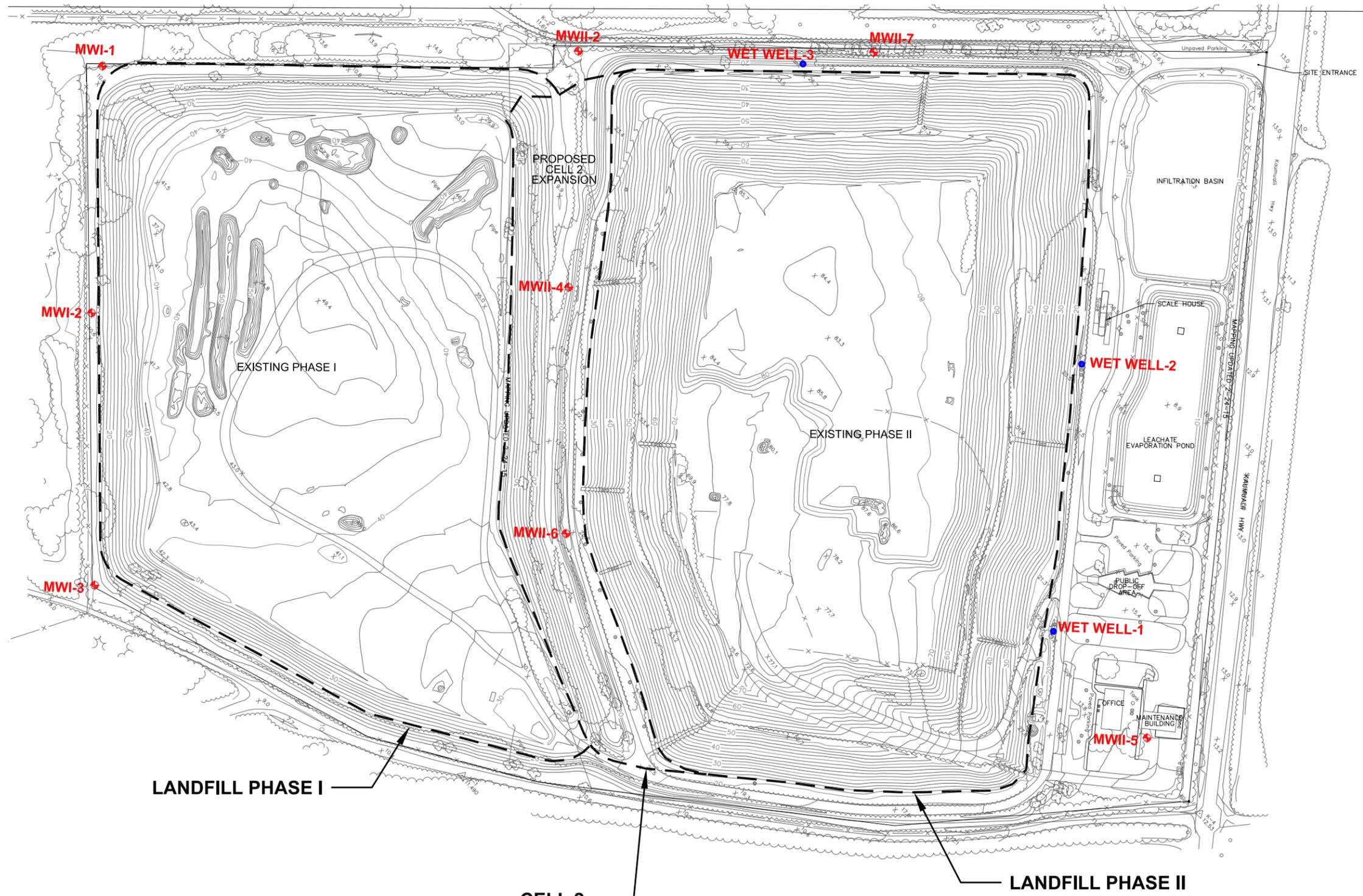




**Figure 1**  
**Site Location Map**  
**Kekaha Landfill**  
**Kauai, Hawaii**



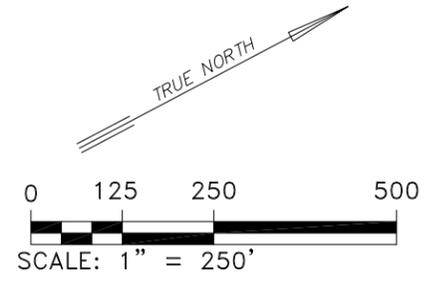
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LEGEND	
	GROUNDWATER MONITORING WELL
	LEACHATE WET WELL

NOTES	
1. GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A FEBRUARY 2015 AERIAL SURVEY.	



**Figure 2**  
**Groundwater Monitoring**  
**Site Layout Map**



Kekaha Sanitary Landfill, Kau'i, Hawai'i



## **DRAWINGS**

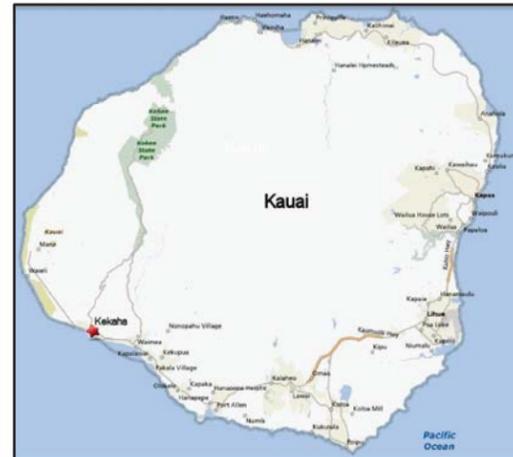


# ENGINEERING REPORT

## KEKAHA LANDFILL PHASE II - CELL 2 LATERAL EXPANSION

### KEKAHA SANITARY LANDFILL

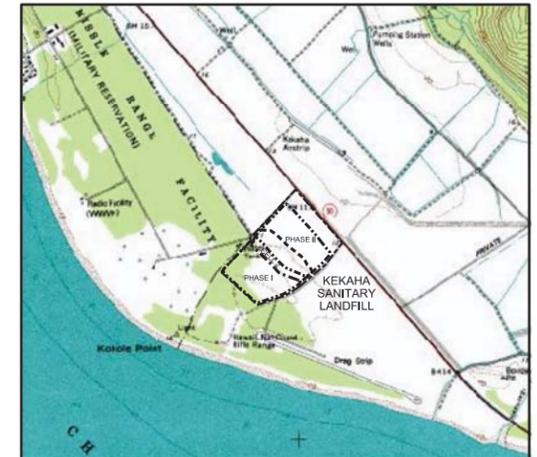
KAUAI, HAWAII  
AUGUST 2012



VICINITY MAP



<u>DRAWING NO.</u>	<u>INDEX</u>	<u>TITLE</u>
-	TITLE AND INDEX	
1	EXISTING SITE CONDITIONS	
2	SUBBASE GRADING PLAN	
3	LEACHATE COLLECTION SYSTEM	
4	FINAL COVER GRADING PLAN	
5	SURFACE WATER MANAGEMENT PLAN	
6	GAS MANAGEMENT SYSTEM PLAN (EIL, LLC)	
7	CROSS SECTIONS	
8	DETAILS	
9	DETAILS	
10	DETAILS	
11	DETAILS	
12	DETAILS	
13	DETAILS	
14	DETAILS	



SOURCE:  
BASE MAP TAKEN FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE:  
KAUAI QUADRANGLE, HAWAII

LOCATION MAP



Revised: FEBRUARY 2016

PREPARED FOR

COUNTY OF KAUAI, DEPARTMENT OF PUBLIC WORKS  
4444 Rice Street  
Lihue, Kauai, 96766

KEKAHA LANDFILL  
6900-D Kaunualii Highway  
Kekaha, Hawaii  
808-337-1416

PREPARED BY

**AECOM**

1001 BISHOP STREET  
SUITE 1600  
HONOLULU, HAWAII 96813  
808-523-8874

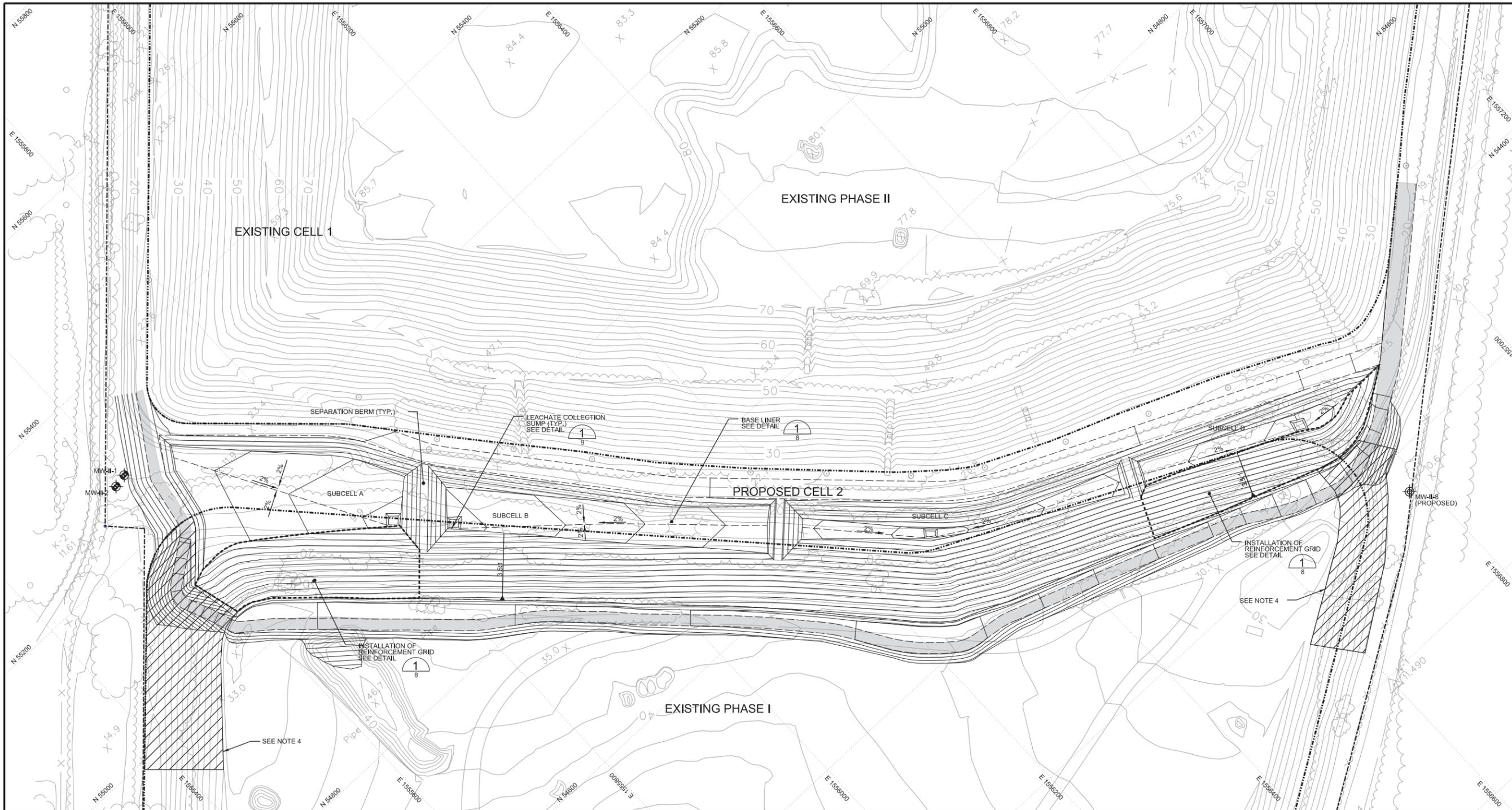


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SIGNATURE

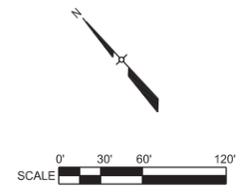
APRIL 30, 2016  
EXPIRATION DATE  
OF THE LICENSE





LEGEND	
	EXISTING TOPOGRAPHY
	PROPERTY LINE
	EXISTING LIMIT OF WASTE
	PROPOSED LIMIT OF WASTE
	CELL DEVELOPMENT LIMIT
	ACCESS ROAD
	GRADE BREAK
	PHASE I FINAL COVER GEOMEMBRANE EXTENSION SEE DETAIL

- NOTES:
1. TOPOGRAPHIC MAP PREPARED BY AEROMETRIC, INC., SEATTLE, WASHINGTON. DATE OF FLIGHT: FEBRUARY 24, 2015.
  2. HORIZONTAL DATUM IS BASED ON NAD83 (1988), HAWAII ZONE 4. VERTICAL DATUM IS SITE SPECIFIC AND CORRELATES TO DESIGNATED USGS BRASS MONUMENT G1000 PLUS 1.21 FEET.
  3. GRADES SHOWN DEPICT SUBBASE AND SURFACE FOR INSTALLATION OF APPROVED BASE LINER.
  4. EXTEND EXISTING PHASE I GEOMEMBRANE TO TOE OF SLOPE AND REPAIR COVER.



NO.	REVISIONS	DRN	CHK	DATE
2	UPDATED TOPOGRAPHIC MAP			02/2016
2	REVISED ACCESS ROAD ALIGNMENT ON TOP OF PHASE I AND MODELED SLUMPS IN CELL 2			03/2013
1	REVISED SUBBASE GRADES OVER PHASE I. NOTED PHASE I FINAL COVER GEOMEMBRANE EXTENSION, INCREASE ROAD HEIGHT, AND SLOPE REINFORCEMENT			12/2012

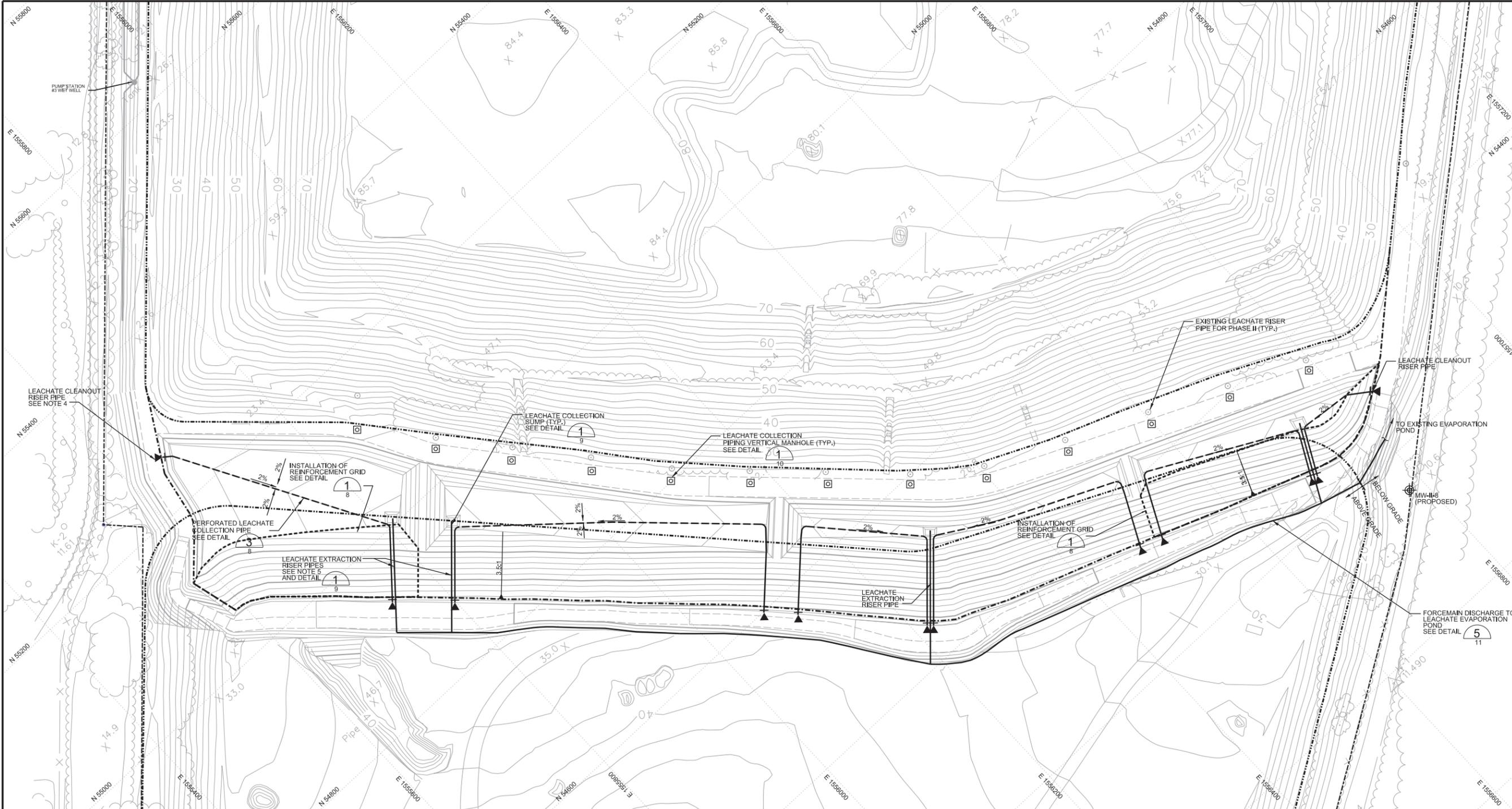
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Sheboygan, Wisconsin  
DRN DRB  
DES NKW/TCR  
CHK FLC/MRH  
APP KJB  
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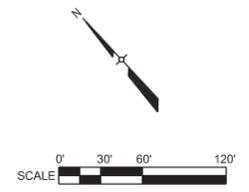
ENGINEERING REPORT  
KEKAHA LANDFILL PHASE II-CELL 2 LATERAL EXPANSION KEKAHA SANITARY LANDFILL KAUAI HAWAII  
SUBBASE GRADING PLAN

DATE AUGUST 2012  
PROJECT NO 60197394  
FILENAME  
SHEET NO  
DRAWING NO



LEGEND	
	EXISTING TOPOGRAPHY
	PROPERTY LINE
	EXISTING LIMIT OF WASTE
	PROPOSED LIMIT OF WASTE
	CELL DEVELOPMENT LIMIT
	GRADE BREAK
	LEACHATE COLLECTION PIPE
	CLEANOUT RISER

- NOTES:
1. TOPOGRAPHIC MAP PREPARED BY AEROMETRIC, INC., SEATTLE, WASHINGTON, DATE OF FLIGHT: FEBRUARY 24, 2015.
  2. HORIZONTAL DATUM IS BASED ON NAD83 (1986), HAWAII ZONE 4. VERTICAL DATUM IS SITE SPECIFIC AND CORRELATES TO DESIGNATED USGS BRASS MONUMENT G1000 PLUS 1.21 FEET.
  3. GRADES SHOWN DEPICT SUBBASE AND SURFACE FOR INSTALLATION OF APPROVED BASE LINER.
  4. THE CLEANOUT PIPES ARE CONNECTED TO THE PERFORATED LEACHATE COLLECTION PIPES.
  5. THE LEACHATE EXTRACTION RISER PIPES ARE THE 18 INCH SIDE SLOPE RISER PIPES FOR THE PUMPS. SEE DETAIL DRAWING NO. 9 FOR CLARIFICATION.



NO.	REVISIONS	DRN	CHK	DATE
3	UPDATED TOPOGRAPHIC MAP, DELETED STORAGE TANKS AND REVISED TRANSFER PIPING	CFE	NKW	02/2016
2	REVISED PERIMETER FEATURES AND TANK LOCATION ON TOP PHASE I. MODELED SUMPS IN CELL 2, MODIFIED CLEANOUT ACCESS	DRB	KJB	03/2013
1	REVISED SUBBASE GRADES OVER PHASE I. SUMP LOCATIONS, SUBCELL C & D NOTED PHASE I FINAL COVER, GEOMEMBRANE EXTENSION, INCREASE ROAD HEIGHT, AND SLOPE REINFORCEMENT	DRB	KJB	12/2012

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ENGINEERING REPORT  
 KEKAHA LANDFILL PHASE II-CELL 2 LATERAL EXPANSION KEKAHA SANITARY LANDFILL KAUAI, HAWAII

LEACHATE COLLECTION SYSTEM

DATE	AUGUST 2012
PROJECT NO.	60197394
FILENAME	
SHEET NO.	
DRAWING NO.	3

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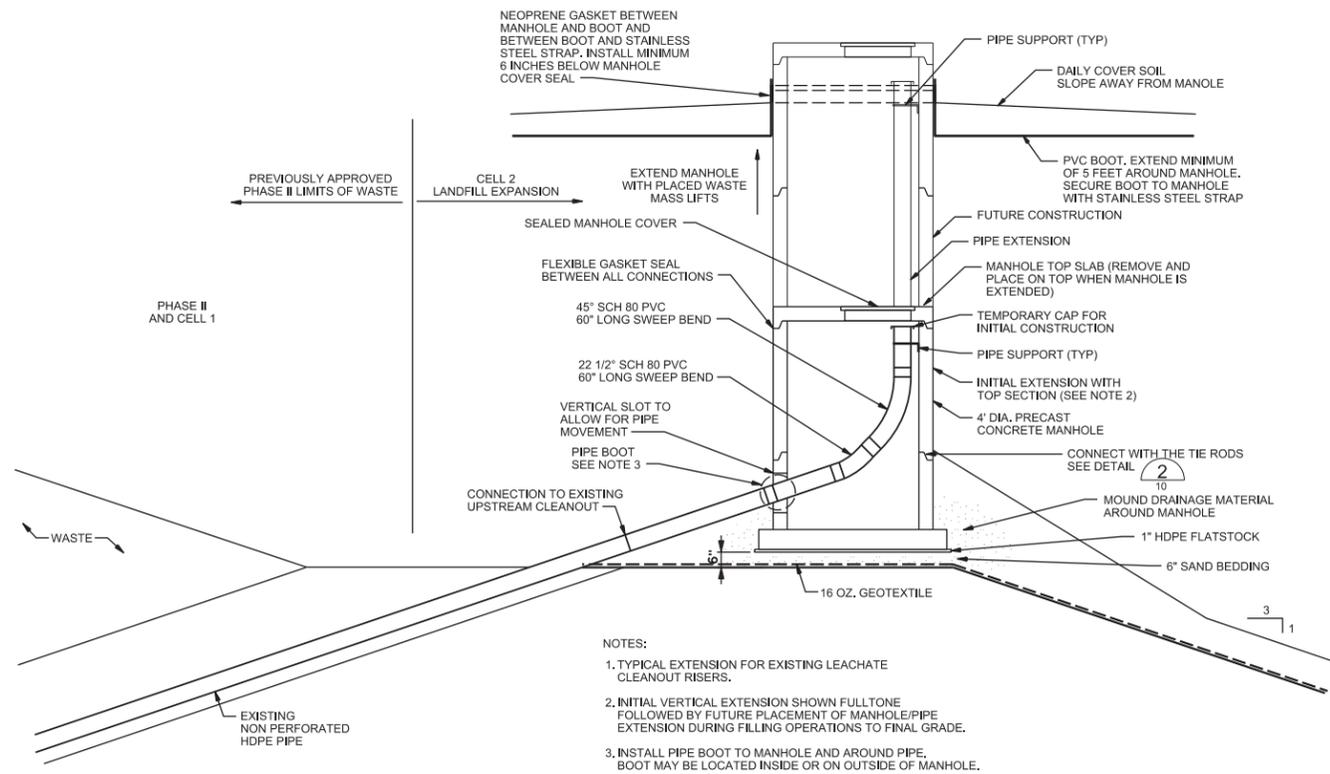






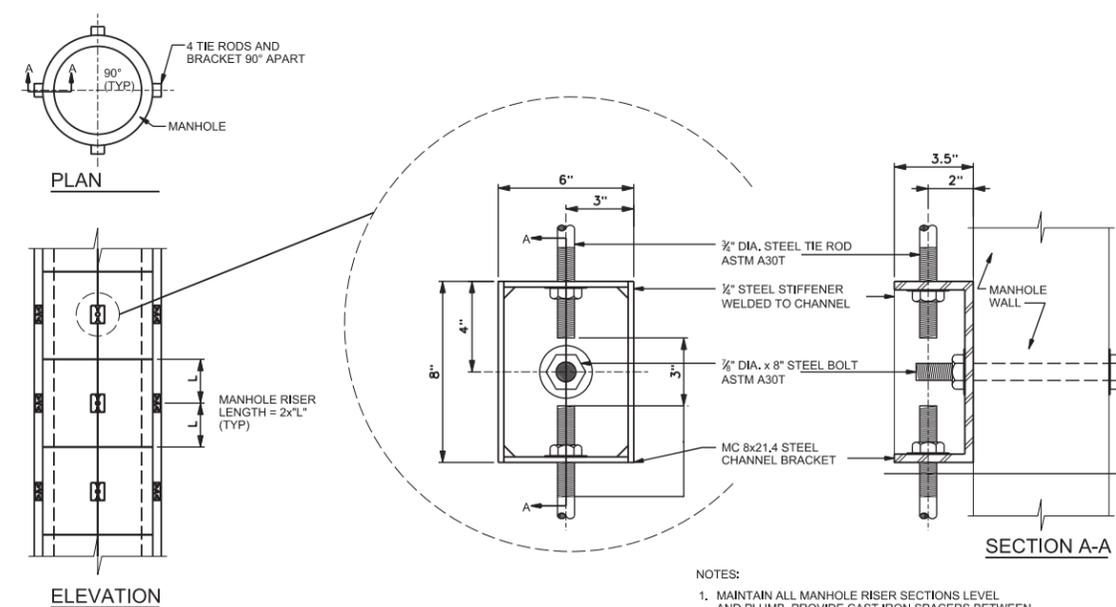






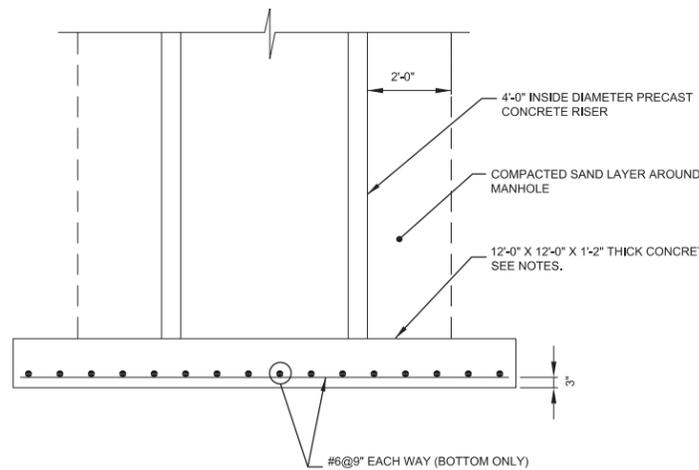
- NOTES:
1. TYPICAL EXTENSION FOR EXISTING LEACHATE CLEANOUT RISERS.
  2. INITIAL VERTICAL EXTENSION SHOWN FULLTONE FOLLOWED BY FUTURE PLACEMENT OF MANHOLE/PIPE EXTENSION DURING FILLING OPERATIONS TO FINAL GRADE.
  3. INSTALL PIPE BOOT TO MANHOLE AND AROUND PIPE. BOOT MAY BE LOCATED INSIDE OR ON OUTSIDE OF MANHOLE.

**VERTICAL LEACHATE CLEANOUT EXTENSION** 1  
NTS



- NOTES:
1. MAINTAIN ALL MANHOLE RISER SECTIONS LEVEL AND PLUMB. PROVIDE CAST IRON SPACERS BETWEEN RISER SECTIONS IF NECESSARY TO ADJUST TO LEVEL CONDITIONS.
  2. EPOXY COAT ALL EXPOSED METAL SURFACES AND BOLTS IMMEDIATELY FOLLOWING INSTALLATION.
  3. STAINLESS STEEL CAN BE SUBSTITUTED FOR ALL COMPONENTS.

**MANHOLE TIE ROD AND BRACKET** 2  
NTS



**MANHOLE BASE DETAIL** 3  
NTS

- NOTES:
1. **CONCRETE PAD**
    - A. ACTUAL PAD DIMENSIONS AND REINFORCEMENT MAY VARY AT TIME OF CONSTRUCTION DUE TO FIELD CONDITIONS.
  2. **CONCRETE MIX**
    - A. CLASS A:
      1. MINIMUM 6 BAGS OF CEMENT PER CUBIC YARD OF CONCRETE.
      2. MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4000 PSL.
    - B. FURNISH AND DELIVER CONCRETE IN ACCORDANCE WITH ASTM C94.
    - C. AIR CONTENT 6 +/- 1%, ASTM C260.
    - D. SLUMP: 4 +/- 1 IN.
    - E. WATER/CEMENT RATIO: 0.45 MAXIMUM, MIXING WATER TO BE POTABLE.
    - F. CEMENT: ASTM C150 TYPE 1.
    - G. AGGREGATES: FINE TO BE NATURAL SAND, COARSE TO BE CRUSHED GRAVEL ASTM C33. SIZE (3/4 INCH MAXIMUM).
    - H. APPLY ASTM C309 TYPE 1 OR 1-D CURING COMPOUND IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CURE AND SEAL J-20 BY DAYTON SUPERIOR OR EQUAL.
    - I. EXPOSED CONCRETE SURFACES TO HAVE SURFACE DEFECTS PATCHED AND PROJECTING FINS KNOCKED OFF.
    - J. PATCH HONEYCOMBING, STONE POCKETS, SPALLS, AND OTHER IRREGULARITIES WITH PATCHING MORTAR, SIKATOP BY SIKA CORPORATION OR EQUAL.
    - K. EXTERIOR EXPOSED SLAB TO HAVE A FLOAT AND BROOM FINISH.
  3. **REINFORCEMENT**
    - A. DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60.
    - B. DO NOT WELD OR FIELD BEND REINFORCING BARS.
    - C. #6 REINFORCING BAR:
      1. LAPPED SPLICE LENGTH = 30 INCHES
      2. EMBEDMENT LENGTH = 24 INCHES.

NO.	REVISIONS	DATE
1	ADD PVC PIPE BOOT TO MANHOLE. DETAIL 1	10-23-12
2	REMOVED DETAIL 5. LEACHATE TRANSFER PIPE TIE-IN TO LCM-1	02/2016
DRN	CHK	
DRB	KJB	
CFF	NKW	



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CHK	FLCMRH
APP	KJB

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KEKAHA LANDFILL PHASE II-CELL 2 LATERAL EXPANSION KEKAHA SANITARY LANDFILL KAUAI HAWAII

DETAILS

DATE	AUGUST 2012
PROJECT NO	60197394
FILENAME	
SHEET NO	
DRAWING NO	











**Appendix A**  
**Landfill Gas Collection and Control System**  
**Design Plan**



**KEKAHA LANDFILL  
COUNTY OF KAUAI  
KEKAHA, KAUAI, HAWAII**

**LANDFILL GAS COLLECTION AND CONTROL  
SYSTEM DESIGN PLAN**



Prepared for

County of Kauai  
Department of Public Works  
Lihue, Kauai, Hawaii

March 2015



Prepared By:

Environmental Information Logistics, LLC  
130 E. Main Street  
Caledonia, Michigan 49316  
(616) 891 2591



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ME OR UNDER MY SUPERVISION

*Andrew J. Querio* 4/30/16  
Signature 3/19/15 Expiration Date of License

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## **ACRONYMS AND ABBREVIATIONS**

ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulations
CO	carbon monoxide
DOH	Department of Health, State of Hawaii
GCCS	Gas Collection and Control System
HDPE	high-density polyethylene
LandGEM	Landfill Air Emissions Estimation Model
LFG	landfill gas
Mg/yr	megagrams per year
NESHAP	National Emission Standards for Hazardous Air Pollutants
NMOC	non-methane organic compound
NSPS	New Source Performance Standards
ppm	part per million
PVC	polyvinyl chloride
scfm	standard cubic feet per minute
SEM	surface emission monitoring
SSM	Start-up, Shutdown and Malfunction
U.S. EPA	United States Environmental Protection Agency
w.c.	water column
ZOI	zone of influence
%	percent
40 CFR §	Section
°C	degree Celsius
°F	degree Fahrenheit

# 1 INTRODUCTION

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## 1.1 Purpose

This document serves as the Gas Collection and Control System (GCCS) Design Plan for Kekaha Landfill including Phase I (a closed area) and Phase II (an active area with a 2014 permitted vertical expansion) in accordance with requirements of 40 Code of Federal Regulations (CFR), New Source Performance Standards (NSPS) Part 60, Subpart WWW, for Municipal Solid Waste Landfills. The purpose of this document is to provide a design plan that meets the requirements of the NSPS and to provide the Administrator the design standards and calculations used to prepare this GCCS Design Plan.

## 1.2 Applicability/Background

**40 CFR §60.752(b)(2)** If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, the owner or operator shall: ...

Pursuant to 40 CFR 60, Subpart WWW, promulgated on March 12, 1996, those facilities that commence construction, reconstruction, or modification after May 30, 1991, are subject to the applicable provisions of the rule.

The permitting of the Phase II-Cell 1 vertical expansion on March 5, 2014 (a modification under the NSPS rules) increased the design capacity of Kekaha Landfill to greater than 2.5 million megagrams (Mg) *and* 2.5 million cubic meters (m<sup>3</sup>) making Kekaha Landfill subject to Tier 1 calculations of the Landfill NSPS because it exceeded the applicability provisions of 40 CFR §60.752(a)(2). That rule specifies that both volume and mass after a landfill modification must exceed both 2.5 million Mg *and* 2.5 million m<sup>3</sup> to trigger Tier 1. The County of Kauai (County) submitted an Amended Design Capacity report reflecting the modification to greater than 2.5 million Mg *and* 2.5 million cubic meters (m<sup>3</sup>) to the United States Environmental Protection Agency (U.S. EPA) and State of Hawaii Department of Health (DOH) on June 2, 2014 (within 90 days of the permitted increase in design capacity as required by rule).

The County submitted a Tier 1 calculation on June 2, 2014 in accordance with 40 CFR §60.752(b) demonstrating that the NMOC emission rate exceeded 50 Mg/yr making the facility subject to the gas collection and control requirements of the Landfill NSPS.

This initial GCCS Design Plan complies with the timeline established by 40 CFR §60.752(b)(2)(i) – *submit a collection and control system design plan prepared by a professional engineer to the Administrator within 1 year (i.e., one year after submittal of the Tier 1 calculation demonstrating that the NMOC emission rate exceeded 50 Mg/yr which occurred on June 2, 2014).* Future compliance dates will be based on June 2, 2015, the due date for the GCCS Design Plan.

As stated in this design plan, the GCCS at Kekaha Landfill complies with the specifications for active collection systems as stipulated in 40 CFR §60.759 of the NSPS. If future expansions of the GCCS are necessary, they will be designed to comply with the NSPS requirements, accommodate existing site conditions, or any approved alternatives.

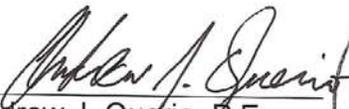
The submittal of this document fulfills the requirement for the Facility to prepare a GCCS Design Plan in accordance with 40 CFR §60.752(b)(2). In addition, a surface emissions monitoring plan has been prepared and is included in Appendix C.

The GCCS Design Plan outlines the methodology employed to design a landfill gas collection and control system that will collect, transport, and dispose of the landfill gas generated by the entire permitted landfill at final grades. The facility will comply with the monitoring, record keeping, and reporting requirements of the NSPS as specified within the rule with alternatives and variance requests to these requirements included in Section 6. Furthermore, the NSPS specifically requires the gas collection system to be designed in accordance with general conditions that are contained within the NSPS. These regulations will be found throughout this document in addition to the means to how the landfill is meeting or plans on meeting these regulations.

### 1.3 Certification

This GCCS Design Plan for Kekaha Landfill has been prepared by Environmental Information Logistics, LLC (EIL) under contract with AECOM as authorized by the County of Kauai.

I certify that the GCCS as described in this Plan meets the design requirements specified in 40 CFR 40 CFR §60.759 and any alternatives pursuant to 40 CFR §60.752(b)(2). I further certify that this report was prepared by me or under my direct supervision, and that I am a duly registered Professional Engineer under the laws of the State of Hawaii.

  
Andrew J. Querio, P.E.  
Senior Engineer

3/19/15



## 2 DESIGN CRITERIA

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The GCCS (Gas Collection and Control System) has been designed and is to be constructed to conform to NSPS requirements.

### 2.1 Landfill Gas Collection Design

The following listed NSPS regulations describe when landfill gas has to be collected from municipal solid waste (MSW) that has been deposited in the landfill.

**40 CFR §60.752(b)(2)(ii)(A)(2)** Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of:

**40 CFR §60.752(b)(2)(ii)(A)(2)(i)** 5 years or more if active; or

**40 CFR §60.752(b)(2)(ii)(A)(2)(ii)** 2 years or more if closed or at final grade;

These above regulations are commonly known as the 5/2 yr rule, and will be called such when referenced in this design plan.

In accordance with these requirements, gas extraction devices and the installation/expansion of the pipe network to connect the devices into the gas collection system, has been designed and are to be installed to collect gas from all areas with waste that have reached the age of 5 years or older if active; and in waste that has reached the age of 2 years or more if closed or at final grade. At Kekaha Landfill, Phase I meets the requirements of 40 CFR §60.752(b)(2)(ii)(A)(2)(ii) and all current permitted cells of Phase II meet the requirements of 40 CFR §60.752(b)(2)(ii)(A)(2)(i) and will have a GCCS installed. Furthermore, the surface emission monitoring (SEM) performed in accordance with 40 CFR §60.753, and addressed below in the Gas Collection Density, Section 2.1.1, will demonstrate compliance with this requirement in addition to the certification of the design by a professional engineer.

Additionally, the GCCS has been designed to be in compliance with the following regulations:

**40 CFR §60.752(b)(2)(ii)(A)(3)** Collect gas at a sufficient extraction rate;

**40 CFR §60.752(b)(2)(ii)(A)(4)** Be designed to minimize off-site migration of gas.

The GCCS has been designed, as demonstrated by this plan, to extract LFG at a sufficient rate to minimize subsurface lateral migration from the solid waste boundaries of the facility and surface emissions. This is achieved by sizing, installing, and operating collection elements (which are discussed in the sections below) that sufficiently collect the landfill gas, which include, adequately sized transmission headers and laterals (pipe network), gas moving equipment (blower(s)), and controlled in a manner that is expected to handle the estimated LFG flow rate. According to the definition in 40 CFR §60.751, collecting at sufficient rate can be determined by maintaining negative (gauge) pressure at all wellheads.

These design attributes are discussed below and the calculations and drawings for the designs are in the Appendices. Furthermore, existing, and future planned control devices will also be examined in the Design Section of this plan.

The USEPA's Landfill Gas Emissions Model (LandGEM) is a design 'tool' that incorporates the information available to project future operating conditions. In addition to the site-specific characteristics (waste acceptance rate, type, liner/cap configuration, etc.), for sites that have a GCCS, the existing LFG extraction rate is also used to calibrate LandGEM. Actual operating parameters may dictate changes in the system flow characteristics and process equipment as the system is expanded. These changes will be made in accordance with 40 CFR §60.752 as dictated by actual site conditions at the time of construction.

The GCCS header/lateral pipe network at final build-out is designed to accommodate the anticipated maximum flows; however, there may be interim site conditions that require the temporary installation of a sacrificial pipe network sized to convey interim gas flows.

The portions of the pipe network that are installed prior to maximum gas generation and are planned for use as part of the final grade design specified in this plan will be appropriately sized to handle that maximum.

### **2.1.1 Gas Collection Density**

One of the requirements of the NSPS for designing a gas collection system is to ensure sufficient density of the LFG extraction points, as stated below:

**40 CFR §60.759(a)(2)** The sufficient density of gas collection devices determined in paragraph (a)(1) of this section shall address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.

Per the definition stated in 40 CFR §60.759, "sufficient density" means "any number, spacing, and combination of collection system components. . .

necessary to maintain emission and migration control as determined by measures of performance set forth in this part.”<sup>1</sup>

The well spacing required to achieve comprehensive control of LFG is a function of many parameters including liner type, cover type, surrounding geology/hydrogeology, landfill geometry, well depth, waste composition and age, and the presence of liquids within the landfill.

All of these factors were used to space the extraction wells including an analysis of the zone of influence from each extraction well using Darcy’s equation. The spacing should effectively control surface emissions and subsurface migration of LFG in accordance with NSPS requirements especially in light of the geosynthetic cap that will be used on Phase II and which currently covers Phase I except for the side slopes. Based on extensive industry experience, the LFG collector spacing determined by the Darcy equation is adequate to provide comprehensive control of the LFG as required. In the event that this spacing is not adequate to meet the required operating standards, additional collectors will be installed as necessary.

Additionally, properly designed, installed, and operated gas collection element density can be demonstrated in the field by use of the Surface Emission Monitoring (SEM) requirements contained in 40 CFR §60.753 of the NSPS.

### **2.1.2 Landfill Gas Collection System Expandability**

Expandability of the GCCS is achieved by installing in-line valves, flange adapters with blind flanges or HDPE butt caps along the header and lateral piping. This allows the GCCS to be modified/expanded in the future.

### **2.1.3 Fill Settlement**

Settlement will occur over time due to decomposition of the in-place refuse. To accommodate this condition, the GCCS components were designed with several features to account for this settlement including:

- LFG extraction devices will be connected to the LFG transmission piping via a flexible pipe or hose connection. This allows the LFG piping to accommodate changes in the orientation of the LFG transmission piping or LFG extraction well.
- LFG transmission piping was sloped at sufficient grades so that reasonable amounts of differential and total settlement may occur without causing pipe

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<sup>1</sup> “this part” pertains to the landfill NSPS

breakage or disrupting the overall flow gradient of the LFG transmission piping.

- Adequate piping will be used for the construction of the header and lateral transmission system. Piping materials will be determined as needed during construction. Typically, piping that is flexible and absorbs differential settlement without breaking or cracking will be used i.e. high density polyethylene pipe (HDPE).

#### **2.1.4 LFG Collection and Connection Components**

This section details how the collection devices are connected to the GCCS.

**40 CFR §60.759(b)(3)** Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly shall include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices shall be constructed of PVC, HDPE, fiberglass, stainless steel, or other non-porous material of suitable thickness.

The collection devices are connected to the collection header pipes via lateral piping. The lateral piping will be connected to the header above the landfill surface to provide easy access. The piping is routed below grade for short intervals to allow for proper surface drainage or to prevent damage from landfill operations. Road crossings will be sleeved to ensure that equipment does not damage the piping.

The connector assemblies (extraction wellheads) will be located above grade. These assemblies include a positive closing throttle valve, necessary seals and couplings, access couplings, and sampling ports.

At times, vertical LFG wells may collect water. During these times, it may be necessary to install water pumps to remove liquid from the wells. When pumps are installed to lower liquid levels in an effort to enhance extraction efficiency, this installation and operation may be considered expansion of the GCCS as per 40 CFR §60.755.

#### **2.1.5 GCCS Materials**

In accordance with 40 CFR §60.759 collector materials must be constructed of PVC, HDPE, fiberglass, stainless steel, or other non-porous corrosion resistant material of suitable thickness. These materials are designed and installed to:

- Withstand the stresses induced during installation (limited pipe bending);
- Withstand static load and settlement;

- Withstand traffic loads;
- Be extended to comply with emission and migration control standards;
- Be resistant to decomposition heat; and
- Be perforated adequately.

The GCCS at Kekaha Landfill consists of HDPE pipe and CPVC extraction wells both of which fulfill the requirements specified by US EPA. As an alternative, HDPE pipe may be used in place of CPVC for extraction wells as directed by the County Engineer and the Design Engineer.

### **2.1.6 Well, Collection Device, & Pipe Network Loading**

The pipe network is designed to withstand the estimated static, settlement, overburden, and traffic loads. Static loads from the vacuum applied to the GCCS components and applied loads on the GCCS were both evaluated. Vacuum loads required for the GCCS operation (<40 inches water column) were compared to, and found to be less than, the allowable vacuum loads for the GCCS components (108 inches water column at 120 deg. F – Chevron Phillips HDPE Pipe Performance Bulletin PP 501, January 2015).

Foundations used for GCCS components (flare system concrete pad) were designed to handle the applied loads. The applied loads on GCCS components within the landfill (truck traffic on road crossings), as well as settlement forces, cannot accurately be predicted due to the non-homogeneous nature of the refuse within the landfill. However, the road crossing pipe loads will be distributed by using a pipe sleeve and the settlement forces will be minimized since most of the system will be above grade. Should various sections of the header or laterals settle and collect condensate, the piping will be moved to eliminate the problem. Further, the GCCS components within the landfill are consistent with those at other landfills, which have been in-place for extended periods of time and verified to be capable of withstanding applied static and settlement forces.

### **2.1.7 Nonproductive Areas**

Nonproductive areas may be excluded from the requirements to have a NSPS compliant control device(s) in the area, as stated below:

**40 CFR §60.759(a)(3)(ii)** Any nonproductive area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material shall be documented and provided to the Administrator upon request. A separate NMOC emissions estimate shall be made for each section proposed for exclusion, and the sum of all such sections shall be compared to the NMOC emissions estimate for the entire landfill.

As areas of the landfill are determined to be nonproductive, these areas will be excluded in accordance with the requirement stated above. Copies of required documentation, including calculations on proving the nonproductive area exemption, will be on file at the landfill. The nonproductive areas at the landfill may change over time and therefore, records of these areas will be kept on file at the site. Nonproductive areas may occur over all parts of the landfill timeline, which include existing, interim, and final conditions.

### **2.1.8 Asbestos and Non-degradable materials**

Any areas of the landfill that contain only asbestos and/or non-degradable materials are not required to be controlled in accordance with the NSPS, as stated below:

**40 CFR §60.759(a)(3)(i)** Any segregated area of asbestos or non-degradable material may be excluded from collection if documented as provided under 40 CFR §60.758(d). The documentation shall provide the nature, date of deposition, location and amount of asbestos or non-degradable material deposited in the area, and shall be provided to the Administrator upon request.

No such areas are known to currently exist. However, if the landfill excludes degradable material from non-degradable material in the future, these segregated areas will be excluded from the requirement of collecting LFG from it. Any areas or planned areas containing these types of waste will be included in the appropriate section of a revised Design Plan.

### **2.1.9 Landfill Gas Extraction System Design**

The landfill gas extraction is normally implemented using gas collection devices that are connected to a vacuum source. This section describes design considerations for these gas collection devices. There are some specific requirements included in the following NSPS sections that apply to the gas collection and extraction components:

**40 CFR §60.759(a)(1)** - The collection devices within the interior and along the perimeter areas shall be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues shall be addressed in the design: depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, and resistance to the refuse decomposition heat.

**40 CFR §60.759(b)(1)** The landfill gas extraction components shall be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other non-porous corrosion resistant material of suitable dimensions to: convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads. The collection system shall extend as necessary to comply with emission and migration standards. Collection devices such as

wells and horizontal collectors shall be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations shall be situated with regard to the need to prevent excessive air infiltration.

**40 CFR §60.759(b)(2)** Vertical wells shall be placed so as not to endanger underlying liners and shall address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors shall be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices shall be designed so as not to allow indirect short-circuiting of air into the cover or refuse into the collection system or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations.

**40 CFR §60.759(b)(3)** Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly shall include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices shall be constructed of PVC, HDPE, fiberglass, stainless steel, or other non-porous material of suitable thickness.

At Kekaha Landfill, the collection devices are connected to the collection system via HDPE header and lateral piping. The lateral piping is connected to the header above the landfill surface except for short intervals where it is installed below grade to ensure surface water drainage or protection from equipment and so as not to interfere with site landfill operations. These collection devices are called, "gas wells," which include extraction wellheads (connector assemblies) that are located above grade. These wellheads include a positive closing throttle valve, necessary seals and couplings, access couplings, and a minimum of two sampling ports; all which aid in the prevention of air intrusion, allow for proper operation of the wellheads, and allow the wellheads to be sampled and monitored.

#### **2.1.10 Depths of Extraction Wells**

The vertical wells are designed to protect the landfill underlying liner system by terminating the well boreholes 10 feet above documented liner system elevations. Bore depths will be checked periodically during installation to ensure that the design depth is not exceeded.

If documented liner system elevations are not known, the bore will be extended to depths 10 feet above those approximating the base of the landfill established by inquiry of site personnel. Bore depths will be checked periodically during installation to ensure that the design depth is not exceeded.

In addition, the proposed vertical wells depths will be adjusted based on surveyed elevations to account for differences between the design and actual measurements. The well screen is designed in such a manner so that it captures as much landfill gas as is practicable, without pulling air into the landfill. This well

screen is also adequately sized to allow any liquid to enter the well casing without compromising gas flow and the casing is sized to allow for the installation of a pump if necessary to remove that liquid.

Practical site-specific factors that were addressed during the design include:

- Availability of accurate liner construction records (boreholes must not be advanced far enough to risk penetrating the liner);
- Proximity to liner side-slopes or other areas in which the liner elevation changes rapidly; and
- Obstructions or other technical difficulties that may impact the drilling operations.

#### **2.1.10.1 Vertical LFG Wells**

To a large extent, a well's zone of influence is dictated by the amount of vacuum that can be applied without causing an excessive amount of air intrusion into the landfill. Typically, to reduce air intrusion and thereby increase the zone of influence (ZOI), the upper part of the final well depth is not slotted or backfilled with gravel (Drawing No. 4 in Appendix B shows the design details of the proposed extraction wells). Experience has shown that a minimum of 10 feet and a maximum of 40 feet of solid pipe below grade provides a good balance between air intrusion control and LFG collection efficiency. Air intrusion is also minimized by using soil backfill in the upper zone of the vertical wells and hydrated bentonite plugs just above the well screen and where the pipe penetrates the landfill soil cover.

LFG enters the extraction well through perforations in the portion of the well backfilled with gravel. The designed minimum open area of the perforations is 12 in<sup>2</sup>/foot, which will provide sufficient open area for free gas flow while minimizing the impact on pipe strength.

Further, air intrusion and LFG emissions will be controlled through periodic monitoring and adjustment of the GCCS in coordination with appropriate maintenance of the landfill cover system. The Kekaha closure plan calls for a soil cap with geomembrane on Phase II. The existing Phase I cap does not include a geomembrane on the side slopes. Areas where geomembranes are present will include a boot around the well casing.

Vertical collection wells will be installed in the approximate locations shown on the GCCS Plan included in Appendix B. A typical well design detail is also provided on the GCCS Details included in Appendix B.

### **2.1.11 Extraction Well Perforations & Backfill**

Extraction wells must be perforated to allow LFG entry without excessive head loss and the surrounding gravel sized to prevent blocking of perforations. The designed minimum open area of the perforations is 12 in<sup>2</sup>/foot and the gravel is to be 1.5 – 2.5 inch with less than 5% passing a 1.25" sieve.

There are many site-specific factors that were examined to determine the length of the slotted portion of the gas well. These are shown on the drawing details in Appendix B. Due to the costs associated with new well installation, it is in the best interest of the landfill to choose the optimal slot depth to collect as much gas from the well; yet, maintain compliance with the NSPS well parameters.

The design considered the following conditions:

- Mitigation of odor potential by keeping the well screen as near to the surface as practical; and
- Installation of deeper slots to extend ZOI because of the use of a geomembrane in the caps.
- Air infiltration through the cover, refuse contamination of the collection elements, and direct venting of LFG to the atmosphere.

The designed screen length balance these two concerns favoring deeper screen because of the potential for beneficial use of the gas in the future.

### **2.1.12 Well/Collection Device Backfill**

Gravel, washed aggregate, or other acceptable crushed stone with low carbonate content and of sufficient size, or inert non-calcareous material, will be used to prevent penetration or blockages of the LFG collector pipe perforations/slots. Also, note that an acceptable substitute may be used in lieu of the aforementioned rock as long as it prevents blockage/penetration of the extraction well pipe perforations/slots.

### **2.1.13 Accessibility**

At a minimum, the system is designed to provide accessibility to the GCCS components by persons on foot. The gas piping is above grade and the extraction wellheads are all accessible above grade as well.

### **2.1.14 Landfill Gas Well – Installation Requirements**

LFG vertical gas extraction wells installed in waste and any future wells constructed for LFG collection, will have sufficient cross-section to allow for their proper construction and completion, including centering of the pipes and

placement of gravel or other approved backfill material. Similarly, any horizontal gas collectors that may be installed in the future would have a similar cross-sectional area.

## **2.2 Leachate and Condensate Management**

In accordance with the leachate and condensate management requirement included in 40 CFR §60.759(a)(1), leachate management is accomplished through the use of a leachate collection and management system. A leachate collection and recovery system (LCRS) is incorporated above the Kekaha Landfill Phase II base liner containment system. The LCRS is designed to allow no more than 12-inches of leachate to accumulate over the liner and consists of a gravel layer connected to perforated pipes that drain to leachate sumps. An automated pumping system pumps the leachate out of the sumps to the leachate evaporation pond. The older Phase I portion of the Kekaha Landfill does not have a base liner or LCRS.

Condensate management is to be accomplished by sloping the LFG transmission piping to low points in the GCCS piping for collection of the condensate. The perimeter header system drains by gravity to low spots along the gas collection system. This includes a sump at the flare station. Condensate collection sumps/drains are located at these low points, to collect the condensate and remove it from the transmission piping. Condensate collected in drains/sumps is designed to be re-introduced into the leachate management system and ultimately managed with the leachate at the facility.

Connections of the leachate collection system to the GCCS may be completed in the future but they would be for odor control and to meet other landfill operating needs beyond regulatory compliance with the rule.

## **2.3 Control Systems**

The NSPS specifically requires that LFG collected by a NSPS compliant gas collection system be sent to NSPS compliant control device(s). These regulations contained in the NSPS are listed below:

**40 CFR §60.752(b)(2)(iii)** Route all the collected gas to a control system that complies with the requirements in either paragraph (b)(2)(iii)(A), (B) or (C) of this section.

Since the Kekaha Landfill plans to utilize an enclosed LFG flare as a control system, the required operational performance of the control devices is stipulated by 40 CFR §60.752(b)(2)(iii)(B), which states:

**40 CFR §60.752(b)(2)(iii)(B)** A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC

concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial performance test, required under 40 CFR §60.8 using the test methods specified in 40 CFR §60.754(d).

**40 CFR §60.752(b)(2)(iii)(C)** Route all collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be subject to the requirements of paragraph (b)(2)(iii)(A) or (B) of this section.

The enclosed LFG flare at Kekaha Landfill is designed to reduce the concentration of NMOCs present in the LFG delivered to the flare by at least 98 percent (by weight) or reduce outlet NMOC concentrations to less than 20 parts per million by volume (ppmv).

Per 40 CFR §60.752(b)(2)(iii)(B)(2), the enclosed LFG flare will operate within the performance ranges established during the source performance tests and is operated in such a manner as to meet the emission requirements of the NSPS.

The County of Kauai is contemplating energy recovery from the landfill which may include a compressed natural gas facility or other similar type project beneficially using landfill gas generated at the site. Any future LFG control device, devices, and/or treatment system will be designed to adequately comply with the above NSPS requirements. Control device(s) at the landfill will be adequately sized to handle all the gas collected by the GCCS. The selected control system may change over time; therefore, all chosen control devices will be designed, installed, and operated in compliance with the required regulations.

The capacity of the control system may increase/decrease over time as the amount and quality of LFG produced by the landfill changes. Therefore, the control device, devices, or system chosen for the existing, interim, and future timeframes may vary depending on the site specific LFG characteristics including the quantities produced, which are collected by the gas collection system. All changes to the control system will be reviewed by a professional engineer to determine if an air permit is necessary.

### **2.3.1 Enclosed Flare – Fail Safe Operations**

In accordance with 40 CFR §60.756 of the NSPS, the flare exhaust temperatures are monitored continuously. Continuous flame presence is also monitored using an ultraviolet (UV) flame sensor. The flare exhaust temperature is monitored continuously using thermocouples installed at three stack elevations.

The enclosed flare will be continuously monitored for the presence of a flame, indicating that combustion is occurring. In the event that a flame is not detected,

indicating that the combustion process has been disrupted, the monitoring system will automatically:

- a. Cut power to the LFG mover(s), and;
- b. Initiate the closure of either an electric or pneumatic-activated valve at the inlet to the mover(s).

Stopping the mover(s) will cause the LFG extraction process to cease. As previously mentioned, closing the inlet valve will eliminate the potential for direct venting of raw LFG through the control system. This process will be initiated automatically, in the event of flame failure, without the need for operator intervention. There is no LFG flow bypass around the control device.

## **3 EXISTING SITE CONDITIONS**

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### **3.1 Landfill Description**

The Kekaha Landfill is in the southwestern portion of the island of Kauai, approximately 1.3 miles northwest of the town of Kekaha, between Kaunualii Highway (Highway 50) and Laeo Kokole Lighthouse site. The closed Phase I of the Kekaha Landfill is on property granted to the County by the State of Hawaii by executive order and is owned/maintained by the County of Kauai. The adjacent parcels are owned by the State of Hawaii, the National Guard, the US Coast Guard, and the US Navy. Phase II of the Kekaha Landfill is located on these adjacent parcels. The Kekaha Landfill is operated by Waste Management of Hawaii (WMH), a wholly owned subsidiary of Waste Management, Inc.

The Kekaha Landfill has been in operation since 1953. The original boundaries of the Phase I landfill are defined by Tax Map Key (TMK) (4):1-2-02 Plat 9, providing approximately 33 acres.

As summarized in the Kekaha Landfill, Phase I, Closure/Post-Closure Plan prepared by Harding Lawson Associates (dated January 1994), the Kekaha Landfill site has served as a disposal site for municipal, agricultural, commercial, demolition and industrial solid waste for Kauai since 1953. From July 1991 until October 1993, Phase I of the Kekaha Landfill was the only municipal solid waste landfill operating on Kauai. In October 1993, all waste disposal activities ceased at Phase I of the Kekaha Landfill. Due to impending implementation of EPA's Subtitle D regulations, at that time, it was determined that emergency conditions warranted closure of the Phase I Landfill and construction of a new Phase II Landfill on adjoining property began. Closure of Phase I was undertaken at that time and accomplished as documented in the Kekaha Landfill, Phase I Closure, Post-Construction Report prepared by Harding Lawson Associates (dated February 1996). In October 1993, the County began disposing of all municipal solid waste at Phase II of the Kekaha Landfill. Phase II of the Kekaha Landfill consists of approximately 39 acres.

The only LFG collection and control system features in place at the landfill at this time include a passive gas venting system in Phase I. The conceptual collection network and vent detail were provided in the 1994 Closure/Post-Closure Plan referenced previously and consisted of a geotextile blanket collector and a

geosynthetic edge drain pipe network to gather the gas and move it to vents that penetrate the cover. The gas venting system was installed as part of the closure referenced previously and, as documented in the 1996 Post-Construction Report, includes approximately 25 vents and associated piping. No LFG collection features exist in Phase II at this time.

The existing gas venting system components on Phase I will be capped, and the new GCCS will be installed on Phase I and Phase II of the Kekaha Landfill as described herein. However, portions of the existing gas vent system may be connected to the proposed gas collection system as described in Section 4 (interim gas collection).

## **4 INTERIM DESIGN CONDITIONS**

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This section of the GCCS Design Plan addresses interim conditions. Interim conditions are those that occur while the landfill is in its active state, accepting waste, and before it is closed or at final grades. The gas extraction system will be installed during these interim conditions and will be operated in compliance with the NSPS, while also balancing the requirements placed upon the gas collection system by the day-to-day activities of an active landfill. Interim conditions can hinder the effectiveness of the GCCS because it may be inadvertently damaged by landfill personnel operating heavy equipment, or water-in of header and lateral pipes because of bellies resulting from heavy traffic or differential settlement. In these cases, the design accommodates header relocation and the installation of interim extraction wells if necessary. In addition, interim conditions are situations where the existing landfill elevations have not reached final landfill design grades.

Interim gas extraction wells at the landfill will be installed per the design in compliance with NSPS requirements and raised if necessary. However, in some cases the location of extraction wells installed during interim conditions cannot be accurately predicted due to shifting refuse fill patterns that may change based on the weather (significant area events such as hurricanes, tropical storms, earthquakes, floods, etc.), waste type, and waste volumes. In these instances, wells not installed in the design locations will be replaced or a new well added per the design at final grades. Lastly, interim well spacing's may change from the final design because the final design relies upon a geomembrane which minimizes air intrusion. The surface emissions monitoring will be used to assess performance of interim systems and the GCCS modified accordingly if necessary.

### **4.1 Gas Collection System Expansion during Interim Conditions**

During interim conditions, compliance with the NSPS requirements that specify additional gas collection devices and the corresponding expansion of the overall gas collection system will be maintained. Furthermore, expansions made to the collection system during interim conditions will ensure that LFG will be collected at sufficient rates that may change over the interim time frame, and will be

designed and installed properly to minimize off-site migration of gas. Some of these requirements are specifically stated below:

**40 CFR §60.751** *Sufficient density* means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance set forth in this part.

**40 CFR §60.759(a)(3)** The placement of gas collection devices determined in paragraph (a)(1) of this section shall control all gas producing areas, except as provided by paragraphs (a)(3)(i) and (a)(3)(ii) of this section.

**40 CFR §60.759(a)(2)** The sufficient density of gas collection devices determined in paragraph (a)(1) of this section shall address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.

**40 CFR §60.755(b)** For purposes of compliance with 40 CFR §60.753(a), each owner or operator of a controlled landfill shall place each well or design component as specified in the approved design plan as provided in 40 CFR §60.752(b)(2)(i). Each well shall be installed no later than 60 days after the date on which the initial solid waste has been in place for a period of:

**40 CFR §60.755(b) (1)** 5 years or more if active; or

**40 CFR §60.755(b) (2)** 2 years or more if closed or at final grade.

**40 CFR §60.759(c)** Each owner or operator seeking to comply with 40 CFR §60.752(b)(2)(i)(A) shall convey the landfill gas to a control system in compliance with 40 CFR §60.752(b)(2)(iii) through the collection header pipe(s). The gas mover equipment shall be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment using the following procedures:

In compliance with these regulations, the GCCS has been designed and will be further expanded as necessary during interim conditions, to extract LFG at a sufficient rate so as to minimize the subsurface lateral migration and surface emissions of LFG. This is achieved, in part by, appropriately sizing and installing sufficient collection elements, transmission piping, gas moving equipment, and control device(s) for the estimated maximum flow rate of LFG. Kekaha Landfill has been designed to achieve this.

A professional engineer will certify expansions of the GCCS and the measures of system performance will be verified as set forth in the NSPS. Based upon the outcome of the system performance metrics contained in the NSPS, such as the SEM and monthly collection device monitoring requirements, the GCCS will be adjusted or modified accordingly. This information will be used as an additional tool to evaluate the need for future expansion of the GCCS.

Per the definition stated in 40 CFR §60.751, “sufficient density” means “any number, spacing, and combination of collection system components . . .

necessary to maintain emission and migration control as determined by measures of performance set forth in this part.” Well spacing at the Kekaha Landfill is established based on site-specific conditions (waste age, waste density, moisture content, etc.), ZOI estimates, past operational experience, and engineering judgment (See Appendix A-1). This is consistent with spacing criteria used at other landfills and should effectively control surface emissions and subsurface migration of LFG in accordance with NSPS requirements.

In the event that the actual LFG generation rate exceeds the capacity of the system, additional GCCS components will be designed and installed in accordance with NSPS requirements as dictated by actual site conditions at the time of construction. Therefore, actual operating parameters may dictate changes in the system flow characteristics and process equipment as the system is expanded.

Furthermore, the header and lateral piping systems is sized to accommodate the peak flows of the landfill. The existing Phase I vents will be capped and abandoned, however, one or more of these vents may be used in the future if necessary to address odors, gas migration or other similar situation.

#### **4.1.1.1 Horizontal Gas Collectors:**

Horizontal gas collectors may be installed in areas where waste placement activities interfere with the installation of a vertical well. In these cases, a horizontal trench collector with gravel and perforated piping will be installed and connected to the main header system. To limit air intrusion, these horizontal collectors will be installed only in areas where at least 20 feet of additional waste is to be landfilled above them. However, since horizontal collectors are often installed relatively close to the surface of the landfill, atmospheric air can be pulled into them, resulting in oxygen content greater than the NSPS limit of 5%. Should this occur, a higher operating limit for oxygen may be established in accordance with the NSPS, as discussed in Section 6.1.4 of this Design Plan.

#### **4.1.2 Compatibility with Refuse Filling Operations**

One of the key factors in constructing and operating a gas collection system during interim conditions, is how to design it so it is compatible with the refuse filling operations of an active landfill. As refuse filling operations proceed and portions of the site reach final or near final grades, additional GCCS components may be installed to comply with the 5-year/2-year requirements of NSPS, which are specifically discussed in Section 2, Design Criteria. Using this method allows GCCS components to be installed in accordance with 40 CFR §60.752(b)(2)(ii)(A)(2)(i) and (ii) while minimizing interference of the GCCS with ongoing filling operations.

During the process of refuse filling operations, vertical gas extraction wells may be “raised” periodically so the new refuse is not placed over the top of an existing well. Vertical wells are raised in anticipation of a new lift of refuse, or in advance of the refuse to be added to the area in order to maintain worker safety in the active area during these well raising construction activities. However, in performing the well raising in a safe area, this may require the well to be raised more than 30 days before refuse can be placed around the well during which the well is temporarily offline. A variance request for monitoring these raised wells is contained in Section 6.1.7 of this Plan.

#### **4.1.3 Landfill Cover Properties**

The purpose of the interim cover system is to provide a barrier to LFG emissions, as well as, water and air infiltration, and comply with State of Hawaii solid waste regulations and the landfill’s operating permit. The lateral extent of the interim cover system will vary depending on when the landfill plans to place additional waste in the area. If the landfill municipal solid waste sequencing plan defers filling to final grade in certain area(s), the County may decide to hydroseed or install some kind of a temporary cap over this portion of the landfill to improve performance of the GCCS.

## 5 FINAL DESIGN CONDITIONS

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Final Design conditions are for the closed landfill or areas of the active landfill, which have ceased to accept waste and has a certified closed cap in place. Final Design conditions also apply to the closed landfill or closed portions of an active landfill that achieved final waste grades.

### 5.1 Landfill Gas Collection

This section addresses the location of the GCCS components after the landfill is no longer operating under interim conditions. The GCCS will be operated in accordance with the requirements of the NSPS for a closed landfill.

**40 CFR §60.755(b)** For purposes of compliance with 40 CFR §60.753(a), each owner or operator of a controlled landfill shall place each well or design component as specified in the approved design plan as provided in 40 CFR §60.752(b)(2)(i). Each well shall be installed no later than 60 days after the date on which the initial solid waste has been in place for a period of:

**40 CFR §60.755(b) (2)** 2 years or more if closed or at final grade.

In accordance with this requirement, a GCCS must be installed in all areas with waste that is 5 years or older if open and 2 years or more if closed or at final grade.

**40 CFR §60.752(b)(2)(ii)(A)(3)** Collect gas at a sufficient extraction rate;

**40 CFR §60.752(b)(2)(ii)(A)(4)** Be designed to minimize off-site migration of gas.

**40 CFR §60.759(a)(2)** The sufficient density of gas collection devices determined in paragraph (a)(1) of this section shall address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.

In compliance with 40 CFR §60.752(b)(2)(ii)(A)(3) and (4), the GCCS is designed to extract LFG at a sufficient rate so as to minimize the subsurface lateral migration and surface emissions of LFG. This is achieved by sizing and installing sufficient collection elements, transmission piping, blower(s), and control device(s) for the estimated maximum flow rate of LFG.

The GCCS is designed to collect LFG at a sufficient rate, which per the definition in 40 CFR §60.751 means to maintain a negative [gauge] pressure at all

wellheads. Application of a negative pressure and minimization of air infiltration (oxygen) will be verified by monitoring each LFG wellhead.

Per the definition stated in 40 CFR §60.751, “sufficient density” means “any number, spacing, and combination of collection system components. . . necessary to maintain emission and migration control as determined by measures of performance set forth in this part.” Well spacing at the Kekaha Landfill was established based on site-specific conditions (waste age, waste density, moisture content, etc.), ZOI estimates, past experience, and engineering judgment (See Appendix A-1). This is consistent with spacing criteria used at other landfills and should effectively control surface emissions and subsurface migration of LFG in accordance with NSPS requirements.

Wells may have to be replaced over time due to liquids, fouling, siltation or other similar impacts or well casing damage, or relocated due to the conditions found during installation (obstructions). If this happens, the location of the well may vary from the original designed location, but will remain within the original zone of influence. As-builts of the gas collection system will be updated and a copy of the as-built drawing will be kept on-site. The design criteria discussed in Section 2 of this Plan was incorporated into the planned GCCS (Appendix B).

Kekaha Landfill will conduct SEM events as specified in 40 CFR 60.755(b) in all accessible areas that have waste in-place for 2 years and are closed or at final grade to ensure that the gas collection system was designed, installed, and is being operated properly. If the GCCS at the Kekaha Landfill does not meet the measures of performance set forth in the NSPS, the GCCS will be adjusted or modified in accordance with the NSPS requirements. Possible adjustments or modifications are detailed in Section 6 of this Plan.

### **5.1.1 Landfill Gas Generation Rates and Flow Characteristics**

This portion of the design plan is to address the peak value flow rates used in determining the final build out of the GCCS, as described in this section and in Appendix A-2.

**40 CFR §60.752(b)(2)(ii)(A)(1)** An active collection system shall be designed to handle the maximum expected gas flow rate from the entire landfill that warrants control over the intended use period of the gas control or treatment system equipment

In compliance with 40 CFR §60.752(b)(2)(ii)(A), the maximum expected LFG flow rate for the site was used for sizing the GCCS. LFG generation based on the United States Environmental Protection Agency (USEPA) Landfill Gas Estimation Model (LandGEM) yielded a peak value of 521 scfm in 2020 for total landfill gas. This value is based on the currently permitted volume (including the most recently permitted expansion which is included in this design plan submittal) in

the solid waste disposal permits. Copies of the results of the LFG generation rate modeling are included in Appendix A-2. The corresponding sizing of the system may change based on actual gas flows obtained from the landfill as the site nears closure. Additionally, the sizing of the GCCS may be changed to incorporate a factor of safety.

### **5.1.2 Landfill Cover Properties**

The purpose of the final cover system is to provide a barrier to LFG emissions, as well as, water and air infiltration. At the time of the submittal of this Design Plan, the landfill final cover properties consist of a final cover system pursuant to RCRA Subtitle D, 40 CFR § 258.60(a), designed to:

- (a) Have permeability less than or equal to the permeability of any bottom liner system or natural subsoil present, or a permeability no greater than  $1 \times 10^{-5}$  cm/sec, whichever is less, and
- (b) Minimize infiltration through the closed MSWLF unit by an infiltration layer that contains a minimum of 18-inches of an earthen soil material, and
- (c) Minimize erosion of the final cover by an erosion layer that contains a minimum of 6-inches of earthen material that could sustain native plant growth.

The final cover at Kekaha Landfill will be designed and installed in accordance with applicable regulatory requirements. Closure of Phase I was accomplished as documented in the Kekaha Landfill, Phase I Closure, Post-Construction Report prepared by Harding Lawson Associates (dated February 1996). Final cover placement for Phase II will proceed in phases as fill elevations reach final grades. Integration of GCCS with specific cover components (including provisions for low permeability soils or geosynthetic membranes) will be addressed in the approved Final Closure Plan.

### **5.1.3 Integration with Closure End Use**

Currently, the closure end-use for the site is unspecified. Any modifications to the closure end use will be reviewed by Kekaha Landfill to evaluate compatibility with the GCCS. Items of concern will be mitigated by either altering the proposed closure end-use or by adjusting or modifying the GCCS in accordance with NSPS requirements.

#### **5.1.4 Operation of GCCS After Closure**

The landfill is not required to operate the GCCS indefinitely after closure of the landfill. The requirements that allow for removal of the GCCS are listed below:

**40 CFR §60.752(b)(2)(v)** The collection and control system may be capped or removed provided that all the conditions of paragraphs (b)(2)(v) (A), (B), and (C) of this section are met:

**40 CFR §60.752(b)(2)(v)(A)** The landfill shall be a closed landfill as defined in 40 CFR §60.751 of this subpart. A closure report shall be submitted to the Administrator as provided in 40 CFR §60.757(d);

**40 CFR §60.752(b)(2)(v)(B)** The collection and control system shall have been in operation a minimum of 15 years; and

**40 CFR §60.752(b)(2)(v)(C)** Following the procedures specified in 40 CFR §60.754(b) of this subpart, the calculated NMOC gas produced by the landfill shall be less than 50 megagrams per year on three successive test dates. The test dates shall be no less than 90 days apart, and no more than 180 days apart.

The GCCS will be operated in accordance with the above regulations of the NSPS. After the GCCS is allowed to be removed according to the NSPS, the GCCS may remain in place and functional, but it will no longer be required to operate in accordance with the NSPS operational requirements. If these above regulations regarding GCCS removal change, the landfill will comply with the new/revised regulations.

## **6 NSPS VARIANCE SECTION**

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The following requirement allows for alternatives to the operational standards, test methods, procedures, compliance requirements, monitoring, record-keeping, and reporting provisions to be requested in the design plan.

**40 CFR §60.752(b)(2)(i)(B)** The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, record keeping or reporting provisions of §60.753 through §60.758 proposed by the owner or operator.

The following are variances to the NSPS, arranged by general topic, and comply with the intent of the NSPS requirements.

### **6.1 Collection Device Monitoring**

The following variances to the NSPS relate to collection system monitoring requirements.

#### **6.1.1 Monthly Well Monitoring Device**

The requirements of 40 CFR §60.755 (a)(5) allows for the monitoring of temperature and either nitrogen or oxygen to establish whether excess air infiltration is occurring. Unless an alternative test method is approved, 40 CFR §60.753 (c)(1) and (2), allow for the use of EPA Method 3C to measure the nitrogen levels and the use of either EPA Method 3A or EPA Method 3C to establish the oxygen content. In accordance with the general state-of-the-practice procedures, Kekaha Landfill proposes to use a portable monitoring instrument such as an Envision meter, Landtec GEM 2000 or 5000, LMS, or equivalent. The monitoring equipment will be verified and calibrated in accordance with manufacturer's recommendations to ensure accurate measurement of all parameters for which it is used to monitor.

#### **6.1.2 Operational Change to Accommodate Declining Flows**

The primary objective of the NSPS regulations is to minimize surface emissions into the atmosphere, while mitigating conditions within the landfill that could foster subsurface oxidation. Kekaha Landfill requests the following alternative to standard operating procedures for LFG extraction wells where gas flow rates are so low that applying even minimal vacuum results in an exceedance of the applicable oxygen concentration limit. Shutting such wells

down is likely to cause positive pressure in the wellhead as landfill gas builds up. Therefore, simultaneously complying with both the negative pressure and oxygen concentration limits in 40 CFR §60.753 can be difficult for the wells where gas flow rates have declined over time.

Under provisions in 40 CFR §60.753(b)(3), wells that experience positive pressure after being shutdown to accommodate declining LFG flow rates can be decommissioned if permission is granted by the Administrator. As an alternative to decommissioning wells under the provisions, the Kekaha Landfill has proposed to make the following changes to its standard operating procedure for wells where persistent oxygen exceedances are not the result of operations and/or maintenance issues:

- a. To ensure a representative sample is obtained, LFG should be flowing. The wellhead and / or well casing should be purged of poor stagnant gas prior to sampling.
- b. Wells where oxygen concentrations do not decline to acceptable levels after more than one hour of reduced vacuum will be shut off until the gas quality recovers.
- c. The monthly monitoring required by 40 CFR §60.755 will be conducted for wells that have been shut down, but positive pressure or elevated oxygen concentrations will not be considered exceedances of the operating limits in 40 CFR §60.753.
- d. If monthly monitoring indicates that pressure has built up in the well and the oxygen concentration still exceeds five percent, the well will be opened to relieve the pressure and will be shut down until it is monitored the following month.
- e. If monthly monitoring indicates that the gas quality has improved (i.e. the oxygen concentration has dropped below five percent), the well will be brought back on line until the gas quality declines again.
- f. The quarterly surface emissions monitoring (SEM) required under 40 CFR §60.755 will be conducted for wells that have been shut down. Standard remediation steps, including evaluating the need to return wells to full-time service, will be followed if exceedances of the 500 ppm methane surface concentration limit are detected.

The foregoing procedures are consistent with the alternative operating scenario detailed in an EPA clarification letter dated February 9, 2005 and is also consistent with the determination dated 02/09/2005 (Appendix D-

56). Furthermore, Kekaha Landfill will document these operational changes in the Semi-Annual Monitoring Reports required under NSPS.

### **6.1.3 Collection devices added to the GCCS/ Expanding the system to address Pressure, Temperature, and/or Oxygen or Nitrogen Exceedances**

Subsequent to initial gas system installation, gas system expansion and / or modification may be implemented, which could include the installation of new extraction wells, pipes, or other GCCS components. Pursuant to 40 CFR §60.755(a)(4) the landfill is not required to expand the system during the first 180 days after gas collection system start-up where pressure exceedances were recorded at one or more wells.

Based on the November 10, 2005 meeting between USEPA and waste industry representatives (See Appendix D-116), the exemption from system expansion can be requested for any individual well/collector or series of collectors installed during initial system installation or subsequent to initial installation as part of system expansion or modification; however, such exemption must be approved in the Design Plan. Therefore, the Kekaha Landfill is requesting 180 days from the date that each well or collector is installed to achieve the NSPS operating parameters for pressure, oxygen and/or temperature without having to expand the GCCS due to a monitored exceedance. During the 180 day period, monthly monitoring of the well/collector and attempted corrective actions are still required.

### **6.1.4 Monthly Monitoring and Associated Corrective Actions**

Sections 40 CFR §60.755(a)(3) and 40 CFR §60.755(a)(5) of the NSPS requires the landfill owner or operator to take corrective action to remedy GCCS operating and compliance monitoring exceedances within 5 calendar days. If the condition cannot be corrected within 15 days of the initial exceedance, the GCCS must be expanded within 120 days of the initial reported exceedance, or an alternate remedy to correct the exceedance(s) and a corresponding timeline for implementation may be submitted for agency approval. In many instances expansion of the GCCS will not alleviate the source of the exceedance found during the 5/15 day remonitoring events.

For this reason, Kekaha Landfill is seeking approval for an alternative to this corrective measure protocol. If the condition cannot be corrected within 15 days of the initial exceedance, the Kekaha Landfill is proposing to implement assessment monitoring procedures. These assessment

monitoring procedures will be implemented to ascertain the best approach for enhancing the effectiveness of the GCCS. Assessment monitoring procedures will include evaluation/troubleshooting of existing GCCS components (i.e. investigation for damaged components, checking water levels in wells, investigation of sump pump operability etc.). Assessment monitoring procedures in addition to corrective actions (as discussed below) will be performed as soon as possible, but will not exceed more than 120 days after the initial exceedance. Based on the data gathered during assessment monitoring, the Kekaha Landfill will implement the deemed appropriate corrective action measures to modify/expand/repair the GCCS. If the exceedance(s) can be corrected during the 120-day period, no further action will be taken until the next monthly well monitoring event.

Note that if the Kekaha Landfill is not able to correct for the exceedance(s) within the 120-day period using the corrective action measures deemed appropriate prior to completion of the 120-day assessment period, a letter requesting an extended timeline for implementation of corrective measures will be submitted to the Administrator on or before the 120<sup>th</sup> day of the aforementioned assessment period. If the well cannot be brought back into compliance during assessment monitoring, the data obtained during the 120-day assessment monitoring period will be used to determine if the GCCS is in need of expansion/enhancement or the extraction well has become a low-producing extraction well. If the extraction well is determined to be low-producing, the Kekaha Landfill proposes to implement the alternative operating scenario presented in variance request 6.1.2 of this Design Plan for low-producing extraction wells.

Solutions to any extraction well exceedances may include corrective actions to the GCCS other than the installation of additional collection devices. These corrective actions could include one or more of the following measures:

- a. Installation/upgrades to the blower/flare skid equipment (bigger blowers, larger flare, additional blowers, etc.).
- b. Installation of a liquid management system in the extraction wells or sumps.
- c. Installation/modification of other ancillary equipment (larger air compressor, additional air and condensate force main lines, etc.)
- d. Redrilling and/or installation of additional/replacement collection devices.
- e. Repair of landfill cap to lessen the chance of encountering ambient air.

- f. Repair/Replace header valves.

Please note that the foregoing list is not intended to be exhaustive. Other actions that result in the remediation of an exceedance within the 120-day time frame would also be covered under this alternative. Any enhancements made to the existing GCCS will be documented in the SEM-Annual Reports prepared for compliance with NSPS/Title V requirements. In the event that, the GCCS cannot be brought back into compliance during the 120-day period, the Kekaha Landfill will prepare and submit an alternative compliance schedule for review and approval by the Administrator before the expiration of the 120-day period.

#### **6.1.5 Well Abandonment**

A notice will be submitted to the Administrator when a well is decommissioned. In addition if a well is replaced, the existing well can be abandoned/removed by the landfill without notification or prior approval by the Administrator. The new well will be renamed to an alternative name.

#### **6.1.6 Early Installation of Collection Devices**

The requirements of 40 CFR §60.755(b) states that each extraction well shall be installed no later than 60 days after the date on which the initial solid waste has been in place for a period of 5 years or more in active areas or 2 years or more if closed or at final grade. However, there may be occasions when Kekaha Landfill will decide to install extraction wells included in the Design Plan prior to the onset of NSPS requirements. Based on the foregoing regulatory citation, any extraction wells installed prior to the requirements of NSPS will not be subject to the operational and/or record-keeping requirements of NSPS until the age of the initial waste placed reaches 5 years old if in an active area or 2 years old if closed or at final grade. To make certain that the Administrator is made fully aware of these special circumstances, Kekaha Landfill will include information in the semi-annual report required by NSPS and Title V indicating the date of initial extraction well installation and the NSPS compliance date of the "early extraction well". Appendix D-21.

#### **6.1.7 Monitoring of Collection Device during Well Raising**

During the process of refuse filling operations, installed vertical extraction wells have to be "raised" periodically so the new refuse is not placed over the top of an existing vertical well. If the well cannot be accessed, then monthly measurements would not be possible. A well is raised in advance of placing waste around it in order to keep people safe and out of the

active area during these well raising construction activities. However, in performing the well raising in a safe area, this may require the well to be raised more than 30 days before refuse can be placed around the well during which time the well is offline.

Therefore the site may have a well extending up into the air that may be near an active refuse placement area, and cannot have monthly monitoring performed on it. Furthermore, as refuse is placed around the well in the active face, access for landfill gas technicians is very limited and typically unsafe due to all the heavy equipment being operated in a small area.

Due to the potential dangers associated with well raising, Kekaha Landfill is requesting that raised wells be exempt from the monthly NSPS monitoring for a period not greater than 60 days. Wells that were not monitored due to well raising activities will be noted on the semi-annual NSPS reports. Records will be maintained of the period wells are offline. Appendix D-26.

#### **6.1.8 Monitoring of Leachate Clean-out Risers**

During the operating life of the landfill, Kekaha Landfill may decide to connect the Phase II leachate collection system to the GCCS to help control odors, to increase the quantity of LFG available for beneficial use, or to meet other landfill operating needs beyond regulatory compliance with the rule. This Plan has been prepared to meet the required level of LFG control without the use of the aforementioned connections. For this reason, Kekaha Landfill does not believe that the operating requirements of the rule should be applied to voluntarily added collectors because these collectors only act to enhance the performance of the system beyond that required by the rule. Further, because these devices are installed for purposes other than to meet the requirements of the rule, their design may preclude their ability to meet the stipulated operational requirements.

Additionally, these leachate collection risers often operate with oxygen at atmospheric level (approximately 21%), which is far greater than the 5% oxygen limit for gas collection wells contained in the NSPS. Furthermore, these leachate collection risers that are connected to the gas collection system are not always operated under a negative pressure because they are sometimes closed off for operational purposes. If Kekaha Landfill is required to operate any gas connection points to the leachate collection system, then the Kekaha Landfill will need to operate those points at a variance of 21% and at times be allowed to be operated under a positive pressure. Therefore, Kekaha Landfill is requesting that connections to the

leachate risers not be required to be operated and monitored in compliance with the NSPS. If the Administrator feels that any leachate risers connected to the GCCS must be operated and monitored in accordance with the NSPS, then the Kekaha Landfill would need to establish an oxygen variance of less than twenty-one percent and be allowed to operate them at positive pressures as well.

## **6.2 Surface Emission Monitoring**

The following variances are related to Surface Emission Monitoring (SEM) events.

### **6.2.1 Exclusion of dangerous areas from SEM requirements**

40 CFR §60.753(d) **Operational Standards for Collection and Control Systems:** "...A surface monitoring design plan shall be developed...Areas with steep slopes or other dangerous areas may be excluded from surface testing.

Kekaha Landfill is proposing to exclude the following steep slopes and dangerous areas from SEM:

- a. Roads;
- b. Active areas or working face;
- c. Truck traffic areas;
- d. Slopes steeper than or equal to 4:1; and
- e. Areas where the landfill cover material has been exposed for the express purpose of installing, expanding, replacing, or repairing components of the LFG, leachate, or gas condensate collection and removal systems

### **6.2.2 10-day SEM Re-monitoring Event**

Kekaha Landfill is requesting a variance to the 10-day Surface Emissions Remonitoring Event (REM) window allotted for adjustments to the cover and/or GCCS. Industry experience with NSPS facilities suggests that this 10-day time frame may not be reasonable to effect comprehensive repairs during all quarters of a typical year. For example, if the facility experiences precipitation events following a surface scan, it may take several days or even weeks for the sideslopes of the landfill to dry out enough to support construction equipment cover repairs. If the sideslopes are not completely dry, the repair equipment could cause greater damage to the final cap (and subsequently higher emissions) than the original erosion or crack. Poor weather conditions can prevent

cover maintenance, causing the follow-up Surface Emissions REM events 10 days later to automatically fail. This can ultimately force a facility to install an unnecessary LFG collection device when all that was really required was enough time to effect a cover repair.

For this reason, the Kekaha Landfill is requesting that the 10-day REM event time frame be extended by an additional two (2) weeks, in the event of bad weather conditions after a quarterly SEM event. Kekaha Landfill is proposing to obtain this two-week extension automatically upon providing the EPA with the following written information:

- The date of the Initial Quarterly SEM event
- The date of the inclement weather event
- Description of inclement weather event
- The name of the responsible sampling technician (Print and Signature)

Please note that a copy of this information will also be maintained in the Kekaha Landfill NSPS files. (See Iowa Determination Letter dated March 15, 2006 shown in Appendix D-21.)

### **6.2.3 Alternative Remedy for SEM Events**

Sections 40 CFR §60.755(a)(4) of the NSPS requires the landfill owner or operator to take corrective action to remedy any methane surface emissions of greater than or equal to 500 ppm. Kekaha Landfill plans to perform the initial SEM Events and 10-day/30-day SEM events in accordance with the NSPS and 6.2.2 of this variance request section. Additionally, SEM exceedance corrective measures may include corrective actions to the GCCS other than the installation of additional LFG collection devices. Therefore, Kekaha Landfill is proposing to implement these alternative remedies to correct SEM exceedances. These corrective actions could include one or more of the following measures:

- a. Installation/upgrades to the blower/flare skid equipment (bigger blowers, larger flare, additional blowers, etc.).
- b. Installation of a liquid management system in the extraction wells or sumps.
- c. Installation/modification of other ancillary equipment (larger air compressor, additional air and condensate force main lines, etc.)
- d. Redrilling or installation of additional/replacement LFG collection devices.

- e. Repair of landfill cap or intermediate soil cover to lessen the chance of landfill gas emissions.
- f. Repair/Replace header valves.

Please note that the foregoing list is not intended to be exhaustive. Other actions that result in the remediation of an exceedance within the 120-day time frame would also be covered under this alternative. Any enhancements made to the existing GCCS will be documented in the Semi-Annual Reports prepared for compliance with NSPS/Title V requirements. Please note that Kekaha Landfill will be proactively implementing this variance to make certain that exceedances are addressed as expeditiously as possible. In the event that, the GCCS cannot be brought back into compliance during the 120-day assessment period, Kekaha Landfill will prepare an alternative compliance schedule for review and approval by the Administrator.

#### **6.2.4 SEM for Closed Portions of the Landfill**

Kekaha Landfill is requesting that any portions of the landfill that have been certified closed or have been closed and capped in accordance with the cover conditions contained in this Design Plan be treated as a closed landfill for SEM events. These closed portions of the landfill would be monitored in accordance with 40 CFR §60.756(f), which states the following:

“...Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring. Any reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for the landfill to quarterly monitoring.”

Therefore, Kekaha Landfill is requesting that all closed areas of the landfill (i.e., Phase I of the existing Kekaha Landfill) have SEM performed on it in accordance with the requirements of 40 CFR §60.756(f).

### **6.3 Control Device**

The following variances have to do with Control Devices.

#### **6.3.1 1-hour and 5-day Standards**

Section 60.755(e) states that the compliance provisions apply at all times, except during periods of startup, shutdown or malfunction provided that the

duration of the start-up, shutdown or malfunction shall not exceed 5 days for collection systems and shall not exceed 1 hour for treatment or control devices. The collection and control systems are designed so that when the control system is off-line the gas moving equipment is shutdown as well preventing gas from being vented to the atmosphere. Therefore, the entire collection system is off-line when the control system is shutdown. It is the understanding of Kekaha Landfill that the 1-hour and 5-day downtime provisions mean that the collection system cannot be down for more than 5 days at a time. Further, the treatment and/or control system (i.e., flare) cannot be down for more than 1 hour at a time while the collection system is running, in a manner that allows uncontrolled LFG to vent to the atmosphere. For this reason Kekaha Landfill will operate the GCCS such that control system downtime in excess of 5 days, assuming no uncontrolled LFG emissions into the atmosphere in excess of 1 hour, is not considered an exceedance of the standard. This type of operational procedure is understood to meet the intent of the regulation. Furthermore, the EPA appears to agree with this understanding of the regulation, because the proposed NSPS revision does not include the 1-hour rule as part of the regulation. This information is shown in the EPA-SWANA Meeting Summary of Responses, which can be found in Appendix D-116.

### **6.3.2 Flow meters when no bypass is present**

The Municipal Solid Waste Landfill NSPS/EG-- Questions and Answers (Q&A) document indicates that LFG flow measurement or lock and key requirements would not apply to a GCCS that is designed such that there is no physical means to bypass the LFG flow before it reaches the control device. In the event that a malfunction occurs with the GCCS equipment, an electric or pneumatically operated valve has been designed to close to prevent the direct venting of raw LFG into the atmosphere. The existing GCCS design satisfies the foregoing LFG flow measurement/lock-and-key waiver criteria; therefore, Kekaha Landfill is requesting to not be required to install and operate flow-measuring device in accordance with the requirements of the NSPS. If Kekaha Landfill decides to install a flow measuring device, it will not be required to monitor or record flow in accordance with NSPS. A copy of the Q&A Document is shown in Appendix D-61.

### **6.3.3 Intermittent operation and shutdown of extraction wells and control devices**

The site is located in a relatively dry area of the island, therefore gas generation is expected to be very limited. This may necessitate intermittent operation or the operation of wells with positive pressure to prevent a landfill fire as provided for in the NSPS. Kekaha Landfill is requesting approval to operate wells intermittently to avoid conditions that would be conducive to the formation of a fire consistent with the NSPS. It may be necessary to turn off this control device periodically to ensure that air does not get introduced into the landfill.



## **APPENDIX A**

### **GCCS DESIGN CALCULATIONS**

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## Appendix A-1: Discussion of the Darcy Zone of Influence for Landfill Gas Extraction Systems

**Purpose:** To present a design procedure for determination of gas extraction well locations and relative placement/spacing.

**Method:** Utilization of an individual gas extraction well's Darcy zone of influence to determine optimal well spacing sufficient to induce vacuum uniformly throughout the waste disposal area.

**Objective:** As a standard design method, landfill gas extraction well spacing by means of the Darcy zone of influence provides a reasonable effective extraction area coverage over the waste disposal area, with minimum overlap or open spaces. Placement of gas extraction wells on side slopes should be minimized to reduce air intrusion.

**Definition:** The zone of influence (ZOI) is the radial distance from an extraction well from which the migration direction of landfill gas will be influenced by an application of vacuum. Since gas is influenced by convection forces (pressure gradient), the zone of influence is established where the measured pressure/vacuum at extreme zone ( $r_1$ ) of influence is zero.

### Darcy Zone of Influence for Radial Compressible Fluid Flow

**Discussion:** Darcy equation, for radial fluid flow

$$v = \left( \frac{g_c K}{\mu} \right) \left( \frac{dP}{dr} \right) \quad \text{equation ( 1 )}$$

**Where:**

- $g_c$  = acceleration of gravity constant = 32.2 (lb<sub>M</sub>·ft/lb<sub>F</sub>·sec<sup>2</sup>)
- $v$  = apparent flow velocity in (ft/sec) units
- $\mu$  = absolute viscosity of the flowing fluid (landfill gas) in (lb<sub>M</sub>/ft·sec) units
- $K$  = absolute permeability of the porous media (refuse) in (ft<sup>2</sup>) units
- $dP$  = pressure gradient in the direction of radial flow in (lb<sub>F</sub>/ft<sup>2</sup>) units
- $dr$  = radial distance gradient in (ft) units

**Definition:** Permeability is defined as a measure of a porous media's ability to transmit fluids.

**Assumptions necessary to develop the basic flow equations:**

- (1) steady-state flow conditions exist.

- (2) the pore space of the refuse is 100 percent saturated with the flowing fluid (landfill gas).
- (3) the viscosity of the flowing fluid is constant.
- (4) isothermal conditions in the refuse prevail.
- (5) flow is laminar, horizontal, and linear since refuse grain size is relatively small and the velocity of the fluid flow is low.

Please refer to the ideal radial flow system diagram (Figure 1). With these assumptions in mind, let

$$v = \frac{q}{A}$$

Where:

- $v$  = the apparent velocity of the flowing fluid (gas)
- $q$  = volumetric rate of fluid (gas) flow
- $A$  = total cross-sectional area perpendicular to flow direction  
=  $2\pi r h_s$
- $h_s$  = total extraction well length of slotted pipe

Substitute in equation (1):

$$q / A = \left( \frac{g_c K}{\mu} \right) \left( \frac{dP}{dr} \right) \quad \text{equation( 2 )}$$

with  $A = 2\pi r h_s$  and rearranging

$$q = \left( \frac{2\pi r h_s g_c K}{\mu} \right) \left( \frac{dP}{dr} \right) \quad \text{equation( 3 )}$$

Since landfill gas is a compressible fluid, its viscosity and flow characteristics must be corrected to standard conditions.

When a flowing fluid is compressible, then  $q$  is not constant, but is a function of pressure and temperature  $f(P, T)$ . An expression for the standard flow rate of a gas ( $q_s$ ) is obtained from Charles' law, assuming ideal gas behavior at standard conditions:

$$\frac{P_1 q_1}{T_1} = \frac{P_2 q_2}{T_2} = \text{constant} = \frac{P_s q_s}{T_s} \quad \text{at standard conditions}$$

Substitution in equation (3):

$$\frac{P_s q_s}{T_s} = \frac{Pq}{T} = \left( \frac{2\pi r h_s g_c K}{\mu T} \right) \left( \frac{PdP}{dr} \right) = \text{constant}$$

Where:

- $T_s$  = standard temperature = 60(degF) = 520(degR) constant
- $P_s$  = standard pressure = 14.7 (psia) = 2,116.8 (lb<sub>F</sub>/ft<sup>2</sup>) constant
- $T$  = flowing temperature of the fluid (landfill gas)

Therefore:

$$\frac{P_s q_s}{T_s} = \left( \frac{2\pi r h_s g_c K}{\mu T} \right) \left( \frac{PdP}{dr} \right) \quad \text{equation ( 4 )}$$

let  $q_s$  = standard volumetric rate of fluid flow

$$q_s = (dG / dt) V \rho = (dG / dt) \pi r^2 h_T \rho$$

Where:

- $(dG/dt)$  = landfill gas generation rate
- $V$  = volume of well influence, assuming uniform cylindrical geometry  
=  $\pi r^2 h_T$
- $\rho$  = density of refuse; assume  $\rho = 1,300$  (lb<sub>M</sub>/yd<sup>3</sup>) = 48.15 (lb<sub>M</sub>/ft<sup>3</sup>)
- $h_T$  = total extraction well length (total well depth)

This approach assumes that all conditions are uniform, and that all gas generated at radius  $r_1$  is extracted. Actually, only a fraction of the gas generated at some distance "r" from the well would be extracted, and this fraction would decrease as the radius increases.

Please refer to the ideal radial flow system diagram (Figure 1).

$$\frac{P_s ( dG / dt ) \pi r^2 h_T \rho}{T_s} = \left( \frac{2\pi r h_s g_c K}{\mu T} \right) \left( \frac{PdP}{dr} \right) \quad \text{equation( 5 )}$$

Substitution in equation (4):

Simplification, separation of variables, and insertion of system limits in equation (5):

$$\int_{r_0}^{r_1} r dr = \frac{2 g_c K T_s ( h_s / h_T )}{P_s ( dG / dt ) \rho \mu T} \int_{P_0}^{P_1} P dP$$

Where:

- $r_0$  = radius of the extraction well pipe
- $r_1$  = the Darcy zone of influence

Which when integrated:

$$\frac{( r_1^2 - r_0^2 )}{2} = \left[ \frac{g_c K T_s ( h_s / h_T )}{P_s ( dG / dt ) \rho \mu T} x ( P_1^2 - P_0^2 ) \right]$$

Solving for zone of influence ( $r_1$ ):

$$r_1 = \left[ \frac{2 g_c K T_s ( h_s / h_T )}{P_s ( dG / dt ) \rho \mu T} ( P_1^2 - P_0^2 ) + r_0^2 \right]^{1/2} \quad \text{equation( 6 )}$$

This is the Darcy zone of influence equation.

Since a concentric cylindrical surface at distances  $r_1$  and  $r_0$  are assumed, perpendicular gas flow across the surface at  $r_1$  must be much greater than that across the surface at  $r_0$  and since  $r_0 \ll r_1$ , then  $r_0$  is negligible and:

$$r_1 = \left[ \frac{2 g_c K T_s ( h_s / h_T )}{P_s ( dG / dt ) \rho \mu T} ( P_1^2 - P_0^2 ) \right]^{1/2} \quad \text{equation( 7 )}$$

The maximum vacuum that can be applied in a gas extraction well is usually dependent on the length of solid pipe section specified. The relationship is that as the length of solid pipe section increases, the potential of air intrusion through the cover or side slopes decreases, therefore allowing more vacuum to be applied to the gas extraction well to maximize its effective zone of well influence. The average reasonable applied vacuum at the wellhead ( $P_0$ ) for an active gas extraction system must be anticipated by the designer to calculate the Darcy zone of influence.

The following table is a guideline of reasonable applied vacuum values to be utilized in equation (7):

Length of Solid Pipe (ft)	Applied Vacuum (in. W.C.)	Applied Vacuum (lb/ft) absolute
15	0.25	2,115.5
20	0.75	2,112.9
25	2.0	2,106.4
30	2.5	2,103.8
35	3.0	2,101.2
40	3.5	2,098.61

Note:

ft                      foot/feet  
in. w.c.                inches water column pressure  
lb/ft                    pounds per foot

The following calculation demonstrates how the Darcy zone of influence can be determined for a conceptual gas extraction well location plan.

Assumptions:

Landfill gas composition based on EPA model:

percent methane (CH<sub>4</sub>)            =        50 %  
percent carbon dioxide (CO<sub>2</sub>) =        50 %  
Total                                        =        100 %

Average flowing landfill gas temperature (T) = 100(deg F) = 560(deg R)

Gas generation rate (dG/dt) = k\*L<sub>o</sub> \* 2 = 0.02\*100\*2 = 4 m<sup>3</sup>/Mg-yr =  
0.065(ft<sup>3</sup>/lb<sub>M</sub>-yr)

or (dG/dt) = 2.06 x 10<sup>-9</sup>(ft<sup>3</sup>/lb<sub>M</sub>-sec)

k and L<sub>o</sub> are based on EPA's AP-42 emissions factors for dry sites.

Average reasonable applied vacuum at the wellhead (P<sub>o</sub>) for an active gas extraction system with a 20-foot length of solid pipe:

P<sub>o</sub>        =        1.51 (inches of water column)  
              =        0.0547 (psig)  
              =        2,108.9 (lb<sub>F</sub>/ft<sup>2</sup>) absolute

Conversion: 1.0 (psig) = 27.7 (inches of water column)

Average reasonable absolute permeability of refuse ( $K$ ) based on HELP model for determining leachate heads within a landfill.

$$K = 2.681 \times 10^{-11} (\text{ft}^2)$$

Typical gas absolute viscosity at standard temperature conditions (60°F)

Absolute Viscosity Reference Values

$$\begin{aligned} \text{methane (CH}_4\text{)} &= 7.1 \times 10^{-6} (\text{lb}_M/\text{ft}\cdot\text{sec}) \\ \text{carbon dioxide (CO}_2\text{)} &= 9.8 \times 10^{-6} (\text{lb}_M/\text{ft}\cdot\text{sec}) \end{aligned}$$

Standard landfill gas viscosity ( $\mu$ ) at 60°F:

$$\begin{aligned} \mu &= (0.5) (7.1 \times 10^{-6}) + (0.5) (9.8 \times 10^{-6}) \\ \mu &= 8.45 \times 10^{-6} (\text{lb}_M/\text{ft}\cdot\text{sec}) \end{aligned}$$

Determine the ratio of slotted pipe to total pipe section for typical gas extraction wells as specified by the designer.

Calculated average ratio value ( $h_s / h_T$ ) = 0.59 for Kekaha Landfill, approximately two-thirds slotted length per total length.

Constants utilized in the Darcy zone of well influence, equation (7):

$$\begin{aligned} g_c &= \text{acceleration of gravity constant} = 32.2 (\text{lb}_M\cdot\text{ft} / \text{lb}_F \cdot \text{sec}^2) \\ T_s &= \text{standard temperature} = 520 (^\circ\text{R}) \\ P_s &= \text{standard pressure} = 2,116.8 (\text{lb}_F / \text{ft}^2) \\ \rho &= \text{density of refuse} = 48.15 (\text{lb}_M / \text{ft}^3) \\ P_1 &= \text{pressure/vacuum at extreme zone } (r_1) \text{ of influence convention} \\ &\quad \text{pressure gradient} \\ P_1 &= 0 (\text{inches of water column}) \\ P_1 &= 0 (\text{psig}) = 14.7 (\text{psia}) \text{ absolute} \\ P_1 &= 2,116.8 (\text{lb}_F / \text{ft}^2) \text{ absolute} \end{aligned}$$

Note that  $P_1 = P_s = 2,116.8 (\text{lb}_F / \text{ft}^2)$  absolute atmospheric pressure.

$$r_1 = \left[ \frac{(2 \times 32.2) (2.681 \times 10^{-11}) (520) (0.59) [(2,116.8)^2 - (2,108.9)^2]}{(2,116.8) (2.06 \times 10^{-9}) (48.15) (8.45 \times 10^{-6}) (560)} \right]^{1/2}$$

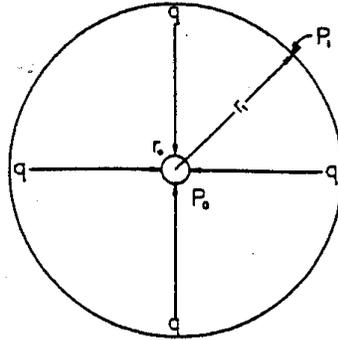
Substitute in equation (7) to derive the Darcy zone of influence for a typical gas extraction well.

$$r_1 = [1.78 \times 10^4 (\text{ft}^2)]^{1/2}$$

Therefore:  $r_1 = 133$  (ft) = zone of well influence.

Figure 1 shows the geometry of a typical zone of influence for a landfill gas well. Table A-1 shows the calculated ZOI for all of the extraction wells. The maximum ZOI was determined to be 164 feet. The design, however, is limited to 150 feet to provide conservative spacing of the extraction wells.

IDEAL RADIAL FLOW  
SYSTEM DIAGRAM



TYPICAL GAS EXTRACTION  
WELL FIELD DIAGRAM

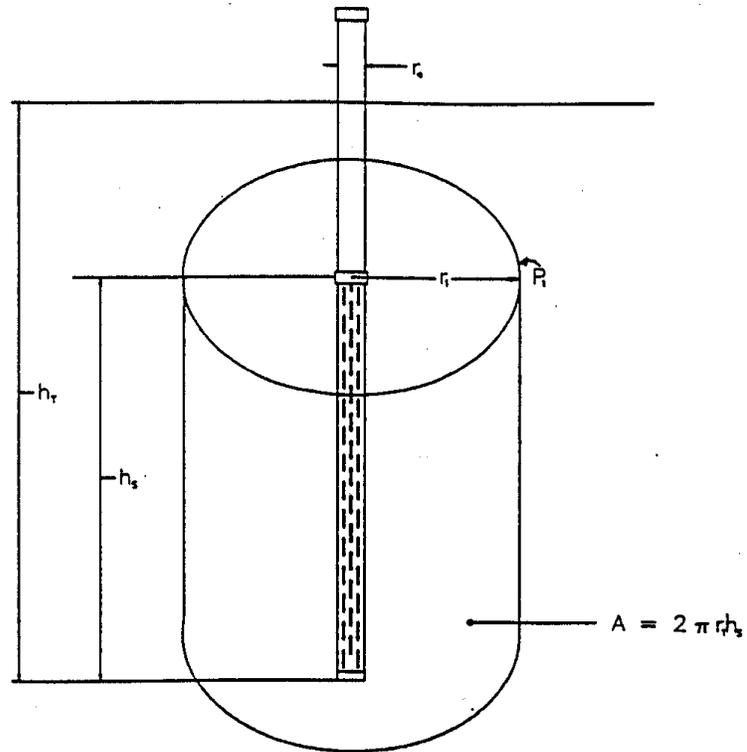


FIGURE 1: DARCY RADIUS OF INFLUENCE CONCEPTS

**TABLE A-1: Zone of Influence Calculation Table**

**AVERAGE ASSUMPTIONS**

<b>GAS GENERATION RATE:</b>	<u>0.064</u>	FT <sup>3</sup> /LBm*YR
<b>PERMEABILITY FACTOR:</b>	<u>2.681</u>	x 10E-11, FT <sup>2</sup>
<b>REFUSE DENSITY:</b>	<u>48.15</u>	LBm/FT <sup>3</sup>
<b>GAS TEMPERATURE:</b>	<u>110</u>	DEG. F
<b>DESIGN MAX. ZOI:</b>	<u>150</u>	FT

*Assumes standard conditions are 14.7 psia, 60 Deg. F.*

WELL NO.	Well COORDINATES		SURFACE ELEVATION (FASL)	BASE ELEVATION (FASL)	DEPTH OFF BASE (FT)	WELL DEPTH (FT)	LENGTH OF PIPE		(Hs/Ht) RATIO	APPLIED VACUUM (in WC)	ZOI (FT)	GAS FLOW (SCFM)
	NORTH	EAST					SOLID (FT)	SLOTTED (FT)				
1	55,833	1,556,407	65.0	16.0	10	39.0	25	14	0.36	2.29	128	6.4
2	55,683	1,556,560	65.0	7.4	10	47.6	25	23	0.47	2.29	147	10.6
3	55,519	1,556,734	60.0	8.5	10	41.5	25	17	0.40	2.29	134	7.9
4	55,358	1,556,896	57.0	8.3	10	38.7	25	14	0.35	2.29	127	6.7
5	55,165	1,557,021	58.0	7.5	10	40.5	25	16	0.38	2.29	132	7.5
6	55,023	1,557,139	55.0	8.3	10	36.7	25	12	0.32	2.29	120	5.8
7	54,862	1,557,186	60.0	8.5	10	41.5	25	17	0.40	2.29	134	7.9
8	54,672	1,557,065	61.2	9.7	10	41.5	25	17	0.40	2.29	134	7.9
9	54,555	1,556,928	60.5	11.1	10	39.4	25	14	0.37	2.29	129	7.0
10	55,297	1,555,940	71.0	15.0	10	46.0	25	21	0.46	2.29	144	9.9
11	55,395	1,556,026	76.0	15.0	10	51.0	25	26	0.51	2.29	150	11.8
12	55,561	1,556,173	72.9	16.0	10	46.9	25	22	0.47	2.29	145	10.3
13	55,710	1,556,310	71.3	16.0	10	45.3	25	20	0.45	2.29	142	9.6
14	55,584	1,556,468	103.7	8.2	10	85.4	25	60	0.71	2.29	150	18.2
15	55,452	1,556,573	106.3	9.0	10	87.3	25	62	0.71	2.29	150	18.6
16	55,330	1,556,728	97.3	9.0	10	78.3	25	53	0.68	2.29	150	16.8
17	55,166	1,556,880	96.5	8.2	10	78.3	25	53	0.68	2.29	150	16.8
18	55,023	1,556,981	90.0	9.5	10	70.5	25	46	0.65	2.29	150	15.3
19	54,796	1,557,015	86.7	10.0	10	66.7	25	42	0.63	2.29	150	14.5
20	54,691	1,556,807	93.7	10.5	10	73.2	25	48	0.66	2.29	150	15.8

**TABLE A-1: Zone of Influence Calculation Table**

**AVERAGE ASSUMPTIONS**

<b>GAS GENERATION RATE:</b>	<u>0.064</u>	FT <sup>3</sup> /LBm*YR
<b>PERMEABILITY FACTOR:</b>	<u>2.681</u>	x 10E-11, FT <sup>2</sup>
<b>REFUSE DENSITY:</b>	<u>48.15</u>	LBm/FT <sup>3</sup>
<b>GAS TEMPERATURE:</b>	<u>110</u>	DEG. F
<b>DESIGN MAX. ZOI:</b>	<u>150</u>	FT

*Assumes standard conditions are 14.7 psia, 60 Deg. F.*

WELL NO.	Well COORDINATES		SURFACE ELEVATION (FASL)	BASE ELEVATION (FASL)	DEPTH OFF BASE (FT)	WELL DEPTH (FT)	LENGTH OF PIPE		(Hs/Ht) RATIO	APPLIED VACUUM (in WC)	ZOI (FT)	GAS FLOW (SCFM)
	NORTH	EAST					SOLID (FT)	SLOTTED (FT)				
	21	54,554					1,556,779	63.8				
22	54,632	1,556,559	60.6	12.1	10	38.5	25	13	0.35	2.29	126	6.6
23	54,766	1,556,364	60.8	11.5	10	39.4	25	14	0.37	2.29	129	7.0
24	54,924	1,556,201	59.1	11.8	10	37.2	25	12	0.33	2.29	122	6.0
25	55,120	1,556,064	63.3	12.5	10	40.8	25	16	0.39	2.29	132	7.6
26	55,273	1,556,179	114.4	10.8	10	93.6	20	74	0.79	1.70	150	21.2
27	55,432	1,556,320	119.1	9.3	10	99.7	20	80	0.80	1.70	150	22.6
28	55,264	1,556,432	119.7	9.4	10	100.3	20	80	0.80	1.70	150	22.7
29	55,146	1,556,567	120.0	9.7	10	100.3	20	80	0.80	1.70	150	22.7
30	55,009	1,556,697	119.9	10.0	10	99.9	20	80	0.80	1.70	150	22.6
31	54,910	1,556,848	119.1	10.3	10	98.8	20	79	0.80	1.70	150	22.4
32	54,793	1,556,606	102.7	11.4	10	81.3	20	61	0.75	1.70	150	18.5
33	54,957	1,556,455	113.2	11.3	10	91.9	20	72	0.78	1.70	150	20.8
34	55,113	1,556,296	112.7	10.8	10	91.9	20	72	0.78	1.70	150	20.8
35	54,708	1,555,929	38.2	5.0	10	23.2	10	13	0.57	0.53	77	2.8
36	54,291	1,556,402	33.0	5.0	10	18.0	10	8	0.44	0.53	68	1.9
37	54,166	1,556,267	33.9	5.0	10	18.9	10	9	0.47	0.53	70	2.1
38	54,113	1,556,132	37.6	5.0	10	22.6	10	13	0.56	0.53	76	2.7
39	54,027	1,555,934	39.9	5.0	10	24.9	10	15	0.60	0.53	79	3.2
40	54,047	1,555,720	42.1	5.0	10	27.1	20	7	0.26	1.70	94	4.7
41	54,195	1,555,573	43.2	5.0	10	28.2	20	8	0.29	1.70	99	5.4
42	54,350	1,555,408	42.5	5.0	10	27.5	20	7	0.27	1.70	96	5.0

**TABLE A-1: Zone of Influence Calculation Table**

**AVERAGE ASSUMPTIONS**

<b>GAS GENERATION RATE:</b>	<u>0.064</u>	FT <sup>3</sup> /LBm*YR
<b>PERMEABILITY FACTOR:</b>	<u>2.681</u>	x 10E-11, FT <sup>2</sup>
<b>REFUSE DENSITY:</b>	<u>48.15</u>	LBm/FT <sup>3</sup>
<b>GAS TEMPERATURE:</b>	<u>110</u>	DEG. F
<b>DESIGN MAX. ZOI:</b>	<u>150</u>	FT

*Assumes standard conditions are 14.7 psia, 60 Deg. F.*

WELL NO.	Well COORDINATES		SURFACE ELEVATION (FASL)	BASE ELEVATION (FASL)	DEPTH OFF BASE (FT)	WELL DEPTH (FT)	LENGTH OF PIPE		(Hs/Ht) RATIO	APPLIED VACUUM (in WC)	ZOI (FT)	GAS FLOW (SCFM)
	NORTH	EAST					SOLID (FT)	SLOTTED (FT)				
43	54,543	1,555,316	42.5	5.0	10	27.5	20	7	0.27	1.70	96	5.0
44	54,708	1,555,456	38.3	5.0	10	23.3	10	13	0.57	0.53	77	2.9
45	54,868	1,555,611	34.1	5.0	10	19.1	10	9	0.48	0.53	71	2.1
46	54,745	1,555,675	36.7	5.0	10	21.7	10	12	0.54	0.53	75	2.6
47	54,538	1,555,845	44.4	5.0	10	29.4	20	9	0.32	1.70	104	6.1
48	54,467	1,555,982	42.0	5.0	10	27.0	20	7	0.26	1.70	93	4.7
49	54,475	1,556,002	37.4	5.0	10	22.4	10	12	0.55	0.53	76	2.7
50	54,188	1,555,914	41.9	5.0	10	26.9	20	7	0.26	1.70	93	4.6
51	54,230	1,555,756	44.0	5.0	10	29.0	20	9	0.31	1.70	102	5.9
52	54,374	1,555,578	46.1	5.0	10	31.1	20	11	0.36	1.70	110	7.2
53	54,537	1,555,475	46.4	5.0	10	31.4	20	11	0.36	1.70	111	7.3
54	54,616	1,555,600	43.4	5.0	10	28.4	20	8	0.30	1.70	100	5.5
55	54,461	1,555,735	47.2	5.0	10	32.2	20	12	0.38	1.70	113	7.8
56	54,360	1,555,894	43.5	5.0	10	28.5	20	8	0.30	1.70	100	5.6
57	54,266	1,556,068	39.7	5.0	10	24.7	10	15	0.59	0.53	79	3.1

## **General Assumptions for Zone of Influence Calculation**

The careful formulation of assumptions is critical and requires some knowledge of the landfill's characteristics.

### **Gas Generation Rate:**

Landfill gas is the by-product of the anaerobic decomposition of organic material disposed of in a landfill, by methanogenic (methane producing) bacteria. Landfill gas production is assumed to have a first order reaction rate and is dependent upon the following:

- age of the landfill
- types of waste received
- location (i.e., climate and precipitation)
- moisture conditions within the refuse
- landfill cover materials and thicknesses

An AP-42 “k” value of  $0.02 \text{ year}^{-1}$  will be used. To convert this to English units for use in the ZOI calculation program, the k value must be multiplied by the theoretical yield. The theoretical yield from AP-42 is assumed to be  $100 \text{ m}^3 \text{ methane/Mg waste}$ , which converts to  $3.2 \text{ ft}^3/\text{lb waste}$ . The gas generation rate is therefore  $0.064 \text{ ft}^3 \text{ LFG/lb refuse/year}$ .

### **Permeability Factor:**

Permeability is defined as a measure of the ability of a porous media to transmit fluids. While the permeability of refuse within a landfill can vary greatly, it is assumed to be a constant for ease of calculation. A reasonable absolute permeability value for refuse is  $2.68 \times 10^{-11} \text{ square feet (ft}^2\text{)}$  based on the EPA’s Landfill Hydrologic Evaluation Landfill Performance (HELP) model. This number was calculated by applying Darcy’s Law for Linear Compressible Fluid Flow to the movement of landfill gas through refuse and assuming the following:

1. Steady state flow conditions exist.
2. The pore space of the refuse is 100 percent saturated with the flowing fluid (landfill gas).
3. The viscosity of the flowing fluid is constant.
4. Isothermal conditions in the refuse prevail.
5. Flow is laminar, horizontal and linear since refuse grain size is relatively small and the velocity of fluid flow is low.

### Refuse Density:

Refuse density is a function of the types of waste received and the degree of compaction at the landfill site. A refuse density of 1300 lbs/yd<sup>3</sup> will be used for the calculations for the facility based on average historical densities measured at the site.

### Gas Temperature:

The temperatures within a landfill can influence the movement of landfill gas in two ways. First, since landfill gas is a compressible fluid, its viscosity and flow characteristics must be corrected to standard temperature and pressure conditions prior to using the Darcy Equation for radial fluid flow.

Secondly, a landfill's interior temperature can affect the rate at which landfill gas is generated since different types of bacteria are present at different temperatures. Methanogens (or methane producing bacteria) that generate landfill gas at temperatures below 110°F are known as mesophilic bacteria, while those that generate gas at temperatures in excess of 110°F are called thermophilic bacteria. Although both types of bacteria produce approximately the same quality of gas, the gas generation rate is optimized in the thermophilic range.

### Average Cover Depth:

The average thickness of final cover is subtracted from the refuse depth available for gas production. Soil is inert and will not contribute to the generation of landfill gas.

### Maximum Zone of Influence:

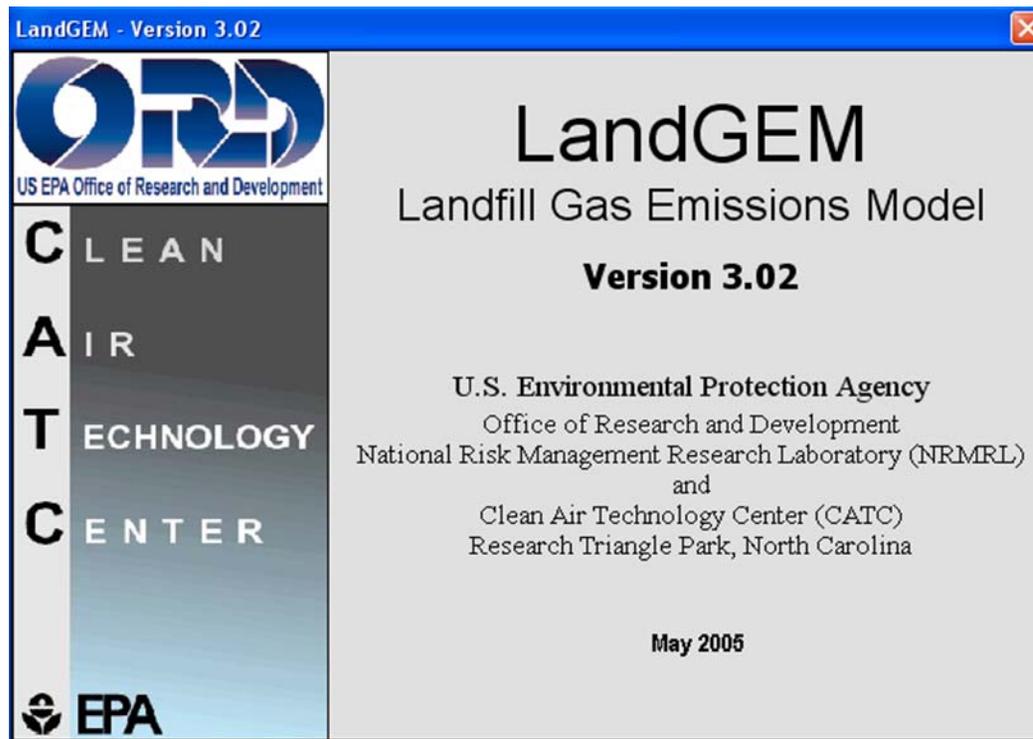
As noted in the prior discussion of the Darcy ZOI, a maximum of 150 feet was utilized in the design of the gas extraction system. This provides a conservative spacing and ensures that all new extraction wells are placed no more than 300 feet apart.

### Average Overlap Factor:

It is desirable to achieve a certain degree of overlap of the circular ZOIs. The overlap provides a factor of safety to the gas control system design. If field conditions prevent gas from moving towards a particular well, an overlap helps ensure that the gas can travel to more than one collection point.

The target range of overlap values is approximately 10 to 15 percent, unless the designer requires a denser well spacing. The overlap value used for the facility's proposed well spacing is approximately 10%.

## **Appendix A-2: LandGEM Modeling Results**



## Summary Report

**Landfill Name or Identifier:** Kekaha Landfill

**Date:** Thursday, February 5, 2015

## About LandGEM:

$$Q_{CH_4} = \sum_{i=1}^n \sum_{j=0.1}^1 kL_o \left( \frac{M_i}{10} \right) e^{-kt_{ij}}$$

First-Order Decomposition Rate Equation:

Where,

$Q_{CH_4}$  = annual methane generation in the year of the calculation ( $m^3/year$ )

$i$  = 1-year time increment

$n$  = (year of the calculation) - (initial year of waste acceptance)

$j$  = 0.1-year time increment

$k$  = methane generation rate ( $year^{-1}$ )

$L_o$  = potential methane generation capacity ( $m^3/Mg$ )

$M_i$  = mass of waste accepted in the  $i^{th}$  year ( $Mg$ )

$t_{ij}$  = age of the  $j^{th}$  section of waste mass  $M_i$  accepted in the  $i^{th}$  year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at <http://www.epa.gov/ttnatw01/landfill/landflpg.html>.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for conventional landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

## Input Review

### LANDFILL CHARACTERISTICS

Landfill Open Year **1985**

Landfill Closure Year (with 80-year limit) **2019**

Actual Closure Year (without limit) **2019**  
 Have Model Calculate Closure Year? **No**  
 Waste Design Capacity *short tons*

MODEL PARAMETERS

Methane Generation Rate, k **0.020** *year<sup>1</sup>*  
 Potential Methane Generation Capacity, L<sub>o</sub> **100** *m<sup>3</sup>/Mg*  
 NMOC Concentration **595** *ppmv as hexane*  
 Methane Content **50** *% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1: **Total landfill gas**  
 Gas / Pollutant #2: **Methane**  
 Gas / Pollutant #3: **Carbon dioxide**  
 Gas / Pollutant #4: **NMOC**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	(short tons/year)	(Mg)	(short tons)
1985	35,533	39,086	0	0
1986	72,959	80,255	35,533	39,086
1987	72,959	80,255	108,492	119,341
1988	72,959	80,255	181,451	199,596
1989	72,959	80,255	254,410	279,851
1990	72,959	80,255	327,369	360,106
1991	72,959	80,255	400,328	440,361
1992	72,959	80,255	473,287	520,616
1993	100,492	110,541	546,246	600,871
1994	78,035	85,838	646,738	711,412

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	(short tons/year)	(Mg)	(short tons)
1995	114,275	125,703	724,773	797,250
1996	196,973	216,670	839,048	922,953
1997	84,825	93,307	1,036,021	1,139,623
1998	58,409	64,250	1,120,845	1,232,930
1999	61,445	67,590	1,179,255	1,297,180
2000	66,207	72,828	1,240,700	1,364,770
2001	70,147	77,162	1,306,907	1,437,598
2002	67,908	74,699	1,377,055	1,514,760
2003	73,693	81,062	1,444,962	1,589,459
2004	78,605	86,465	1,518,656	1,670,521
2005	81,054	89,160	1,597,260	1,756,986
2006	82,043	90,247	1,678,314	1,846,146
2007	81,922	90,114	1,760,357	1,936,393
2008	79,307	87,237	1,842,279	2,026,507
2009	71,343	78,477	1,921,586	2,113,744
2010	63,404	69,744	1,992,928	2,192,221
2011	64,543	70,997	2,056,332	2,261,965
2012	64,080	70,488	2,120,875	2,332,962
2013	74,545	82,000	2,184,955	2,403,450
2014	74,545	82,000	2,259,500	2,485,450
2015	74,545	82,000	2,334,046	2,567,450
2016	74,545	82,000	2,408,591	2,649,450
2017	74,545	82,000	2,483,136	2,731,450
2018	74,545	82,000	2,557,682	2,813,450
2019	73,423	80,765	2,632,227	2,895,450
2020	0	0	2,705,650	2,976,215

## Results

Year	Total landfill gas			Methane		
	(Mg/year)	(m <sup>3</sup> /year)	(av ft <sup>3</sup> /min)	(Mg/year)	(m <sup>3</sup> /year)	(av ft <sup>3</sup> /min)
1985	0	0	0	0	0	0
1986	1.759E+02	1.409E+05	9.464E+00	4.699E+01	7.043E+04	4.732E+00
1987	5.336E+02	4.273E+05	2.871E+01	1.425E+02	2.136E+05	1.436E+01
1988	8.842E+02	7.081E+05	4.757E+01	2.362E+02	3.540E+05	2.379E+01
1989	1.228E+03	9.833E+05	6.607E+01	3.280E+02	4.916E+05	3.303E+01
1990	1.565E+03	1.253E+06	8.419E+01	4.180E+02	6.265E+05	4.210E+01
1991	1.895E+03	1.517E+06	1.020E+02	5.062E+02	7.587E+05	5.098E+01
1992	2.219E+03	1.777E+06	1.194E+02	5.926E+02	8.883E+05	5.969E+01
1993	2.536E+03	2.031E+06	1.364E+02	6.774E+02	1.015E+06	6.822E+01
1994	2.983E+03	2.389E+06	1.605E+02	7.969E+02	1.194E+06	8.025E+01
1995	3.310E+03	2.651E+06	1.781E+02	8.843E+02	1.325E+06	8.906E+01
1996	3.811E+03	3.051E+06	2.050E+02	1.018E+03	1.526E+06	1.025E+02
1997	4.710E+03	3.772E+06	2.534E+02	1.258E+03	1.886E+06	1.267E+02
1998	5.037E+03	4.033E+06	2.710E+02	1.345E+03	2.017E+06	1.355E+02
1999	5.226E+03	4.185E+06	2.812E+02	1.396E+03	2.093E+06	1.406E+02
2000	5.427E+03	4.346E+06	2.920E+02	1.450E+03	2.173E+06	1.460E+02
2001	5.647E+03	4.522E+06	3.038E+02	1.508E+03	2.261E+06	1.519E+02
2002	5.883E+03	4.711E+06	3.165E+02	1.571E+03	2.355E+06	1.583E+02
2003	6.103E+03	4.887E+06	3.283E+02	1.630E+03	2.443E+06	1.642E+02
2004	6.347E+03	5.082E+06	3.415E+02	1.695E+03	2.541E+06	1.707E+02
2005	6.610E+03	5.293E+06	3.556E+02	1.766E+03	2.647E+06	1.778E+02
2006	6.880E+03	5.510E+06	3.702E+02	1.838E+03	2.755E+06	1.851E+02
2007	7.150E+03	5.726E+06	3.847E+02	1.910E+03	2.863E+06	1.924E+02
2008	7.414E+03	5.937E+06	3.989E+02	1.980E+03	2.969E+06	1.995E+02
2009	7.660E+03	6.134E+06	4.121E+02	2.046E+03	3.067E+06	2.061E+02

## Results

Year	Total landfill gas			Methane		
	(Mg/year)	(m <sup>3</sup> /year)	(av ft <sup>3</sup> /min)	(Mg/year)	(m <sup>3</sup> /year)	(av ft <sup>3</sup> /min)
2010	7.862E+03	6.295E+06	4.230E+02	2.100E+03	3.148E+06	2.115E+02
2011	8.020E+03	6.422E+06	4.315E+02	2.142E+03	3.211E+06	2.157E+02
2012	8.181E+03	6.551E+06	4.401E+02	2.185E+03	3.275E+06	2.201E+02
2013	8.336E+03	6.675E+06	4.485E+02	2.227E+03	3.337E+06	2.242E+02
2014	8.540E+03	6.838E+06	4.595E+02	2.281E+03	3.419E+06	2.297E+02
2015	8.740E+03	6.998E+06	4.702E+02	2.334E+03	3.499E+06	2.351E+02
2016	8.936E+03	7.155E+06	4.808E+02	2.387E+03	3.578E+06	2.404E+02
2017	9.128E+03	7.309E+06	4.911E+02	2.438E+03	3.655E+06	2.456E+02
2018	9.316E+03	7.460E+06	5.012E+02	2.488E+03	3.730E+06	2.506E+02
2019	9.501E+03	7.608E+06	5.112E+02	2.538E+03	3.804E+06	2.556E+02
2020	9.676E+03	7.748E+06	5.206E+02	2.585E+03	3.874E+06	2.603E+02
2021	9.484E+03	7.595E+06	5.103E+02	2.533E+03	3.797E+06	2.551E+02
2022	9.297E+03	7.444E+06	5.002E+02	2.483E+03	3.722E+06	2.501E+02
2023	9.113E+03	7.297E+06	4.903E+02	2.434E+03	3.648E+06	2.451E+02
2024	8.932E+03	7.152E+06	4.806E+02	2.386E+03	3.576E+06	2.403E+02
2025	8.755E+03	7.011E+06	4.711E+02	2.339E+03	3.505E+06	2.355E+02
2026	8.582E+03	6.872E+06	4.617E+02	2.292E+03	3.436E+06	2.309E+02
2027	8.412E+03	6.736E+06	4.526E+02	2.247E+03	3.368E+06	2.263E+02
2028	8.245E+03	6.603E+06	4.436E+02	2.202E+03	3.301E+06	2.218E+02
2029	8.082E+03	6.472E+06	4.348E+02	2.159E+03	3.236E+06	2.174E+02
2030	7.922E+03	6.344E+06	4.262E+02	2.116E+03	3.172E+06	2.131E+02

## Results (Continued)

Year	Carbon dioxide		
	(Mg/year)	(m <sup>3</sup> /year)	(av ft <sup>3</sup> /min)
1985	0	0	0
1986	1.289E+02	7.043E+04	4.732E+00
1987	3.911E+02	2.136E+05	1.436E+01
1988	6.481E+02	3.540E+05	2.379E+01
1989	8.999E+02	4.916E+05	3.303E+01
1990	1.147E+03	6.265E+05	4.210E+01
1991	1.389E+03	7.587E+05	5.098E+01
1992	1.626E+03	8.883E+05	5.969E+01
1993	1.859E+03	1.015E+06	6.822E+01
1994	2.186E+03	1.194E+06	8.025E+01
1995	2.426E+03	1.325E+06	8.906E+01
1996	2.793E+03	1.526E+06	1.025E+02
1997	3.452E+03	1.886E+06	1.267E+02
1998	3.692E+03	2.017E+06	1.355E+02
1999	3.830E+03	2.093E+06	1.406E+02
2000	3.977E+03	2.173E+06	1.460E+02
2001	4.139E+03	2.261E+06	1.519E+02
2002	4.311E+03	2.355E+06	1.583E+02
2003	4.473E+03	2.443E+06	1.642E+02
2004	4.651E+03	2.541E+06	1.707E+02
2005	4.844E+03	2.647E+06	1.778E+02
2006	5.043E+03	2.755E+06	1.851E+02
2007	5.240E+03	2.863E+06	1.924E+02
2008	5.434E+03	2.969E+06	1.995E+02
2009	5.614E+03	3.067E+06	2.061E+02

## Results (Continued)

Year	Carbon dioxide		
	(Mg/year)	(m <sup>3</sup> /year)	(av ft <sup>3</sup> /min)
2010	5.762E+03	3.148E+06	2.115E+02
2011	5.878E+03	3.211E+06	2.157E+02
2012	5.995E+03	3.275E+06	2.201E+02
2013	6.109E+03	3.337E+06	2.242E+02
2014	6.259E+03	3.419E+06	2.297E+02
2015	6.405E+03	3.499E+06	2.351E+02
2016	6.549E+03	3.578E+06	2.404E+02
2017	6.690E+03	3.655E+06	2.456E+02
2018	6.828E+03	3.730E+06	2.506E+02
2019	6.963E+03	3.804E+06	2.556E+02
2020	7.091E+03	3.874E+06	2.603E+02
2021	6.951E+03	3.797E+06	2.551E+02
2022	6.813E+03	3.722E+06	2.501E+02
2023	6.679E+03	3.648E+06	2.451E+02
2024	6.546E+03	3.576E+06	2.403E+02
2025	6.417E+03	3.505E+06	2.355E+02
2026	6.290E+03	3.436E+06	2.309E+02
2027	6.165E+03	3.368E+06	2.263E+02
2028	6.043E+03	3.301E+06	2.218E+02
2029	5.923E+03	3.236E+06	2.174E+02
2030	5.806E+03	3.172E+06	2.131E+02

## **Appendix A-3: Condensate Calculation Results**

## **CONDENSATE GENERATION CALCULATIONS/MANAGEMENT**

Gas condensate is produced during the collection and transportation of landfill gas. The condensate must be removed at engineered low points in the extraction system header piping, or it will eventually fill up the header lines and impede gas flow. Calculations for maximum condensate generation rates and condensate management techniques are provided in the following subsections. A discussion of condensate and leachate management is required by 40 CFR 60.759.

### **CONDENSATE GENERATION**

Landfill gas is approximately one-hundred percent saturated with water vapor. Liquid condensate is generated when landfill gas experiences a temperature and/or pressure decrease when extracted, and the saturated water vapor condenses out of the vapor state. All condensate generated from the system must be collected and managed. The header collection system alignment is designed to utilize the vertical relief provided by the landfill contours for gravity flow of condensate.

#### ***Procedures for Calculating Condensate Generation***

1. Utilize the maximum gas flow rate calculated previously, in cubic feet per minute.
2. Determine a maximum gas temperature. This maximum gas temperature can be measured directly if an existing system is present or must be assumed based on typical mesophilic or thermophilic temperatures published in scientific research journals. A typical maximum gas temperature is assumed to range from 90° F to 131° F based on mesophilic conditions.
3. Estimate a minimum gas temperature. Factors such as local climate, depth of frost line, cover soils, etc., should be considered. If minimum extracted gas temperatures are available, they should be used as a reference.
4. Obtain water vapor content of the landfill gas at specified temperatures from the attached “water vapor content of natural gas at saturation” table. The water vapor contents are given in terms of pounds (lb<sub>M</sub>) of water per 1 million cubic feet of gas.
5. The chart is read by finding the desired temperature at the bottom of the chart. Follow the corresponding temperature line to the 14.6 (psia) saturation pressure curve. Read directly across to right or left at intersection of temperature and pressure lines to obtain the value for the water content of the gas.
6. Obtain the water vapor content of the saturated gas at both the minimum and maximum temperatures.

Given:  $q$  = maximum anticipated gas flow rate = 521 ft<sup>3</sup>/min  
 $T(max)$  = maximum anticipated gas temperature = 131° F  
 $T(min)$  = minimum anticipated gas temperature = 90° F  
 $P$  = saturation pressure = 14.7 psia

Therefore:

The water vapor content of saturated gas at 131° F and 14.7 psia = 7288 lb<sub>m</sub>/1x10<sup>6</sup> ft<sup>3</sup>

The water vapor content of saturated gas at 90° F and 14.7 psia = 2049 lb<sub>m</sub>/1x10<sup>6</sup> ft<sup>3</sup>

At a differential temperature drop of 41° F, 5239 lb<sub>m</sub> of water vapor will condense out as liquid per every million cubic feet of gas flow.

Therefore:

[521 ft<sup>3</sup>/min] [gal/8.34 lb<sub>m</sub>] [5239 lb<sub>m</sub>/1x10<sup>6</sup> ft<sup>3</sup>] [1,440 min/day] = 471 gal/day

It is anticipated that 471 gal/day would be the maximum volume of condensate generated from the landfill gas management system.

## **CONDENSATE MANAGEMENT**

The gas extraction system at Kekaha Landfill contains engineered low points where gas condensate is separated from landfill gas. Gas condensate is separated by a knockout structure, or drip leg that is then gravity-drained to a leachate wet manhole. Gas condensate is ultimately treated in the same manner as landfill leachate (evaporation).

**Water Content Calculation for a Hydrocarbon Gas at 60°F and 14.7 psia**

Initial Temperature: 131 °F 7288 lbs water/ mmcf  
Final Temperature: 90 °F 2049 lbs water/ mmcf  
Water Vapor Condensation: 5239 lbs water/ mmcf

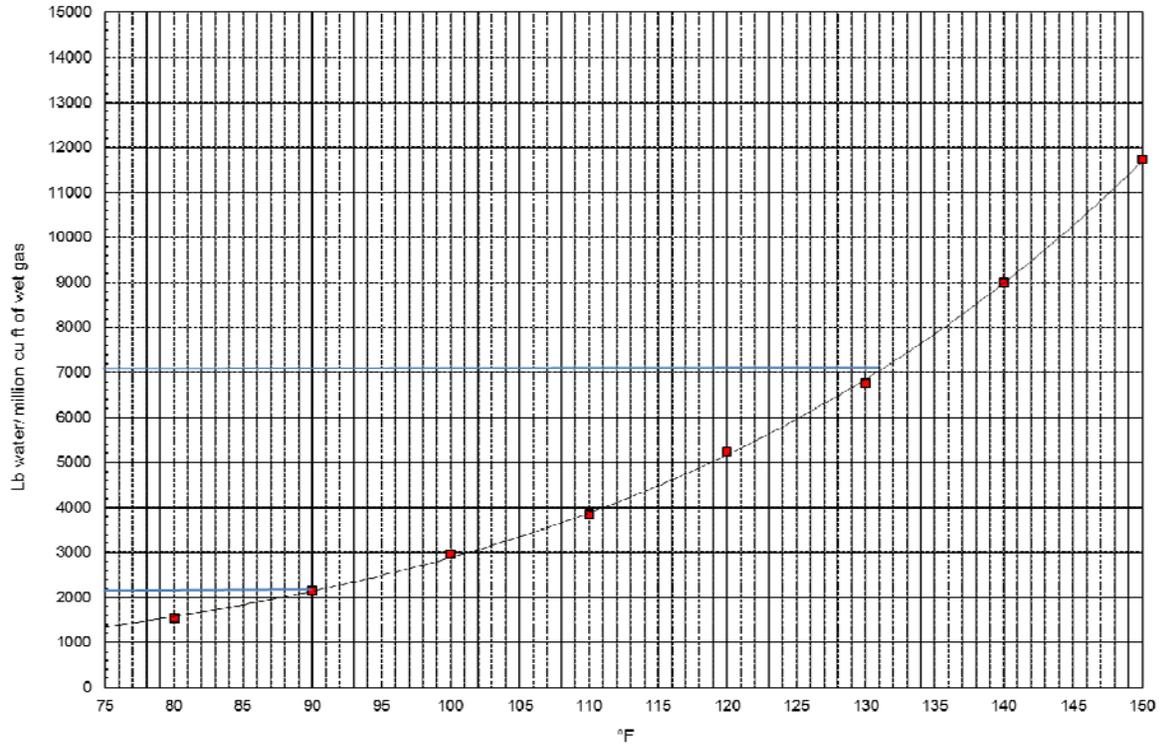
**628** gallons water/ mmcf

Maximum Gas Flow: 749,664 cfd

**Total Daily Condensate Generation:** **471** gallons water/ day

0.33 gpm

# Water Content of Hydrocarbon Gas



## **Appendix A-4: Header Pipe Sizing Calculations**

## **Header Pipe Sizing**

### **INTRODUCTION**

The next step in designing a gas collection system is to lay out a routing for the header line and laterals to connect each of the gas wells into the system, and convey the collected gas to a central location for destruction. After the design engineer has routed the most efficient header system for collecting gas from the extraction wells, the header pipe must be sized appropriately to convey the maximum expected gas flow [40 CFR §60.752(b)(2)(ii)(A)(1)]. Typical design criteria and header construction methods are generally discussed in the following subsections.

The following provides a narrative describing the results of a KYGas<sup>®</sup> analysis of the proposed landfill gas collection and control system (GCCS) for the facility. The purpose of conducting this analysis was to determine the required piping size for the future system in order to convey the maximum expected gas flow rate.

The KYGas<sup>®</sup> model was developed by the University of Kentucky for performing water and gas distribution flow analyses. The program uses a 2-dimensional model depicting the geometry of the piping system. Once the 2-dimension layout of the system has been entered into the model, the user enters the physical properties of the gas, plus other site-specific parameters for the size and type of pipe, gas flow requirements, and operating pressure conditions to calculate the system gas velocities and pressure distribution.

KYGas<sup>®</sup> utilizes the Ideal Gas Law for pressure-temperature-density relationships and the Darcy-Weisbach equation for head losses related to incompressible flow. The program operates under the assumption that all flow in the piping system is steady, one-dimensional, isothermal flow for an ideal gas.

### **MODEL INPUT DATA**

For Kekaha Landfill, the GCCS layout and pipe sizes used in the model are based on the proposed GCCS design included in this plan. High density polyethylene (HDPE) piping having a standard diameter ratio (SDR) rating of 17 was assumed for the inside pipe diameters. Other parameters required for the model include:

- Pipe length
- Roughness within the pipe
- Minor loss coefficient
- LFG operating temperature (assumed to be 110 °F)
- LFG flow rate into the system at each well or node
- Ratio of specific heats (1.303)
- Specific gravity of the landfill gas (1.036)
- Absolute viscosity of the landfill gas ( $2.82 \times 10^{-7}$  lb\*sec/ft<sup>2</sup>)

The peak landfill gas (LFG) flow rate conditions used in the KY-Gas modeling scenario was derived by the LandGEM Modeling and the ZOI calculations. The AP-42 assumes that a facility can achieve an average collection efficiency of 75%.

The KYGas® model requires the user to specify an operating pressure for each vacuum source used in the analysis. A target vacuum of -40 inches water column gauge (“w.c.”) was used during the KYGas® analysis for the blower at the flare station.

The user can start the evaluation of the system once all of the required information is input into the program. This evaluation is an iterative process. Multiple model runs are conducted by adjusting the pipe diameter, until the velocities in the system piping and the vacuum pressure remaining at the furthest node meet design requirements.

The design criteria utilized for the header system is:

- Maximum velocity: 40 feet/second
- Maximum pressure drop: 1 inch per 100 feet of pipe
- Minimum vacuum at any node/well: 10 inches of water column

## **DESCRIPTION OF KYGAS® MODEL RESULTS**

A copy of the KYGas® modeling report is provided after this discussion. Also included are three model-generated layouts of the GCCS. Figure 1 identifies the pipe segment and pipe node names used by the model. These names can be used to reference the information on the model print-out. Figure 2 shows the pipe sizes used, and Figure 3 shows the available vacuum at each well, and the calculated flow rate through each pipe segment for the modeled scenario.

A summary of the simulation is provided, including gas parameters and units of measure. The geometry and operating criteria used in the model is identified, including pipe names, nodes that connect to each pipe segment, pipe lengths and diameters, and pipe roughness.

The next set of pages summarizes the junction “nodes” and their “demand”, or the unit flow rate for the quantity of LFG entering the system at that node location. Because the GCCS operates under a negative pressure, the operating flow rates and pressures are entered as negative numbers. Column 3 indicates the LFG extraction flow rate that is introduced to the piping system at that junction location.

The modeling results for each pipe segment are then provided. This includes the calculated LFG flow rate through each pipe segment. A negative number indicates the direction of LFG flow is reversed from the orientation indicated by the pipe nodes. Also shown is the calculated friction loss along the length of pipe segment expressed in inches of water column, the calculated velocity of the LFG flowing through the pipe segment, the density of LFG used in the calculations, and a variable calculated by the model for each pipe segment based on flow rate.

## **SUMMARY OF LANDFILL KYGAS® RESULTS**

The KYGas® results for Kekaha Landfill indicate that all values are well within the specified design criteria. Therefore, the pipe sizing selected meets the NSPS requirement to convey the maximum expected gas flow rate.

### Header Slope

The header line is typically sloped at a 3% grade when installed within refuse to provide for gravity drainage of liquid gas condensate and to minimize blockages resulting from differential settlement of the landfill, although certain sections of the proposed header slope in the closed Phase I landfill are at a minimum 1% grade based on existing topography. This will be confirmed by route survey. The header pipe placed outside of refuse limits is sloped a minimum of 1%.

### Design Methodology

The optimum diameter of the header pipe is determined after the design engineer has specified the most efficient header system for collecting gas flow from the individual extraction wells. The diameter of each segment of header pipe will vary, depending on the volume of landfill gas it will be expected to convey. The header line that connects the gas wells furthest from the source of vacuum will carry the least amount of gas flow. As the header piping gets closer to the source of vacuum, more and more gas wells will “contribute” flow to the line which necessitates an increase in pipe size.

Header systems usually incorporate “loops” of piping to allow for partial or total loss of header function in one direction without losing gas management system functionality. Therefore, there may be several large diameter lines converging on the source of vacuum from different directions.

### Header Construction

The header pipe proposed for installation is HDPE pipe. HDPE pipe is ideal due to its compatibility with landfill gas and waste, its flexibility (if settlement occurs), its long term stability, and its excellent chemical resistance. The pipe is set in a trench, and is surrounded by compatible bedding media.

Control valves are located throughout the collection header network as necessary. The valves can manually shut off the applied vacuum to a particular section of header pipe. This allows portions of the well field to be isolated for monitoring and maintenance purposes.

## NSPS Compliance

The header system as described in this section will meet the following requirements listed in 40 CFR 60.759:

- *Gas system expandability & accessibility.* Blind flanges have been incorporated into the design in order to allow for future gas system expansions. In addition, HDPE pipe can be cut and new components fused in place to expand the system easily.
- *Corrosion resistance.* HDPE is resistant to corrosion from landfill gas.
- *Fill settlement.* The flexibility of the material and the modulus of elasticity of HDPE is sufficient to prevent collapse or failure due to settlement
- *Required materials of construction.* The materials of construction are consistent with those specified within the rule.
- *Ability to withstand planned overburden or traffic loads.* The pipe wall thickness and the modulus of elasticity of HDPE is sufficient to prevent collapse due to overburden or traffic loads.

## LANDFILL KYGAS® RESULTS

```
* * * * * K Y G A S * * * * *
*
* Gas Network Analysis Software
*
* CopyRighted by KYPIPE LLC (www.kypipe.com)
* Version: 6.025 10/21/2013
* Serial #: 8-5537277
* Interface: Classic
* Licensed for Pipe2006
*
* * * * *

INPUT DATA FILE NAME FOR THIS SIMULATION = c:\users\EILLEN~1\desktop\KEKAHA~1\
2015FE~1\KEKAHA~1.KYP\kekaha20.DAT
OUTPUT DATA FILE NAME FOR THIS SIMULATION = c:\users\EILLEN~1\desktop\KEKAHA~1\
2015FE~1\KEKAHA~1.KYP\kekaha20.OT2

DATE FOR THIS COMPUTER RUN      : 2-06-2015
START TIME FOR THIS COMPUTER RUN : 10: 9:37:47

SUMMARY OF DISTRIBUTION SYSTEM CHARACTERISTICS:
-----

NUMBER OF PIPES          = 101
NUMBER OF JUNCTION NODES = 99

UNITS SPECIFIED          = ENGLISH

A CONSTANT DENSITY FLUID IS SPECIFIED - DENSITY = .08POUNDS/CUBIC FOOT
ABSOLUTE VISCOSITY       = .282E-06 POUND SECONDS/SQUARE FOOT

      USER SPEC. FLOW UNITS (USFU) = SCF / MIN.
      USER SPEC. PRESSURE UNITS(USPU) = INCHES OF WATER (GAUGE)
```

----- SUMMARY OF PIPE NETWORK GEOMETRIC AND OPERATING DATA -----

PIPE NAME	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	ROUGHNESS (MILLIFEET)	SUM-M FACT.	PUMP ID	ELEVATION CHANGE
P-1	Flare	J-2	407.0	11.3	.400	.0	0	.0
P-10	J-10	GW-8	33.0	4.0	.400	.0	0	.0
P-100	GW-42	GW-52	174.0	4.0	.400	.0	0	.0
P-11	J-12	J-10	70.0	5.8	.400	.0	0	.0
P-12	J-12	J-16	228.0	11.3	.400	.0	0	.0
P-13	J-13	GW-20	197.0	4.0	.400	.0	0	.0
P-14	J-13	GW-9	22.0	4.0	.400	.0	0	.0
P-15	J-16	J-13	98.0	5.8	.400	.0	0	.0
P-16	J-16	J-19	123.0	11.3	.400	.0	0	.0
P-17	J-18	GW-21	97.0	4.0	.400	.0	0	.0
P-18	J-18	J-20	229.0	7.6	.400	.0	0	.0
P-19	J-20	J-30	44.0	7.6	.400	.0	0	.0
P-2	J-2	J-38	36.0	11.3	.400	.0	0	.0
P-20	J-20	GW-22	48.0	4.0	.400	.0	0	.0
P-21	J-19	J-18	205.0	7.6	.400	.0	0	.0
P-22	J-19	J-24	398.0	5.8	.400	.0	0	.0
P-23	J-24	GW-36	191.0	4.0	.400	.0	0	.0
P-24	J-24	J-25	230.0	5.8	.400	.0	0	.0
P-25	J-25	GW-37	103.0	5.8	.400	.0	0	.0
P-26	J-25	J-93	198.0	5.8	.400	.0	0	.0
P-27	GW-38	GW-57	166.0	4.0	.400	.0	0	.0
P-28	GW-37	GW-49	186.0	4.0	.400	.0	0	.0
P-29	J-30	GW-32	209.0	4.0	.400	.0	0	.0
P-3	J-2	J-97	72.0	11.3	.400	.0	0	.0
P-30	J-30	J-32	197.0	7.6	.400	.0	0	.0
P-31	J-32	J-35	71.0	7.6	.400	.0	0	.0
P-32	J-32	GW-23	22.0	4.0	.400	.0	0	.0
P-33	GW-48	GW-47	169.0	4.0	.400	.0	0	.0
P-34	J-35	J-69	163.0	7.6	.400	.0	0	.0
P-35	J-35	GW-33	223.0	4.0	.400	.0	0	.0
P-36	GW-17	GW-30	239.0	4.0	.400	.0	0	.0
P-37	J-38	GW-17	241.0	5.8	.400	.0	0	.0
P-38	J-38	J-39	153.0	11.3	.400	.0	0	.0
P-39	J-39	GW-4	82.0	4.0	.400	.0	0	.0
P-4	GW-6	J-95	105.0	5.8	.400	.0	0	.0
P-40	J-39	J-42	55.0	11.3	.400	.0	0	.0
P-41	J-42	J-46	172.0	11.3	.400	.0	0	.0
P-42	J-42	J-43	218.0	5.8	.400	.0	0	.0
P-43	J-43	GW-16	28.0	4.0	.400	.0	0	.0
P-44	J-43	GW-29	243.0	4.0	.400	.0	0	.0
P-45	J-46	GW-3	68.0	4.0	.400	.0	0	.0
P-46	J-46	J-49	32.0	11.3	.400	.0	0	.0
P-47	GW-2	GW-14	135.0	4.0	.400	.0	0	.0
P-48	J-49	J-51	209.0	11.3	.400	.0	0	.0
P-49	J-49	GW-15	227.0	4.0	.400	.0	0	.0
P-5	J-6	GW-6	101.0	7.6	.400	.0	0	.0
P-50	J-51	GW-2	62.0	5.8	.400	.0	0	.0
P-51	J-51	J-52	228.0	11.3	.400	.0	0	.0
P-52	J-52	GW-1	44.0	4.0	.400	.0	0	.0
P-53	J-52	J-54	215.0	11.3	.400	.0	0	.0
P-54	J-54	GW-13	107.0	4.0	.400	.0	0	.0
P-55	J-54	J-58	205.0	11.3	.400	.0	0	.0
P-56	GW-12	GW-27	194.0	4.0	.400	.0	0	.0
P-57	J-58	GW-12	131.0	5.8	.400	.0	0	.0
P-58	J-58	J-59	228.0	11.3	.400	.0	0	.0
P-59	J-59	GW-11	163.0	4.0	.400	.0	0	.0
P-6	J-6	J-8	210.0	11.3	.400	.0	0	.0
P-60	J-59	J-70	245.0	11.3	.400	.0	0	.0
P-61	J-62	GW-10	111.0	4.0	.400	.0	0	.0
P-62	J-62	J-65	218.0	7.6	.400	.0	0	.0
P-63	GW-25	GW-26	192.0	4.0	.400	.0	0	.0
P-64	J-65	GW-25	72.0	5.8	.400	.0	0	.0
P-65	J-65	J-68	103.0	7.6	.400	.0	0	.0
P-66	GW-34	GW-28	203.0	4.0	.400	.0	0	.0
P-67	J-68	GW-34	236.0	5.8	.400	.0	0	.0
P-68	J-69	GW-24	28.0	4.0	.400	.0	0	.0

PIPE NAME	NODE #1	NODE #2	LENGTH (FT.)	DIAM. (IN.)	ROUGHNESS (MILLIFEET)	SUM-M FACT.	PUMP ID	ELEVATION CHANGE
P-69	J-68	J-69	118.0	7.6	.400	.0	0	.0
P-7	J-8	GW-7	98.0	4.0	.400	.0	0	.0
P-70	J-70	J-62	149.0	7.6	.400	.0	0	.0
P-71	J-70	J-72	425.0	5.8	.400	.0	0	.0
P-72	J-72	GW-45	210.0	5.8	.400	.0	0	.0
P-73	J-72	J-77	203.0	5.8	.400	.0	0	.0
P-74	GW-45	GW-46	139.0	4.0	.400	.0	0	.0
P-75	GW-46	GW-35	130.0	4.0	.400	.0	0	.0
P-76	GW-44	GW-54	172.0	4.0	.400	.0	0	.0
P-77	J-77	GW-44	191.0	4.0	.400	.0	0	.0
P-78	J-77	J-78	368.0	5.8	.400	.0	0	.0
P-79	J-78	J-79	424.0	5.8	.400	.0	0	.0
P-8	J-8	J-12	294.0	11.3	.400	.0	0	.0
P-80	J-78	GW-43	180.0	4.0	.400	.0	0	.0
P-81	GW-43	GW-53	159.0	4.0	.400	.0	0	.0
P-82	J-79	GW-42	134.0	4.0	.400	.0	0	.0
P-83	J-79	J-83	231.0	5.8	.400	.0	0	.0
P-84	J-83	GW-41	87.0	4.0	.400	.0	0	.0
P-85	J-83	J-88	200.0	5.8	.400	.0	0	.0
P-86	GW-51	GW-55	232.0	4.0	.400	.0	0	.0
P-87	GW-40	GW-51	187.0	4.0	.400	.0	0	.0
P-88	J-88	GW-40	35.0	5.8	.400	.0	0	.0
P-89	J-88	J-92	256.0	5.8	.400	.0	0	.0
P-9	J-10	GW-19	145.0	4.0	.400	.0	0	.0
P-90	GW-50	GW-56	174.0	4.0	.400	.0	0	.0
P-91	GW-39	GW-50	162.0	4.0	.400	.0	0	.0
P-92	J-92	GW-39	38.0	5.8	.400	.0	0	.0
P-93	J-93	GW-38	74.0	4.0	.400	.0	0	.0
P-94	J-92	J-93	214.0	5.8	.400	.0	0	.0
P-95	GW-49	GW-48	244.0	4.0	.400	.0	0	.0
P-96	J-95	GW-18	71.0	4.0	.400	.0	0	.0
P-97	J-95	GW-31	207.0	4.0	.400	.0	0	.0
P-98	J-97	J-6	244.0	11.3	.400	.0	0	.0
P-99	J-97	GW-5	153.0	4.0	.400	.0	0	.0

JUNCTION NAME	NODE TITLE	ELEV	DEMAND (USFU)	FPN PRESSURE
Flare		.00	.00	-40.00
GW-1		.00	-6.40	
GW-10		.00	-9.50	
GW-11		.00	-11.60	
GW-12		.00	-10.30	
GW-13		.00	-9.60	
GW-14		.00	-18.20	
GW-15		.00	-18.60	
GW-16		.00	-16.80	
GW-17		.00	-16.80	
GW-18		.00	-13.90	
GW-19		.00	-14.50	
GW-2		.00	-10.70	
GW-20		.00	-15.80	
GW-21		.00	-8.20	
GW-22		.00	-6.60	
GW-23		.00	-7.00	
GW-24		.00	-6.00	
GW-25		.00	-7.60	
GW-26		.00	-21.20	
GW-27		.00	-22.60	
GW-28		.00	-22.70	
GW-29		.00	-22.70	
GW-3		.00	-8.00	
GW-30		.00	-22.60	
GW-31		.00	-22.40	
GW-32		.00	-18.50	

JUNCTION NAME	NODE TITLE	ELEV	DEMAND (USFU)	FPN PRESSURE
GW-33		.00	-20.80	
GW-34		.00	-20.80	
GW-35		.00	-2.80	
GW-36		.00	-1.90	
GW-37		.00	-2.10	
GW-38		.00	-2.70	
GW-39		.00	-3.20	
GW-4		.00	-6.80	
GW-40		.00	-4.70	
GW-41		.00	-5.40	
GW-42		.00	-5.00	
GW-43		.00	-5.00	
GW-44		.00	-2.90	
GW-45		.00	-2.10	
GW-46		.00	-2.60	
GW-47		.00	-6.10	
GW-48		.00	-4.70	
GW-49		.00	-2.70	
GW-5		.00	-7.50	
GW-50		.00	-4.60	
GW-51		.00	-5.90	
GW-52		.00	-7.20	
GW-53		.00	-7.30	
GW-54		.00	-5.50	
GW-55		.00	-7.80	
GW-56		.00	-5.60	
GW-57		.00	-3.10	
GW-6		.00	-6.30	
GW-7		.00	-7.70	
GW-8		.00	-7.90	
GW-9		.00	-7.00	
J-10		.00	.00	
J-12		.00	.00	
J-13		.00	.00	
J-16		.00	.00	
J-18		.00	.00	
J-19		.00	.00	
J-2		.00	.00	
J-20		.00	.00	
J-24		.00	.00	
J-25		.00	.00	
J-30		.00	.00	
J-32		.00	.00	
J-35		.00	.00	
J-38		.00	.00	
J-39		.00	.00	
J-42		.00	.00	
J-43		.00	.00	
J-46		.00	.00	
J-49		.00	.00	
J-51		.00	.00	
J-52		.00	.00	
J-54		.00	.00	
J-58		.00	.00	
J-59		.00	.00	
J-6		.00	.00	
J-62		.00	.00	
J-65		.00	.00	
J-68		.00	.00	
J-69		.00	.00	
J-70		.00	.00	
J-72		.00	.00	
J-77		.00	.00	
J-78		.00	.00	
J-79		.00	.00	
J-8		.00	.00	

JUNCTION NAME	NODE TITLE	ELEV	DEMAND (USFU)	FPN PRESSURE
J-83		.00	.00	
J-88		.00	.00	
J-92		.00	.00	
J-93		.00	.00	
J-95		.00	.00	
J-97		.00	.00	

=====  
Set = 0

===== RESULTS FOR THIS SIMULATION FOLLOW =====

Solution was obtained in 10 trials  
Flow Accuracy = .3657E-02[ < .500E-02]  
RV Accuracy = .0000E+00[ < .100E-02]

PIPE NO.	NODE #1	NODE #2	FLOW (USFU)	LOSS (USPU)	VELOCITY (FT/S)	DENSITY (#/CF)	FRICTION FACTOR	AREA RATIO
P-1	Flare	J-2	-554.500	.36	13.65	.075	.0199	
P-10	J-10	GW-8	-7.900	.00	1.56	.075	.0411	
P-100	GW-42	GW-52	-7.200	.01	1.42	.075	.0423	
P-11	J-12	J-10	-22.400	.00	2.04	.075	.0340	
P-12	J-12	J-16	-160.991	.02	3.96	.075	.0245	
P-13	J-13	GW-20	-15.800	.04	3.12	.075	.0343	
P-14	J-13	GW-9	-7.000	.00	1.38	.075	.0426	
P-15	J-16	J-13	-22.800	.01	2.08	.075	.0338	
P-16	J-16	J-19	-138.191	.01	3.40	.075	.0253	
P-17	J-18	GW-21	-8.200	.01	1.62	.075	.0407	
P-18	J-18	J-20	-75.479	.04	4.06	.075	.0269	
P-19	J-20	J-30	-68.879	.01	3.70	.075	.0275	
P-2	J-2	J-38	-313.309	.01	7.71	.075	.0217	
P-20	J-20	GW-22	-6.600	.00	1.30	.075	.0434	
P-21	J-19	J-18	-83.679	.04	4.50	.075	.0264	
P-22	J-19	J-24	-54.512	.13	4.97	.075	.0277	
P-23	J-24	GW-36	-1.900	.00	.38	.075	.0392	
P-24	J-24	J-25	-52.612	.07	4.80	.075	.0279	
P-25	J-25	GW-37	-15.600	.00	1.42	.075	.0374	
P-26	J-25	J-93	-37.012	.03	3.38	.075	.0301	
P-27	GW-38	GW-57	-3.100	.00	.61	.075	.0244	
P-28	GW-37	GW-49	-13.500	.03	2.67	.075	.0356	
P-29	J-30	GW-32	-18.500	.06	3.66	.075	.0330	
P-3	J-2	J-97	-241.191	.01	5.94	.075	.0227	
P-30	J-30	J-32	-50.379	.02	2.71	.075	.0294	
P-31	J-32	J-35	-43.379	.00	2.33	.075	.0305	
P-32	J-32	GW-23	-7.000	.00	1.38	.075	.0426	
P-33	GW-48	GW-47	-6.100	.01	1.21	.075	.0444	
P-34	J-35	J-69	-22.579	.00	1.21	.075	.0360	
P-35	J-35	GW-33	-20.800	.08	4.11	.075	.0321	
P-36	GW-17	GW-30	-22.600	.10	4.47	.075	.0315	
P-37	J-38	GW-17	-39.400	.04	3.59	.075	.0297	
P-38	J-38	J-39	-273.909	.04	6.74	.075	.0222	
P-39	J-39	GW-4	-6.800	.00	1.34	.075	.0430	
P-4	GW-6	J-95	-36.300	.02	3.31	.075	.0303	
P-40	J-39	J-42	-267.109	.01	6.58	.075	.0223	
P-41	J-42	J-46	-227.609	.03	5.60	.075	.0229	
P-42	J-42	J-43	-39.500	.04	3.60	.075	.0297	
P-43	J-43	GW-16	-16.800	.01	3.32	.075	.0338	
P-44	J-43	GW-29	-22.700	.10	4.49	.075	.0315	
P-45	J-46	GW-3	-8.000	.00	1.58	.075	.0410	
P-46	J-46	J-49	-219.609	.01	5.41	.075	.0231	
P-47	GW-2	GW-14	-18.200	.04	3.60	.075	.0331	

PIPE NO.	NODE #1	NODE #2	FLOW (USFU)	LOSS (USPU)	VELOCITY (FT/S)	DENSITY (#/CF)	FRICTION FACTOR	AREA RATIO
P-48	J-49	J-51	-201.009	.03	4.95	.075	.0235	
P-49	J-49	GW-15	-18.600	.07	3.68	.075	.0330	
P-5	J-6	GW-6	-42.600	.01	2.29	.075	.0306	
P-50	J-51	GW-2	-28.900	.01	2.64	.075	.0319	
P-51	J-51	J-52	-172.109	.02	4.24	.075	.0242	
P-52	J-52	GW-1	-6.400	.00	1.26	.075	.0438	
P-53	J-52	J-54	-165.709	.02	4.08	.075	.0244	
P-54	J-54	GW-13	-9.600	.01	1.90	.075	.0390	
P-55	J-54	J-58	-156.109	.02	3.84	.075	.0247	
P-56	GW-12	GW-27	-22.600	.08	4.47	.075	.0315	
P-57	J-58	GW-12	-32.900	.02	3.00	.075	.0309	
P-58	J-58	J-59	-123.209	.01	3.03	.075	.0259	
P-59	J-59	GW-11	-11.600	.02	2.29	.075	.0370	
P-6	J-6	J-8	-191.091	.03	4.70	.075	.0237	
P-60	J-59	J-70	-111.609	.01	2.75	.075	.0265	
P-61	J-62	GW-10	-9.500	.01	1.88	.075	.0391	
P-62	J-62	J-65	-55.721	.02	3.00	.075	.0288	
P-63	GW-25	GW-26	-21.200	.07	4.19	.075	.0320	
P-64	J-65	GW-25	-28.800	.01	2.63	.075	.0319	
P-65	J-65	J-68	-26.921	.00	1.45	.075	.0345	
P-66	GW-34	GW-28	-22.700	.09	4.49	.075	.0315	
P-67	J-68	GW-34	-43.500	.05	3.97	.075	.0291	
P-68	J-69	GW-24	-6.000	.00	1.19	.075	.0446	
P-69	J-68	J-69	16.579	.00	.89	.075	.0392	
P-7	J-8	GW-7	-7.700	.01	1.52	.075	.0414	
P-70	J-70	J-62	-65.221	.02	3.51	.075	.0278	
P-71	J-70	J-72	-46.388	.10	4.23	.075	.0287	
P-72	J-72	GW-45	-7.500	.00	.68	.075	.0466	
P-73	J-72	J-77	-38.888	.04	3.55	.075	.0298	
P-74	GW-45	GW-46	-5.400	.00	1.07	.075	.0461	
P-75	GW-46	GW-35	-2.800	.00	.55	.075	.0493	
P-76	GW-44	GW-54	-5.500	.01	1.09	.075	.0458	
P-77	J-77	GW-44	-8.400	.01	1.66	.075	.0404	
P-78	J-77	J-78	-30.488	.04	2.78	.075	.0315	
P-79	J-78	J-79	-18.188	.02	1.66	.075	.0359	
P-8	J-8	J-12	-183.391	.03	4.51	.075	.0239	
P-80	J-78	GW-43	-12.300	.03	2.43	.075	.0365	
P-81	GW-43	GW-53	-7.300	.01	1.44	.075	.0421	
P-82	J-79	GW-42	-12.200	.02	2.41	.075	.0365	
P-83	J-79	J-83	-5.988	.00	.55	.075	.0504	
P-84	J-83	GW-41	-5.400	.00	1.07	.075	.0461	
P-85	J-83	J-88	-.588	.00	.05	.075	.0295	
P-86	GW-51	GW-55	-7.800	.02	1.54	.075	.0413	
P-87	GW-40	GW-51	-13.700	.03	2.71	.075	.0355	
P-88	J-88	GW-40	-18.400	.00	1.68	.075	.0358	
P-89	J-88	J-92	17.812	.01	1.62	.075	.0361	
P-9	J-10	GW-19	-14.500	.03	2.87	.075	.0350	
P-90	GW-50	GW-56	-5.600	.01	1.11	.075	.0456	
P-91	GW-39	GW-50	-10.200	.02	2.02	.075	.0383	
P-92	J-92	GW-39	-13.400	.00	1.22	.075	.0391	
P-93	J-93	GW-38	-5.800	.00	1.15	.075	.0451	
P-94	J-92	J-93	31.212	.02	2.85	.075	.0313	
P-95	GW-49	GW-48	-10.800	.03	2.13	.075	.0377	
P-96	J-95	GW-18	-13.900	.01	2.75	.075	.0354	
P-97	J-95	GW-31	-22.400	.09	4.43	.075	.0316	
P-98	J-97	J-6	-233.691	.04	5.75	.075	.0228	
P-99	J-97	GW-5	-7.500	.01	1.48	.075	.0418	
Flare	Flare	Flare	-554.500	.00	.00	.075	*****	

JUNCTION	NODE	DEMAND	PRESSURE	PRESSURE	PRESSURE	DENSITY
NAME	TITLE	(USFU)	(USPU)	(PSIA)	(PSIG)	#/CF
Flare		.00	-40.00	13.25	-1.44	.075
GW-1		-6.40	-39.49	13.27	-1.42	.075
GW-10		-9.50	-39.40	13.27	-1.42	.075
GW-11		-11.60	-39.42	13.27	-1.42	.075
GW-12		-10.30	-39.44	13.27	-1.42	.075
GW-13		-9.60	-39.46	13.27	-1.42	.075
GW-14		-18.20	-39.47	13.27	-1.42	.075
GW-15		-18.60	-39.47	13.27	-1.42	.075
GW-16		-16.80	-39.53	13.27	-1.43	.075
GW-17		-16.80	-39.58	13.27	-1.43	.075
GW-18		-13.90	-39.55	13.27	-1.43	.075
GW-19		-14.50	-39.49	13.27	-1.42	.075
GW-2		-10.70	-39.51	13.27	-1.43	.075
GW-20		-15.80	-39.45	13.27	-1.42	.075
GW-21		-8.20	-39.44	13.27	-1.42	.075
GW-22		-6.60	-39.41	13.27	-1.42	.075
GW-23		-7.00	-39.39	13.27	-1.42	.075
GW-24		-6.00	-39.39	13.27	-1.42	.075
GW-25		-7.60	-39.38	13.28	-1.42	.075
GW-26		-21.20	-39.31	13.28	-1.42	.075
GW-27		-22.60	-39.35	13.28	-1.42	.075
GW-28		-22.70	-39.25	13.28	-1.42	.075
GW-29		-22.70	-39.43	13.27	-1.42	.075
GW-3		-8.00	-39.54	13.27	-1.43	.075
GW-30		-22.60	-39.48	13.27	-1.42	.075
GW-31		-22.40	-39.47	13.27	-1.42	.075
GW-32		-18.50	-39.35	13.28	-1.42	.075
GW-33		-20.80	-39.31	13.28	-1.42	.075
GW-34		-20.80	-39.34	13.28	-1.42	.075
GW-35		-2.80	-39.32	13.28	-1.42	.075
GW-36		-1.90	-39.36	13.28	-1.42	.075
GW-37		-2.10	-39.29	13.28	-1.42	.075
GW-38		-2.70	-39.26	13.28	-1.42	.075
GW-39		-3.20	-39.24	13.28	-1.42	.075
GW-4		-6.80	-39.59	13.27	-1.43	.075
GW-40		-4.70	-39.23	13.28	-1.42	.075
GW-41		-5.40	-39.23	13.28	-1.42	.075
GW-42		-5.00	-39.21	13.28	-1.41	.075
GW-43		-5.00	-39.22	13.28	-1.42	.075
GW-44		-2.90	-39.28	13.28	-1.42	.075
GW-45		-2.10	-39.32	13.28	-1.42	.075
GW-46		-2.60	-39.32	13.28	-1.42	.075
GW-47		-6.10	-39.23	13.28	-1.42	.075
GW-48		-4.70	-39.23	13.28	-1.42	.075
GW-49		-2.70	-39.26	13.28	-1.42	.075
GW-5		-7.50	-39.62	13.27	-1.43	.075
GW-50		-4.60	-39.22	13.28	-1.42	.075
GW-51		-5.90	-39.20	13.28	-1.41	.075
GW-52		-7.20	-39.20	13.28	-1.41	.075
GW-53		-7.30	-39.21	13.28	-1.41	.075
GW-54		-5.50	-39.27	13.28	-1.42	.075
GW-55		-7.80	-39.18	13.28	-1.41	.075
GW-56		-5.60	-39.22	13.28	-1.41	.075
GW-57		-3.10	-39.26	13.28	-1.42	.075
GW-6		-6.30	-39.57	13.27	-1.43	.075
GW-7		-7.70	-39.55	13.27	-1.43	.075
GW-8		-7.90	-39.51	13.27	-1.43	.075
GW-9		-7.00	-39.49	13.27	-1.42	.075
J-10		.00	-39.52	13.27	-1.43	.075
J-12		.00	-39.52	13.27	-1.43	.075
J-13		.00	-39.49	13.27	-1.42	.075
J-16		.00	-39.50	13.27	-1.43	.075

JUNCTION	NODE	DEMAND	PRESSURE	PRESSURE	PRESSURE	DENSITY
NAME	TITLE	(USFU)	(USPU)	(PSIA)	(PSIG)	#/CF
J-18		.00	-39.45	13.27	-1.42	.075
J-19		.00	-39.49	13.27	-1.42	.075
J-2		.00	-39.64	13.27	-1.43	.075
J-20		.00	-39.42	13.27	-1.42	.075
J-24		.00	-39.37	13.28	-1.42	.075
J-25		.00	-39.30	13.28	-1.42	.075
J-30		.00	-39.41	13.27	-1.42	.075
J-32		.00	-39.39	13.27	-1.42	.075
J-35		.00	-39.39	13.27	-1.42	.075
J-38		.00	-39.63	13.27	-1.43	.075
J-39		.00	-39.59	13.27	-1.43	.075
J-42		.00	-39.58	13.27	-1.43	.075
J-43		.00	-39.54	13.27	-1.43	.075
J-46		.00	-39.55	13.27	-1.43	.075
J-49		.00	-39.54	13.27	-1.43	.075
J-51		.00	-39.51	13.27	-1.43	.075
J-52		.00	-39.49	13.27	-1.42	.075
J-54		.00	-39.47	13.27	-1.42	.075
J-58		.00	-39.45	13.27	-1.42	.075
J-59		.00	-39.44	13.27	-1.42	.075
J-6		.00	-39.58	13.27	-1.43	.075
J-62		.00	-39.41	13.27	-1.42	.075
J-65		.00	-39.39	13.27	-1.42	.075
J-68		.00	-39.39	13.27	-1.42	.075
J-69		.00	-39.39	13.27	-1.42	.075
J-70		.00	-39.43	13.27	-1.42	.075
J-72		.00	-39.33	13.28	-1.42	.075
J-77		.00	-39.29	13.28	-1.42	.075
J-78		.00	-39.25	13.28	-1.42	.075
J-79		.00	-39.23	13.28	-1.42	.075
J-8		.00	-39.55	13.27	-1.43	.075
J-83		.00	-39.23	13.28	-1.42	.075
J-88		.00	-39.23	13.28	-1.42	.075
J-92		.00	-39.24	13.28	-1.42	.075
J-93		.00	-39.27	13.28	-1.42	.075
J-95		.00	-39.56	13.27	-1.43	.075
J-97		.00	-39.62	13.27	-1.43	.075

\* This designates the use of default density in a low pressure region

THE NET SYSTEM DEMAND (USFU) = -554.500

SUMMARY OF INFLOWS(+).AND.OUTFLOWS(-) :

NAME	FLOW (USFU)	FPN TITLE
Flare	-554.5	Flare

SUMMARY OF MINIMUM.AND.MAXIMUM VELOCITIES (FT/S)

	MINIMUM		MAXIMUM
Flare	.00	P-1	13.65
P-85	.05	P-2	7.71
P-23	.38	P-38	6.74
P-83	.55	P-40	6.58
P-75	.55	P-3	5.94

-----  
SUMMARY OF MINIMUM.AND.MAXIMUM LOSS/1000. (PSI )  
-----

	MINIMUM		MAXIMUM
P-85	.00	P-1	.03
P-23	.00	P-66	.02
P-27	.00	P-44	.02
P-83	.00	P-56	.02
P-72	.00	P-36	.02

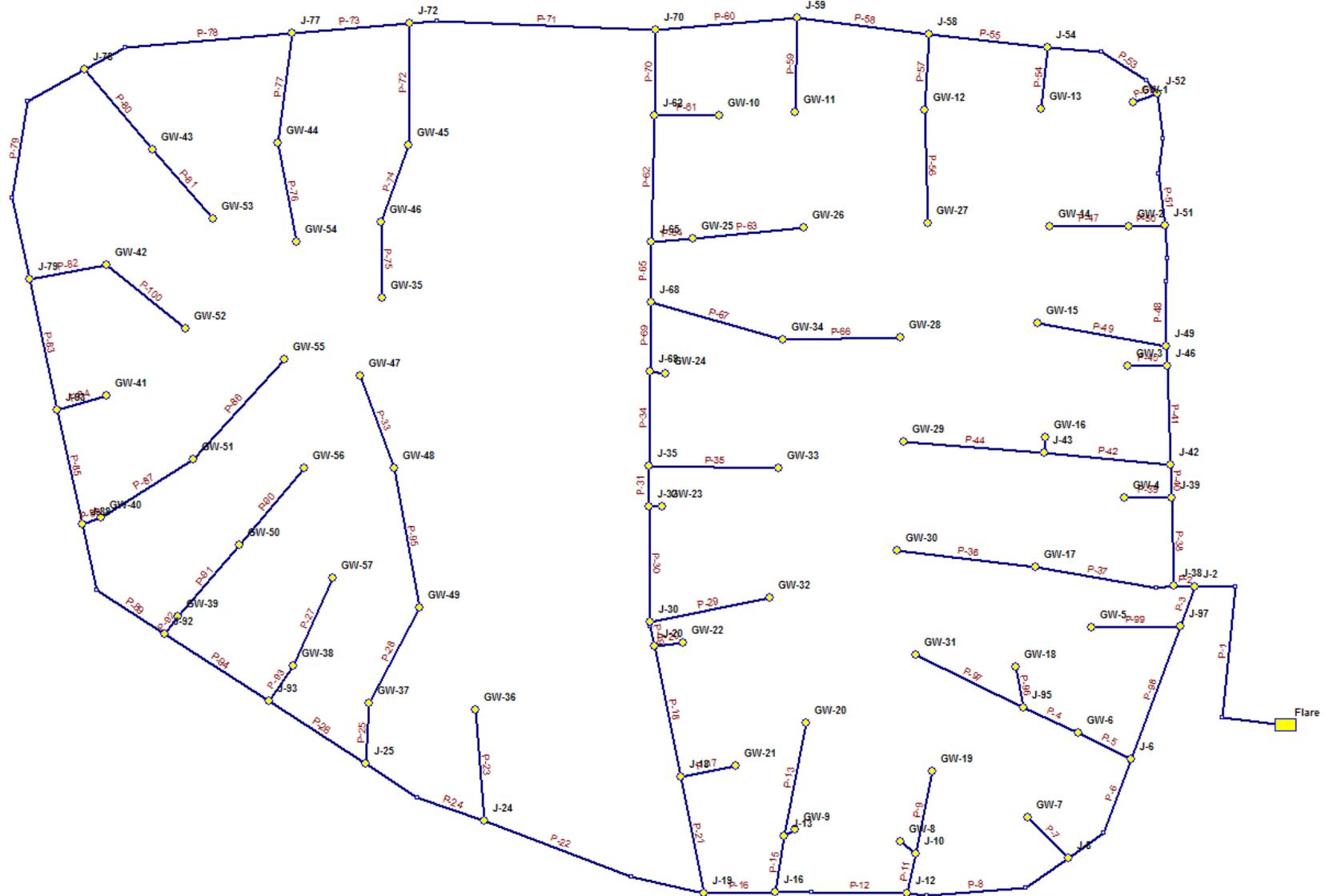
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SUMMARY OF MINIMUM.AND.MAXIMUM PRESSURES (USPU)  
-----

	MINIMUM		MAXIMUM
Flare	-40.00	GW-55	-39.18
J-2	-39.64	GW-51	-39.20
J-38	-39.63	GW-52	-39.20
J-97	-39.62	GW-42	-39.21
GW-5	-39.62	GW-53	-39.21

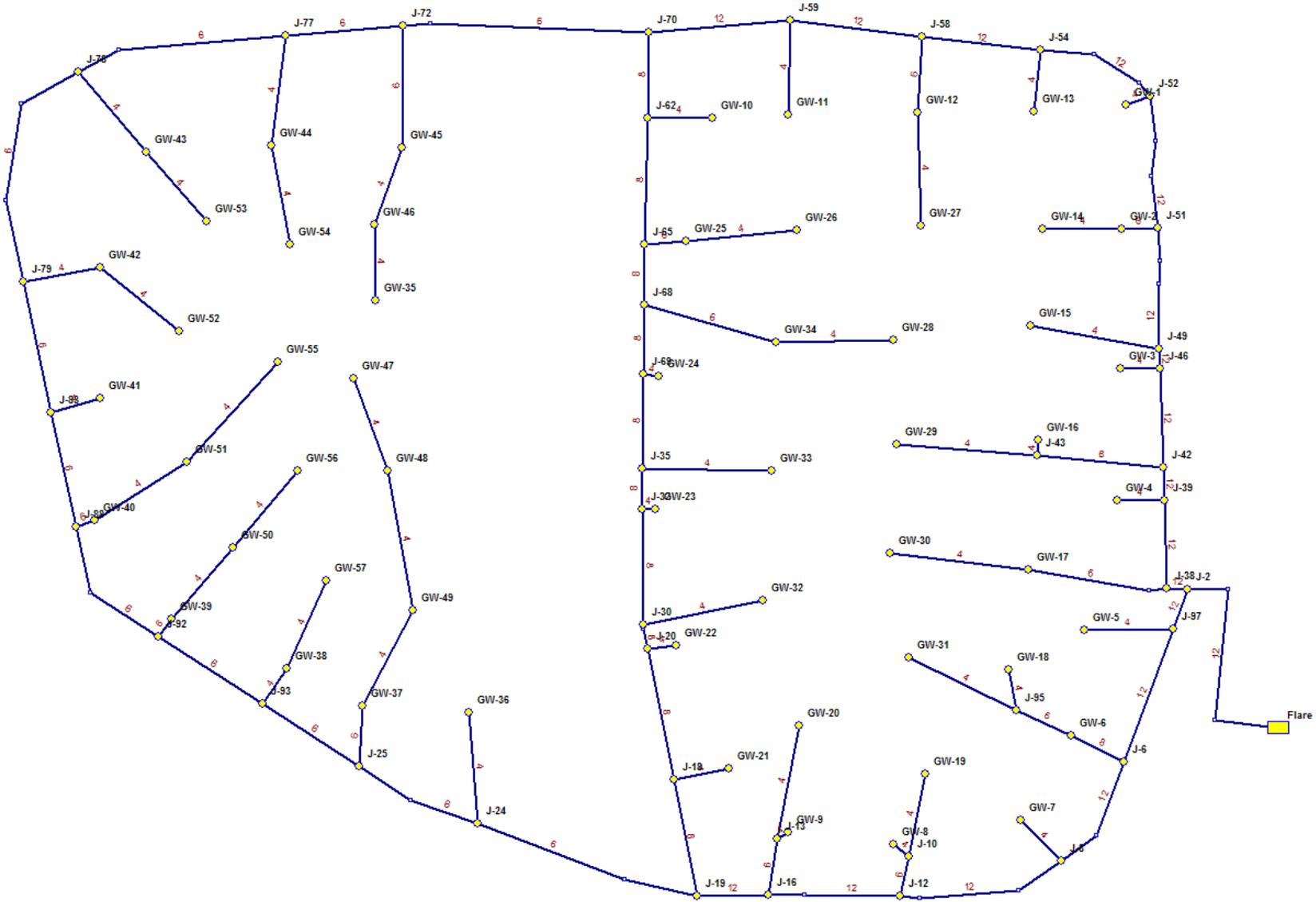
\*\*\*\*\* END OF KYGAS SIMULATION \*\*\*\*\*

DATE FOR THIS COMPUTER RUN : 2-06-2015  
START TIME FOR THIS COMPUTER RUN : 10: 9:37:47

KEKAHA SANITARY LANDFILL  
FIGURE 1: PIPE SEGMENT AND PIPE NODE NAMES

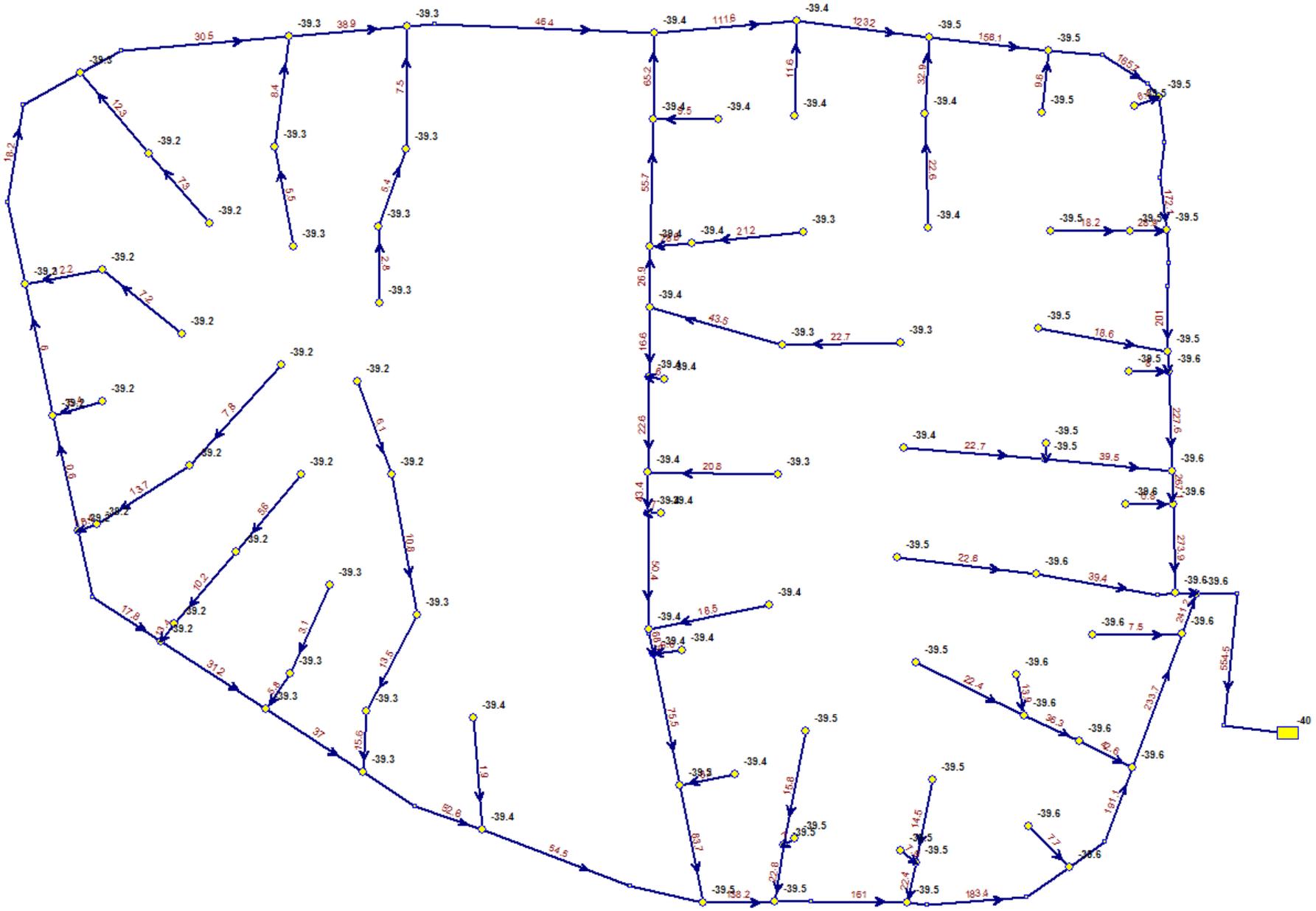


KEKAHA SANITARY LANDFILL  
FIGURE 2: PIPE SIZES



KEKAHA SANITARY LANDFILL

FIGURE 3: AVAILABLE



## **Appendix A-5: Gas Mover & Control Device Criteria**

## **Gas Mover Equipment Sizing**

Per 40 CFR 60.752(b)(2)(ii)(A)(1), the active gas extraction system must be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control system equipment. 40 CFR 60.752(b)(2)(ii)(A)(3) requires that gas be collected at a sufficient extraction rate. As mentioned above, the design is based on all of the projected gas volumes.

Since the blower is responsible for providing the vacuum that actually extracts the gas from the well field and moves it through the system, the sizing of the blower is crucial. General design criteria and the method for determining the required blower size are discussed in the following section.

### **General Design Criteria:**

#### **Flow Volumes:**

Since gas flow volumes will vary over the life of the gas extraction system the blower provides a uniform source of vacuum over a wide range of flow rates. Minimum system flows are those expected when only the initial phases of the system have been installed. Maximum flows will occur after the entire gas system is in place.

#### **Pressure Requirements:**

The blower must be capable of supplying sufficient negative pressure to overcome pressure drops and resistance through piping and equipment at the calculated maximum gas flow rate, as well as supplying sufficient positive pressure for delivery to the control device (i.e., the enclosed flare) for combustion.

The design blower will accommodate the maximum modeled flow rate of 521 scfm, and provide 40 "w.c. of available vacuum.

### **Design Methodologies:**

*Flow Volumes.* The Kekaha Landfill may ultimately require gas mover equipment capable of handling up to 521 scfm landfill gas.

*Pressure Losses in Gas System.* A discussion of the model used for calculating pressure losses in the header piping was provided in the discussion on header pipe sizing. In order to calculate the maximum pressure drop in the system,  $P_H$ , the designer must determine a pressure drop across the system due to elbows, tees, and other fittings in the gas system as well as frictional losses from flow in the pipe itself. Losses

are calculated and minimized to ensure that adequate vacuum is available to all extraction points.

The table included in header pipe sizing calculations illustrates that a total pressure drop of less than one inch water column is expected.

*Applied Well Vacuums.* For design purposes, it is assumed that a minimum of 10 "w.c.,  $P_W$ , should be available at the gas wells in order to provide sufficient vacuum for gas extraction.

*Pressure Loss through Flare.* A pressure loss,  $P_F$ , on the positive side of the gas mover equipment is created by the discharge piping, the flame arrester, orifice plate and the flare itself. Based on information supplied by flare manufacturers, a maximum drop of 10 "w.c. can be expected.

*Required Vacuum.* Based on these pressure losses for the gas management system, the gas mover equipment must ultimately be capable of providing the following vacuum:

$$\begin{aligned} P_{\text{total}} &= P_H + P_W + P_F \\ &= 1 \text{ "w.c.} + 10 \text{ "w.c.} + 10 \text{ "w.c.} \\ &= 21 \text{ "w.c. total static pressure} \end{aligned}$$

The blower at the flare station will be rated for 40 "w.c at a flow rate of 521 scfm. Thus, the system is sufficiently designed to generate the required vacuum of 21 "w.c.

### **Control Device Sizing**

The last requirement in designing a gas collection system is to size and select a control device meeting the requirements of 40 CFR 60.752(b)(2)(iii). Further, the control device must be capable of combusting a wide range of flow volumes.

The proposed flare will be located at a flare station on the northeast corner of the site near the office building.

### **General Design Criteria**

The flare at Kekaha Landfill shall be designed to reduce the concentration of NMOCs present in the LFG delivered to the flare by at least 98 percent (by weight) or reduce outlet NMOC concentrations to less than 20 parts per million by volume (ppmv).

Per 40 CFR §60.752(b)(2)(iii)(B)(2), the LFG flare shall operate within the performance ranges established during the source performance tests and is operated in such a manner as to meet the emission requirements of the NSPS.

The flare capacity will meet the minimum 521 scfm flow rate, which is the maximum modeled flow rate for the site.

### Control Device Sizing

The facility will periodically evaluate the existing gas control capabilities, prior to each expansion of the gas collection system (if any are necessary), to insure that adequate combustion capacity exists for the expected increase in collected gas volumes. Additional control equipment will be added as needed when collected gas volumes warrant the increase.

All control devices installed will meet the NSPS requirements for monitoring and performance testing, depending on the type of control device selected.

The enclosed flare at Kekaha Landfill will have the following design specifications. The equipment shown on drawing 5 in Appendix B is for illustration purposes only. The flare manufacturer will provide detailed drawings that will be incorporated by reference into this design plan.

### LFG Flare System Specifications

- Designed and constructed to operate as a complete pre-assembled unit.
- NFPA, OSHA, NEMA & NEC codes and guidelines are to be followed.
- The design shall include the ability to shut off, neutralize or isolate any energy source.
- System will be completely fabricated, assembled, pre-wired, and tested prior to shipment.

### Basic Components

- Unitized welded heavy-duty structural steel skid with lifting lugs and slip resistant decking (diamond plate or similar) as necessary. Skid to be completely galvanized or painted after fabrication.
- Anchor brackets are to be provided, suitable to secure the unit for 110 mph wind in seismic zone 1.
- Blower with VFD to be sized at full rated flare capacity (16.5 MMBtu/hr). All wetted parts (excluding aluminum impellers) shall be phenolic coated for corrosion resistance. Seals for blowers to be designed to resist corrosion and provide a leak tight operation.
- Blower motors to be TEFC
- Drains with valves to drain entire blower per manufacturer's recommendations, piped to edge of skid. Drain lines to be; of stainless steel material, sized, sloped and installed to promote free draining and accommodate "blow out" cleaning.
- Gas conveyance piping to be corrosion resistant and come fully assembled, mounted, and supported throughout the skid. Pipe sample ports are to be installed to allow for measurement of pressure and temperature at the inlet and outlet of the blower and to provide differential pressure measurement across the flame arrestor and mesh pad of the knockout vessel.

- Moisture separator with demister pad or equivalent shall be designed to resist corrosive condensate. HDPE lids are to be properly reinforced to prevent deflection/bowing under maximum vacuum conditions and operating temperatures to prevent leakage at the connection. Unit shall be designed to accommodate pressures of –5 to +5 PSIG at a minimum and be designed for removal of 99% of all liquid droplets > 10 microns in size. The design should have 4-inch w.c. maximum pressure drop across entire separator at full design flow. Free drain liquids by gravity from sump of moisture separator.
- Pneumatic fail-closed valve shall be a butterfly-type
- Flow Meter to be thermal type mass flow meter with flow straightener, if required to achieve proper flow run. All flow meters shall be installed and used in accordance with manufacturer's published recommendations and meet a minimum accuracy of  $\pm 4\%$  across the entire flare flow range as installed. All meters must report flow volumes corrected to 14.7 PSIA and 60°F. To be located and installed in accordance with manufacturer's published recommendations including minimum lengths of straight pipe (upstream and downstream of meter).
- Flame arrestor with internals capable of being removed and cleaned without removing housing. It shall be all aluminum housing with stainless steel element.
- Flare stacks are to be constructed as part of the skid unless the size requires stand-alone shipment and mounting. The flare shall achieve an overall destruction efficiency of 98% minimum. It is to be based on maximum design flow rate within the entire operating range of 30%-55% CH<sub>4</sub>. The unit shall have a minimum: 10:1 volumetric turndown. The flare shall be designed and constructed for 110 MPH wind load zone 1 seismic classification. Wind load and seismic classification requirements to be met without the use of guy-wires or similar devices. Stable combustion with 30% - 55% methane concentration throughout the design capacity range while maintaining operating temperature without requiring any burner adjustment or flare modification. Maximum 10-inch w.c. pressure drop through flare system (from blower outlet through flare tip). A spark ignited pilot assembly or equivalent is required. Stack to be fabricated using carbon steel. All carbon steel must be, painted, galvanized, or otherwise sufficiently protected (inside and out) against the effects of corrosion and heat with the system operating continuously at maximum design capacity. The flare shall have heavy-duty thermocouple systems designed for maximum life.
- Pilot control system including pressure regulator, fail-closed shutdown valve, manual block valve, strainer, and pressure indicator.
- Electrical equipment: Area classification: Per NEC standards, minimum area classification to be Class I, Div. 2, Group D within 3-feet of any gas (LFG or propane) containing pipe or device. All control panels shall follow all applicable sections of the National Fire Protection Association (NFPA) fire code, and the codes of the National Electrical Manufacturer's Association (NEMA). All control voltage within the control cabinet shall be 120 volt AC or less. All high voltage cabling must be confined to motor control center (MCC) or VFD panel. VFDs (without bypass) with inlet vacuum control via the PLC, to be installed and equipped with "closed loop" air conditioners to properly cool and minimize the

introduction of dust to the drive. Electrical systems shall be isolated and controlled with circuit breakers without fuses for all AC voltages. Weather hood to be provided which extends a minimum of 3' over front of panels. All enclosures and cabinets that have energized circuits are to be lockable to prevent unauthorized personnel from gaining access.

- Electronic paperless recorder capable of storing a minimum of 30 days of data
- PLC based control system with touch screen to be suitable for intended exterior use and with proper resolution for bright daylight conditions and properly protected from potential damage by vandals or direct exposure to sunlight. Control panel to be equipped with data modem for voice alarm notification and remote service and support of the control system. Modem to be capable of connecting to the Sprint 3G network, AT&T 3G network, Verizon 3G network, or POTS.

#### Energy Recovery Distribution

System shall include a blind flange and appropriate valves to allow for connection to a future energy recovery system capable of operating in all, partial, or none gas delivery modes. There shall be a minimum flow rate directed to the flare to maintain system operation and compliance.

## **APPENDIX B**

### **GCCS DESIGN DRAWINGS**

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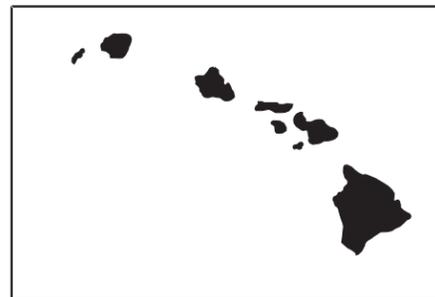
# GAS MANAGEMENT SYSTEM PLAN

## KEKAHA SANITARY LANDFILL COUNTY OF KAUAI KEKAHA, KAUAI, HAWAII

MARCH 2015



SITE LOCATION MAP



HAWAIIAN ISLANDS

### SHEET NO

### TITLE

1	TITLE SHEET
2	EXISTING CONDITIONS PLAN
3	GAS MANAGEMENT SYSTEM PLAN
4 - 6	GAS MANAGEMENT SYSTEM DETAILS

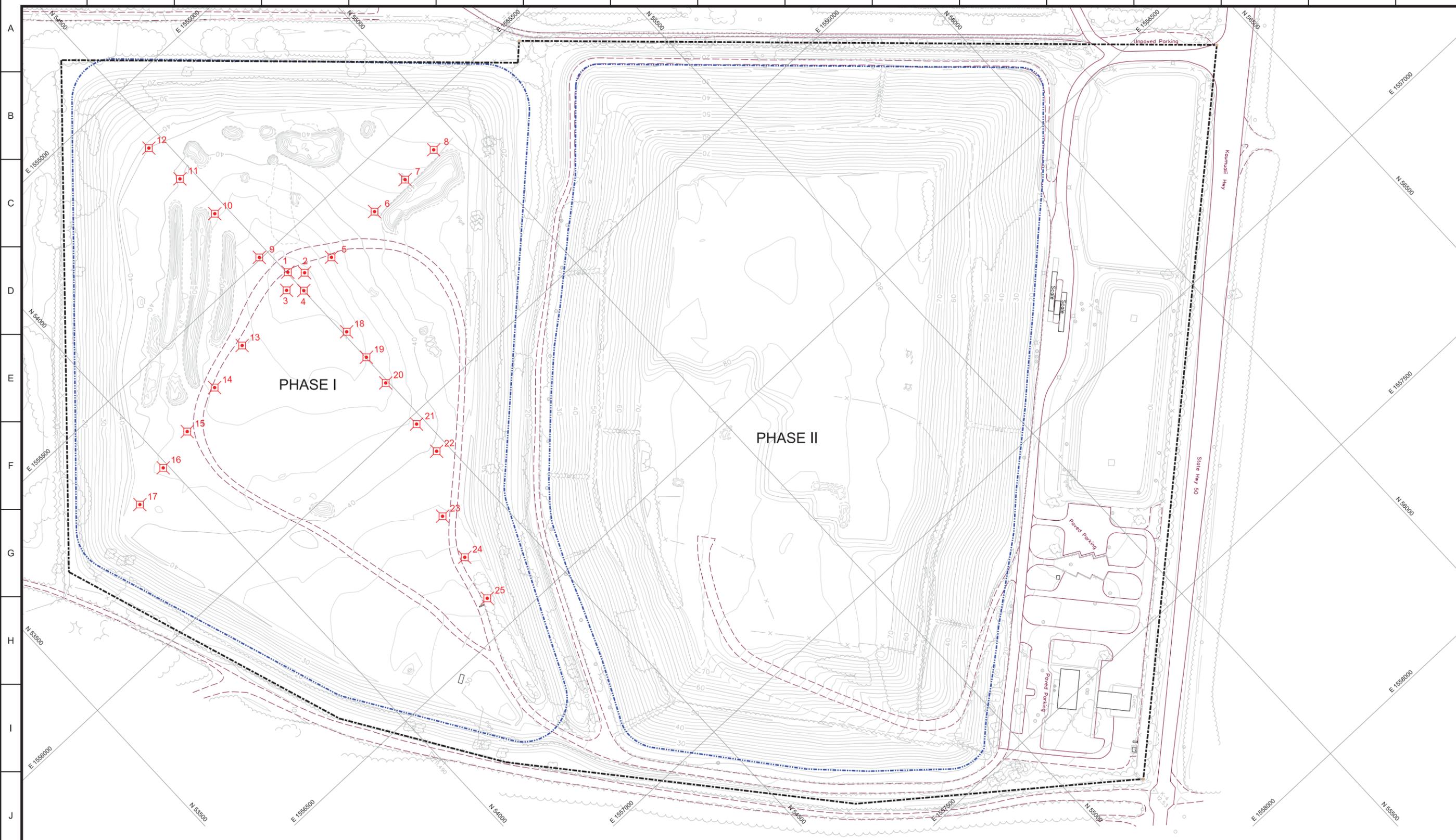


THIS WORK WAS PREPARED BY  
ME OR UNDER MY SUPERVISION

Signature: *Andrew J. Quiero* 4/30/16  
03-19-15 Expiration Date of License

PREPARED BY



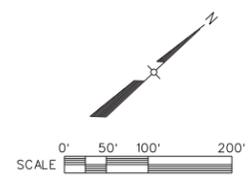


PHASE I

PHASE II

**LEGEND:**

- PROPERTY LINE
- PERMITTED LIMIT OF WASTE
- COORDINATE SYSTEM
- EXISTING STRUCTURE
- PAVED UNPAVED ACCESS ROAD
- EXISTING TOPOGRAPHY
- APPROXIMATE LOCATION OF EXISTING LANDFILL GAS VENT



NOTES:  
 1. TOPOGRAPHIC MAP PROVIDED BY MILLER CREEK AERIAL, INC., DATED, FEBRUARY 24, 2015.  
 2. EXISTING LANDFILL GAS VENTS SHOWN TAKEN FROM DRAWING C-3, ENTITLED "LANDFILL GAS SYSTEM AND GEOTEXTILE 1 PLAN", DATED JANUARY 31, 1996, CREATED BY HARDING LAWSON ASSOCIATES.



Signature *Andrew J. Querio* 03-19-15 Expiration Date of License 4/30/16

DATE		MARCH 2015	
PROJECT NO		090605	
FILENAME		003 KEK EX COND PLAN	
SHEET NO		2 OF 6	
DRAWING NO		2	

DRN	DES	CHK	APP	INITIAL	DATE

REVISIONS	NO	DATE

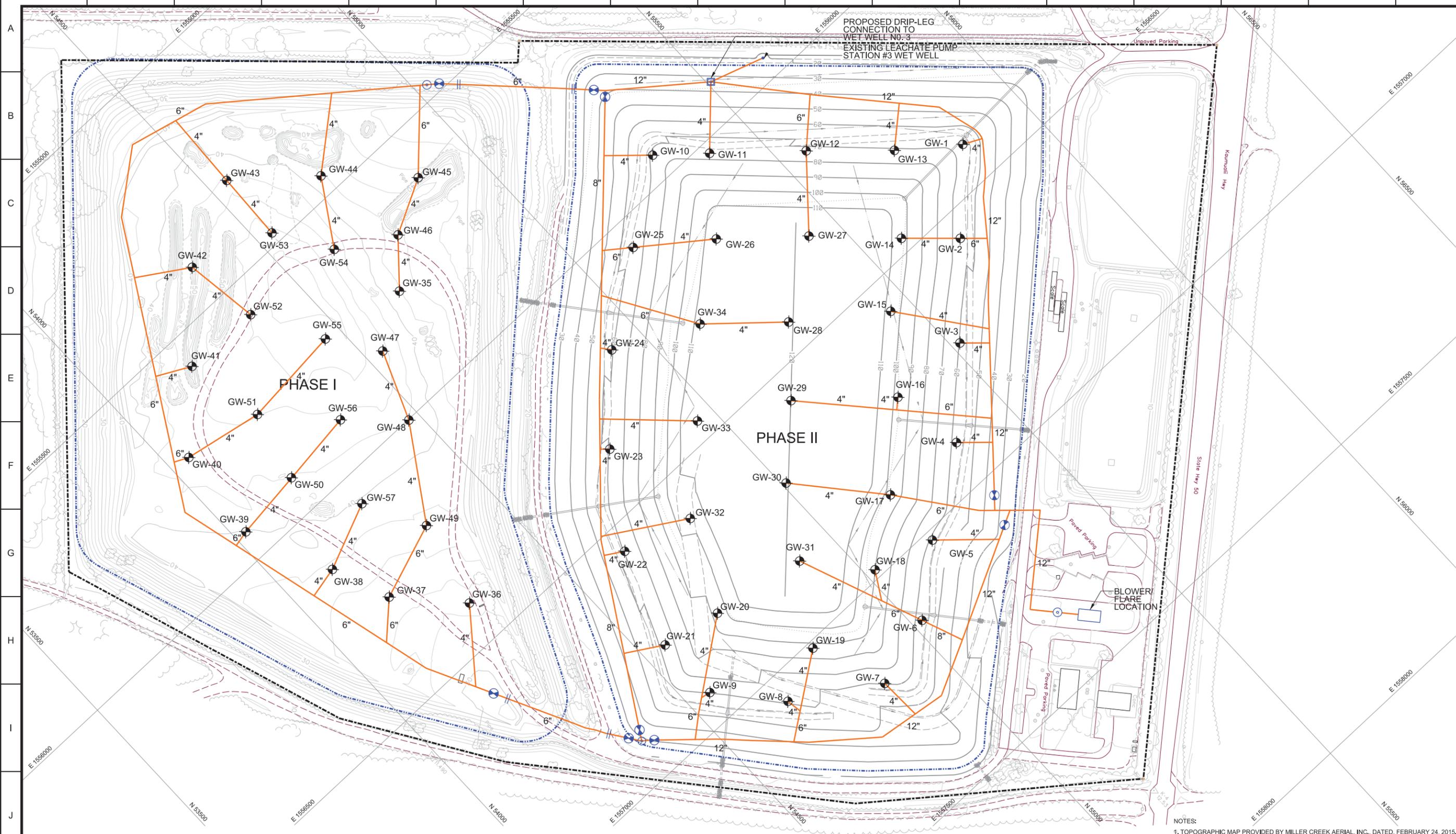
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PREPARED FOR  
**COUNTY OF KAUAI KEKAHE  
 SANITARY LANDFILL**



PREPARED BY  
 KEKAHE SANITARY LANDFILL  
 KEKAHE, KAUAI, HAWAII

**EXISTING CONDITIONS PLAN**



PROPOSED DRIP-LEG CONNECTION TO WET WELL NO. 3  
 EXISTING LEACHATE PUMP STATION #3 WET WELL

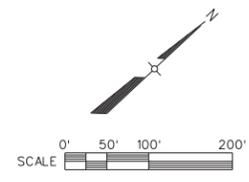
PHASE I

PHASE II

BLOWER/FLARE LOCATION

**LEGEND:**

- PROPERTY LINE
- PERMITTED LIMIT OF WASTE
- ACCESS ROAD
- EXISTING TOPOGRAPHY
- PERMITTED FINAL GRADE
- COORDINATE SYSTEM
- EXISTING STRUCTURE
- LANDFILL GAS COLLECTION HEADER/LATERAL
- LANDFILL GAS EXTRACTION WELL
- CONDENSATE KNOCKOUT
- VALVE
- DRIPLEG



- NOTES:
1. TOPOGRAPHIC MAP PROVIDED BY MILLER CREEK AERIAL, INC., DATED, FEBRUARY 24, 2015.
  2. GRADES SHOWN DEPICT TOP OF FINAL COVER SYSTEM. MAXIMUM FINAL COVER ELEVATION IS 120 FEET.
  3. CURRENT TOPOGRAPHY MAY DIFFER FROM THAT SHOWN DUE TO ON-GOING LANDFILLING OPERATIONS SINCE THE DATE OF THE AERIAL SURVEY.
  4. FOR CLARITY NOT ALL SITE FEATURES ARE SHOWN.
  5. PROPOSED LANDFILL GAS EXTRACTION WELLS WILL BE CONSTRUCTED AS FINAL CONTOURS ARE ATTAINED. INTERIM GAS COLLECTION DEVICES WILL BE INSTALLED AS NEEDED TO MEET THE NSPS CONTROL DEADLINES.
  6. THE PROPOSED PLAN IS CONCEPTUAL AND REPRESENTS TYPICAL PROPOSED LFG WELL AND HEADER SYSTEM LAYOUT. LFG WELLS AND PIPE LOCATIONS MAY BE ADJUSTED AND ADDITIONAL LFG WELLS AND PIPES MAY BE ADDED DURING AND AFTER WASTE FILLING OPERATIONS.
  7. ADDITIONAL WELLS OR COLLECTION DEVICES MAY BE ADDED TO SUPPLEMENT THE DESIGN PRESENTED HEREIN, WITHOUT THE NEED FOR AMENDMENTS TO THIS DESIGN PLAN. AS-BUILTS WILL BE KEPT ON FILE AS-REQUIRED.
  8. THE PHASE I EXISTING LANDFILL GAS VENTING SYSTEM WILL BE CAPPED, ABANDONED, AND/OR OTHERWISE DISMANTLED AS THE NEW GAS CONTROL SYSTEM IS CONSTRUCTED AND PUT INTO OPERATION, WHERE APPLICABLE. BASED ON FIELD CONDITIONS, AND PER SITE PERSONNEL DIRECTION, THE SITE MAY CONNECT EXISTING GAS VENTS TO THE PROPOSED GAS COLLECTION SYSTEM AS AN ALTERNATIVE TO INSTALLING NEW GAS EXTRACTION WELLS.
  9. THE PROPOSED PIPE SIZES INDICATED ON THIS DRAWING REPRESENTS MINIMUM PIPE SIZES. PIPE SIZES MAY BE INCREASED IF NECESSARY AND ADDITIONAL HEADERS/LATERALS MAY BE ADDED FOR ADDITIONAL CROSSOVER PIPING.



Signature: *Andrew J. Querio*  
 03-19-15  
 Expiration Date of License: 4/30/16

DATE		MARCH 2015
PROJECT NO		090605
FILENAME		003 KEK GCCS PLAN 080815
SHEET NO		3 OF 6
DRAWING NO		3

DRN	DES	CHK	APP	INITIAL	DATE

REVISIONS	NO	DATE

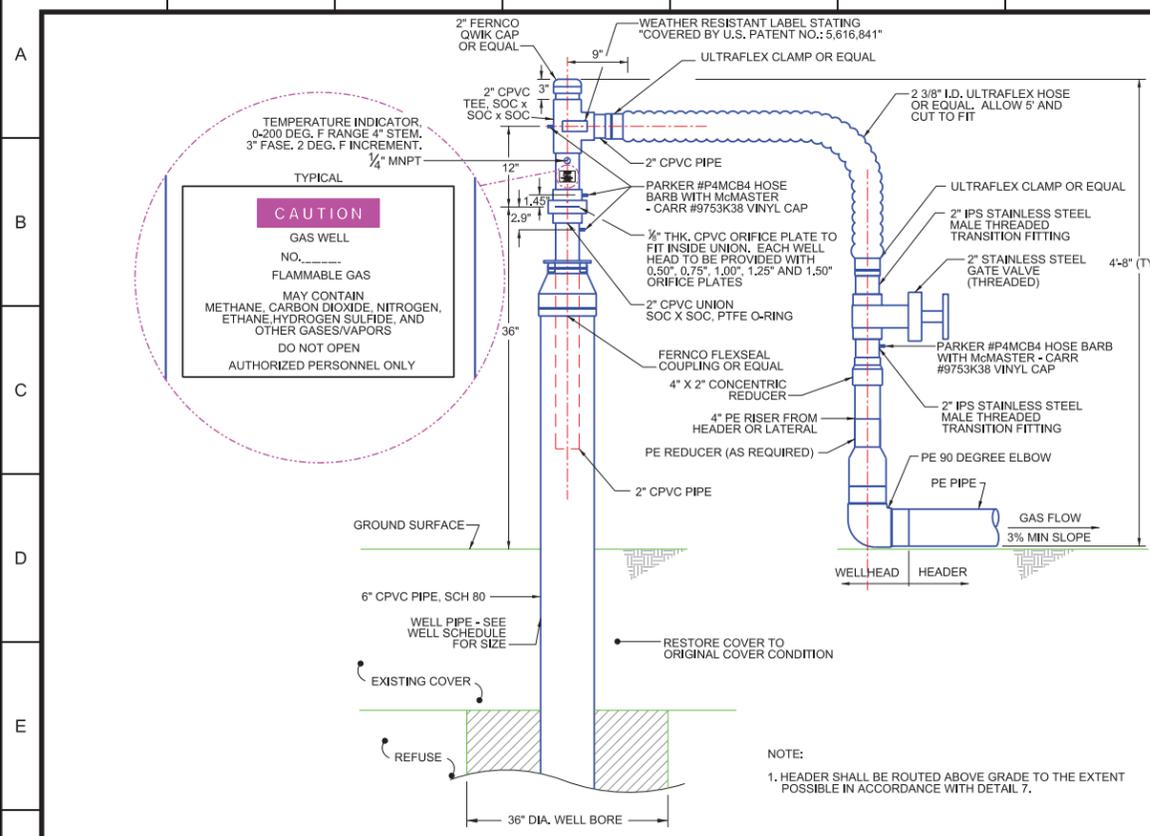
  

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PREPARED FOR: **COUNTY OF KAUAI KEKAHA SANITARY LANDFILL**

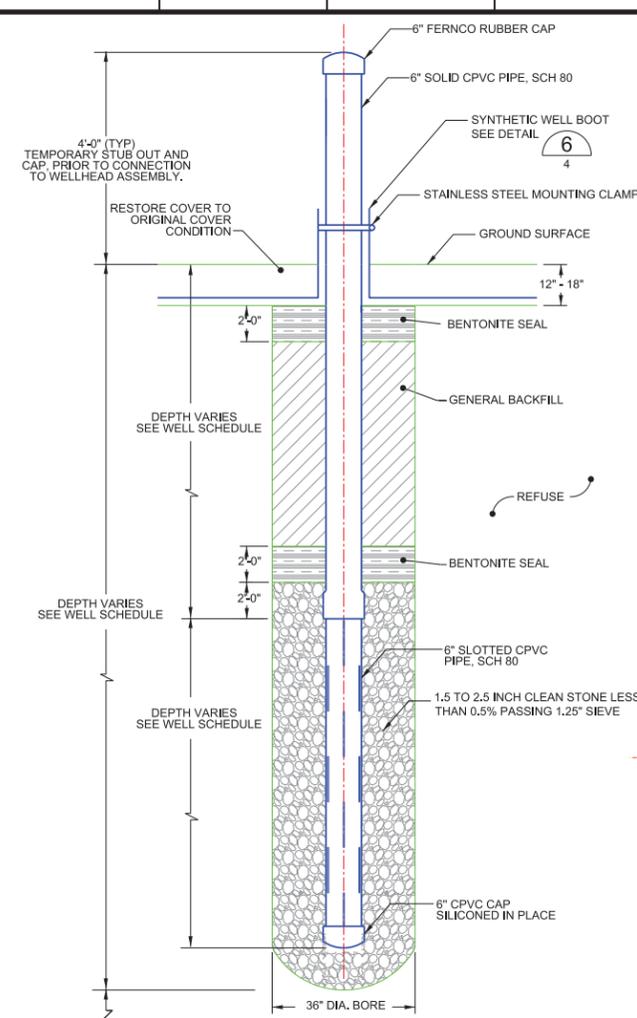
PREPARED BY: **EIL** Environmental Information Logistics, LLC

**GAS MANAGEMENT SYSTEM PLAN**

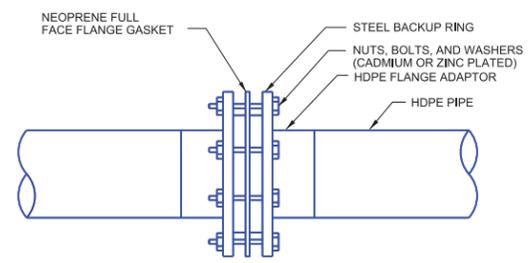


**GAS EXTRACTION WELLHEAD DETAIL 1**  
NTS

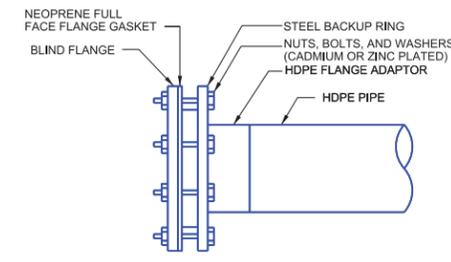
WELL NUMBER	WELL COORDINATES		FINAL GRADE ELEV.	BASE GRADE ELEV.	BASE OFFSET (FT)	TOTAL WELL LENGTH (FT)	LENGTH OF PIPE (FT)		TOP OF CASING ABOVE GRADE (FT)
	NORTH	EAST					SOLID	SCREENED	
GW-1	55,833	1,556,407	65.0	16.0	10	39	25	14	4
GW-2	55,683	1,556,560	65.0	7.4	10	48	25	23	4
GW-3	55,519	1,556,734	60.0	8.5	10	42	25	17	4
GW-4	55,358	1,556,896	57.0	8.3	10	39	25	14	4
GW-5	55,165	1,557,021	58.0	7.5	10	40	25	15	4
GW-6	55,023	1,557,139	55.0	8.3	10	37	25	12	4
GW-7	54,862	1,557,186	60.0	8.5	10	42	25	17	4
GW-8	54,672	1,557,065	61.2	9.7	10	41	25	16	4
GW-9	54,555	1,556,928	60.5	11.1	10	39	25	14	4
GW-10	55,297	1,555,940	71.0	15.0	10	46	25	21	4
GW-11	55,396	1,556,026	76.0	15.0	10	51	25	26	4
GW-12	55,561	1,556,173	72.9	16.0	10	47	25	22	4
GW-13	55,710	1,556,310	71.3	16.0	10	45	25	20	4
GW-14	55,584	1,556,468	103.7	8.2	10	85	25	60	4
GW-15	55,452	1,556,573	106.3	9.0	10	87	25	62	4
GW-16	55,330	1,556,728	97.3	9.0	10	78	25	53	4
GW-17	55,166	1,556,880	96.5	8.2	10	78	25	53	4
GW-18	55,023	1,556,981	90.0	9.5	10	71	25	46	4
GW-19	54,796	1,557,015	86.7	10.0	10	67	25	42	4
GW-20	54,691	1,556,907	93.7	10.5	10	73	25	48	4
GW-21	54,554	1,556,779	63.8	11.7	10	42	25	17	4
GW-22	54,632	1,556,559	60.6	12.1	10	38	25	13	4
GW-23	54,766	1,556,364	60.8	11.5	10	39	25	14	4
GW-24	54,924	1,556,201	59.1	11.8	10	37	25	12	4
GW-25	55,120	1,556,064	63.3	12.5	10	41	25	16	4
GW-26	55,273	1,556,179	114.4	10.8	10	94	20	74	4
GW-27	55,432	1,556,320	119.1	9.3	10	100	20	80	4
GW-28	55,264	1,556,432	119.7	9.4	10	100	20	80	4
GW-29	55,146	1,556,567	120.0	9.7	10	100	20	80	4
GW-30	55,009	1,556,697	119.9	10.0	10	100	20	80	4
GW-31	54,910	1,556,848	119.1	10.3	10	99	20	79	4
GW-32	54,793	1,556,606	102.7	11.4	10	81	20	61	4
GW-33	54,957	1,556,455	113.2	11.3	10	92	20	72	4
GW-34	55,113	1,556,296	112.7	10.8	10	92	20	72	4
GW-35	54,708	1,555,929	38.2	5.0	10	23	10	13	4
GW-36	54,291	1,556,402	33.0	5.0	10	18	10	8	4
GW-37	54,166	1,556,267	35.0	5.0	10	20	10	10	4
GW-38	54,113	1,556,132	37.6	5.0	10	23	10	13	4
GW-39	54,027	1,555,934	39.9	5.0	10	25	10	15	4
GW-40	54,047	1,555,720	42.1	5.0	10	27	20	7	4
GW-41	54,195	1,555,573	43.2	5.0	10	28	20	8	4
GW-42	54,350	1,555,408	42.5	5.0	10	27	20	7	4
GW-43	54,543	1,555,316	42.5	5.0	10	27	20	7	4
GW-44	54,708	1,555,456	38.3	5.0	10	23	10	13	4
GW-45	54,886	1,555,611	34.1	5.0	10	19	10	9	4
GW-46	54,745	1,555,675	36.7	5.0	10	22	10	12	4
GW-47	54,538	1,555,845	44.4	5.0	10	29	20	9	4
GW-48	54,467	1,555,962	42.0	5.0	10	27	20	7	4
GW-49	54,475	1,556,002	37.4	5.0	10	22	10	12	4
GW-50	54,186	1,555,914	41.9	5.0	10	27	20	7	4
GW-51	54,230	1,555,796	44.0	5.0	10	29	20	9	4
GW-52	54,374	1,555,578	46.1	5.0	10	31	20	11	4
GW-53	54,537	1,555,475	46.4	5.0	10	31	20	11	4
GW-54	54,616	1,555,600	43.4	5.0	10	28	20	8	4
GW-55	54,461	1,555,735	47.2	5.0	10	32	20	12	4
GW-56	54,360	1,555,894	43.5	5.0	10	28	20	8	4
GW-57	54,266	1,556,068	39.7	5.0	10	25	10	15	4



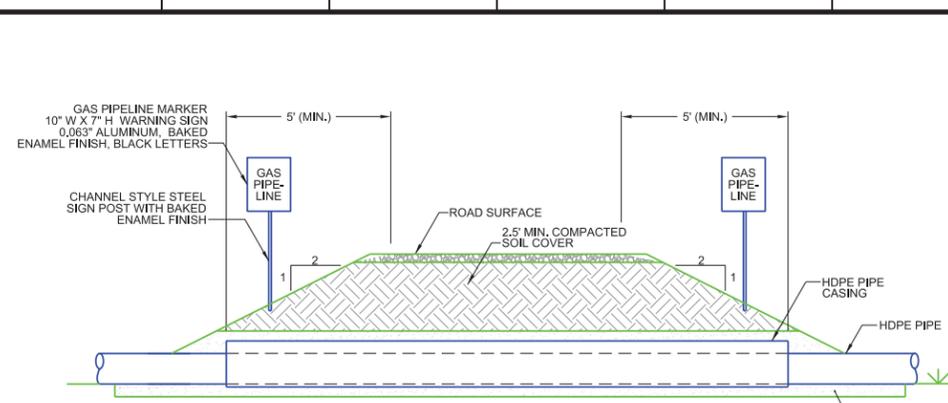
**GAS EXTRACTION WELL ASSEMBLY 2**  
NTS



**FLANGE CONNECTION (TYP) 4**  
NTS

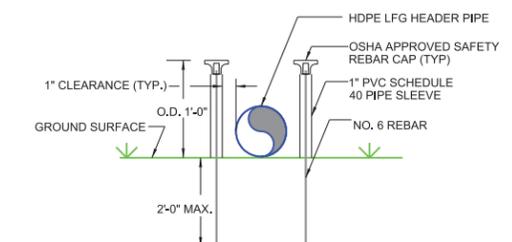


**BLIND FLANGE (TYP) 5**  
NTS



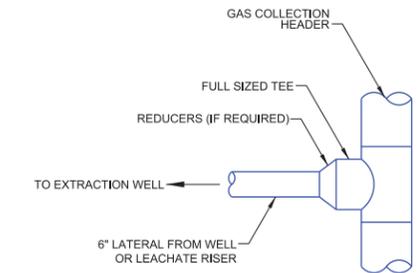
**TYPICAL HEADER CASING 3**  
NTS

- NOTES:
1. IN AREAS WHERE A HEADER CASING IS REQUIRED USE HDPE PIPE CASING TWO PIPE SIZES LARGER THAN HEADER PIPE.
  2. HEADER AND LATERAL PIPES TO BE REPAIRED OR REPLACED WHERE A HEADER CASING IS REQUIRED SHALL BE INSPECTED AND IF NECESSARY EXCAVATED. IF PIPES ARE FOUND TO BE IN GOOD CONDITION THEY CAN REMAIN OTHERWISE A NEW PIPE AND CASING IS REQUIRED.
  3. LOCATION OF ALL HEADER CASINGS TO BE FIELD DETERMINED BY OWNER.
  4. GRADE HEADER CASING CROSS SLOPE TO ORIGINAL ROAD OR GRADE AT A MAXIMUM 8% SLOPE.



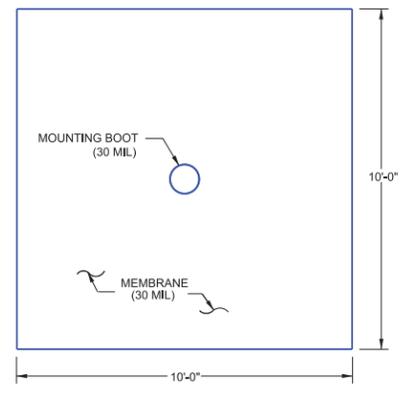
**PIPE ANCHOR DETAIL 7**  
NTS

- NOTES:
1. ANCHOR DETAIL 20' ON CENTER.
  2. CONTRACTOR TO PLACE MINIMUM 2' OF SOIL ABOVE PIPE AT TEES AND 90 DEG. ELBOWS.



**LATERAL CONNECTION DETAIL 8**  
NTS

- NOTES:
1. ALL HDPE PIPE IS SDR-17 OR SDR-26 (DEPENDING ON SIZE AS SPECIFIED IN SUBSEQUENT CONSTRUCTION PLANS) AND ALL FITTINGS ARE SDR-11 UNLESS OTHERWISE NOTED.
  2. ALL CPVC PIPE AND FITTINGS ARE SCH 80 UNLESS OTHERWISE NOTED. HDPE PIPE MAY BE USED IN PLACE OF CPVC AS DIRECTED BY COUNTY ENGINEER AND DESIGN ENGINEER.
  3. CLEAN SAND OR SELECT SITE MATERIAL BEDDING AND BACKFILL COMPACTED IN MAXIMUM LIFTS OF 9".
  4. REPAIR COVER TO ORIGINAL CONDITIONS AND SPECIFICATIONS.
  5. ALL NUTS, BOLTS AND WASHERS ARE CADMIUM OR ZINC PLATED UNLESS OTHERWISE STATED.
  6. DIMENSIONS, LOCATION & SIZE OF SYSTEM COMPONENTS ARE SUBJECT TO CHANGE IN THE FIELD DURING CONSTRUCTION.
  7. SYSTEM COMPONENTS MAY HAVE SUBSTITUTE COMPONENTS INSTALLED OF EQUAL VALUE & CAPABILITY.

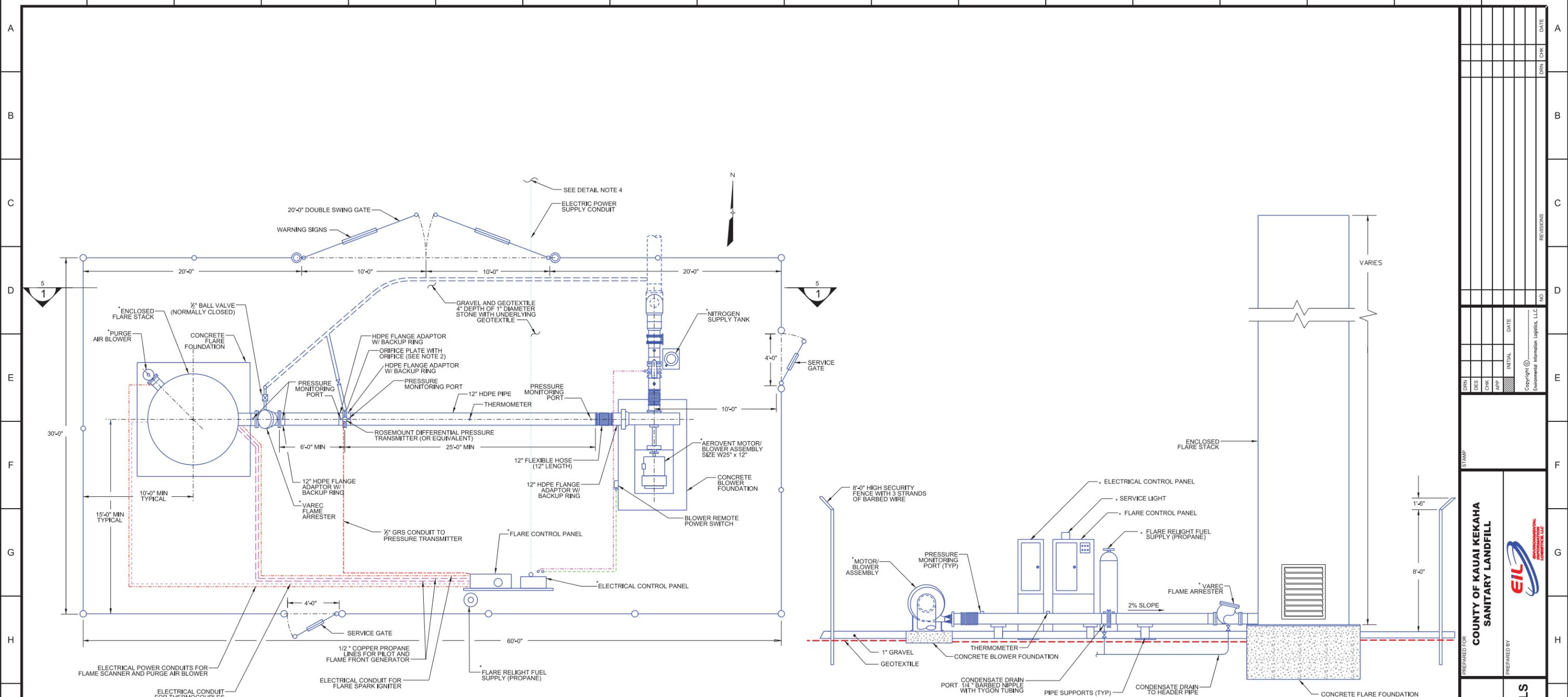


**SYNTHETIC WELL BOOT 6**  
NTS



Signature: *Andrew J. Querio*  
03-19-15  
Expiration Date of License: 4/30/16

COUNTY OF KAUAI KEKAHA  
 SANITARY LANDFILL  
 KEKAHA, KAUAI, HAWAII  
 GAS MANAGEMENT SYSTEM DETAILS  
 DATE: MARCH 2015  
 PROJECT NO: 090605  
 FILENAME: 004 KEK DET1 010815  
 SHEET NO: 4 OF 6  
 DRAWING NO: 4



PLAN VIEW

ELEVATION VIEW

**BLOWER/ FLARE STATION** 1

- NTS
- NOTES:
1. PROPOSED BLOWER/ FLARE STATION LAYOUT MAY VARY BASED ON FIELD CONDITIONS ENCOUNTERED. ACTUAL FLARE DESIGN MAY CHANGE BUT WILL CONFORM WITH GCCS DESIGN REQUIREMENTS.
  2. THE THERMAL MASS METER SHOULD BE PLACED BETWEEN THE BLOWER AND THE FLARE STACK WITH AT LEAST 10 TIMES THE INSIDE DIAMETER OF THE PIPE UP STREAM THE THERMAL MASS METER AND 3 TIMES THE INSIDE DIAMETER OF THE PIPE DOWN STREAM WITHOUT ANY FLOW INTERRUPTIONS (SUCH AS ELBOWS, VALVES, SAMPLE PROBES, ETC).
  3. PROPOSED BLOWER MOTOR MOUNT SHOULD BE ADAPTABLE FOR INITIAL 15 HP MOTOR TO ULTIMATE MAXIMUM OF 50 HP MOTOR.
  4. OWNER TO PROVIDE ELECTRIC SERVICE WITHIN 25 FEET OF FLARE STATION AREA. CONTRACTOR IS RESPONSIBLE FOR CONNECTION OF ELECTRIC SERVICE TO FLARE CONTROL PANEL.
  5. INDICATES EQUIPMENT PROVIDED BY OWNER.

- NOTES:
1. ALL ABOVE AND BELOW GRADE EXPOSED METAL SHALL BE CORROSION PROTECTED WITH BOWMAN GALVALU-COAT METALLIC ZINC SPRAY OR EQUIVALENT.
  2. CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF PIPE SUPPORT PADS AND SUPPLY TANK SUPPORT PADS. CONTRACTOR SHALL PROVIDE 24" x 24" x 4" CONCRETE SUPPORT WITH UNISTRUT P-1000 VERTICAL STANCHION FOR NITROGEN TANKS.
  3. LOCATION OF ALL FENCE ENTRANCE GATES SHALL BE FIELD DETERMINED BY OWNER. CONTRACTOR SHALL VERIFY THE INTEGRITY OF THE INLET VALVE ACTUATOR SUPPLY LINE. FOR ALL ENCLOSED FLARE DIMENSIONAL DATA, INSTALLATION AND OPERATION INFORMATION REFER TO FLARE MANUFACTURER'S SHOP DRAWINGS.
  4. LANDFILL GAS AND LEACHATE SYSTEM MAY CHANGE DUE TO SITE CONDITIONS AT THE TIME OF CONSTRUCTION.
  5. ALL PVC PIPE AND FITTINGS ARE SCH 80 EXCEPT AS NOTED. ALL HDPE PIPE IS SDR-17 OR SDR-26 (DEPENDING ON SIZE AS SPECIFIED IN SUBSEQUENT CONSTRUCTION PLANS) AND ALL FITTINGS ARE SDR-11 UNLESS OTHERWISE NOTED.
  6. FOR ALL BLOWER DIMENSIONAL DATA, INSTALLATION AND OPERATION INFORMATION, REFER TO BLOWER MANUFACTURER'S SHOP DRAWINGS.
  7. TO MAINTAIN GRAVEL PACK STABILITY AND VEGETATION GROWTH CONTROL A GEOTEXTILE SHALL BE INSTALLED IN THE BLOWER/FLARE STATION PRIOR TO FOUR (4) INCHES OF COMPACTED GRAVEL.
  8. CONTRACTOR IS RESPONSIBLE FOR DESIGN OF CONCRETE PAD AND REINFORCING. CONTRACTOR SHALL SUBMIT DESIGN FOR OWNER APPROVAL PRIOR TO INSTALLATION.



Signature: *Andrew J. Querio* 4/30/16  
 03-19-15 Expiration Date of License

DATE	MARCH 2015
PROJECT NO	090605
FILENAME	005 KEK DET 2 011415
SHEET NO	5 OF 6
DRAWING NO	5

DRN	DES	CHK	APP	DATE

NO	INITIAL	DATE

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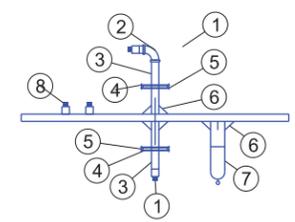
PREPARED FOR  
**COUNTY OF KAUAI KEKAHA  
 SANITARY LANDFILL**

PREPARED BY  
 Environmental Information Logistics, LLC

KEKAHA SANITARY LANDFILL  
 KEKAHA, KAUAI, HAWAII

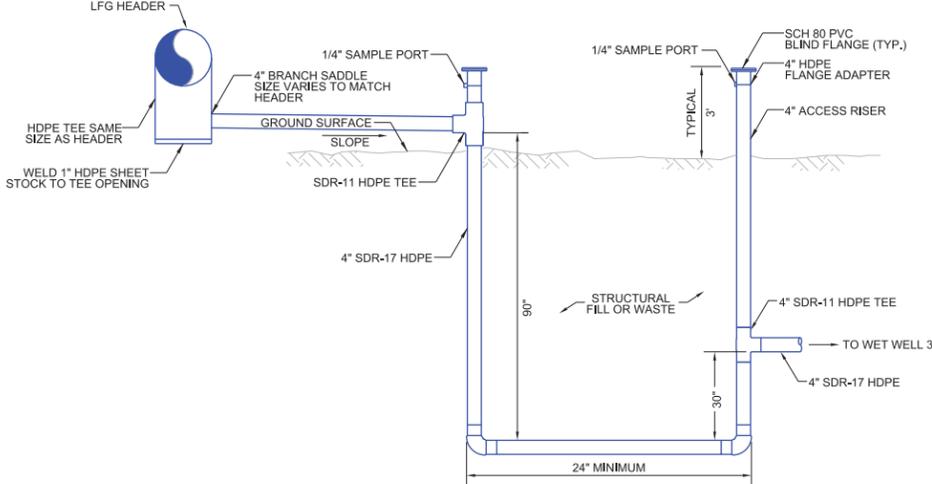
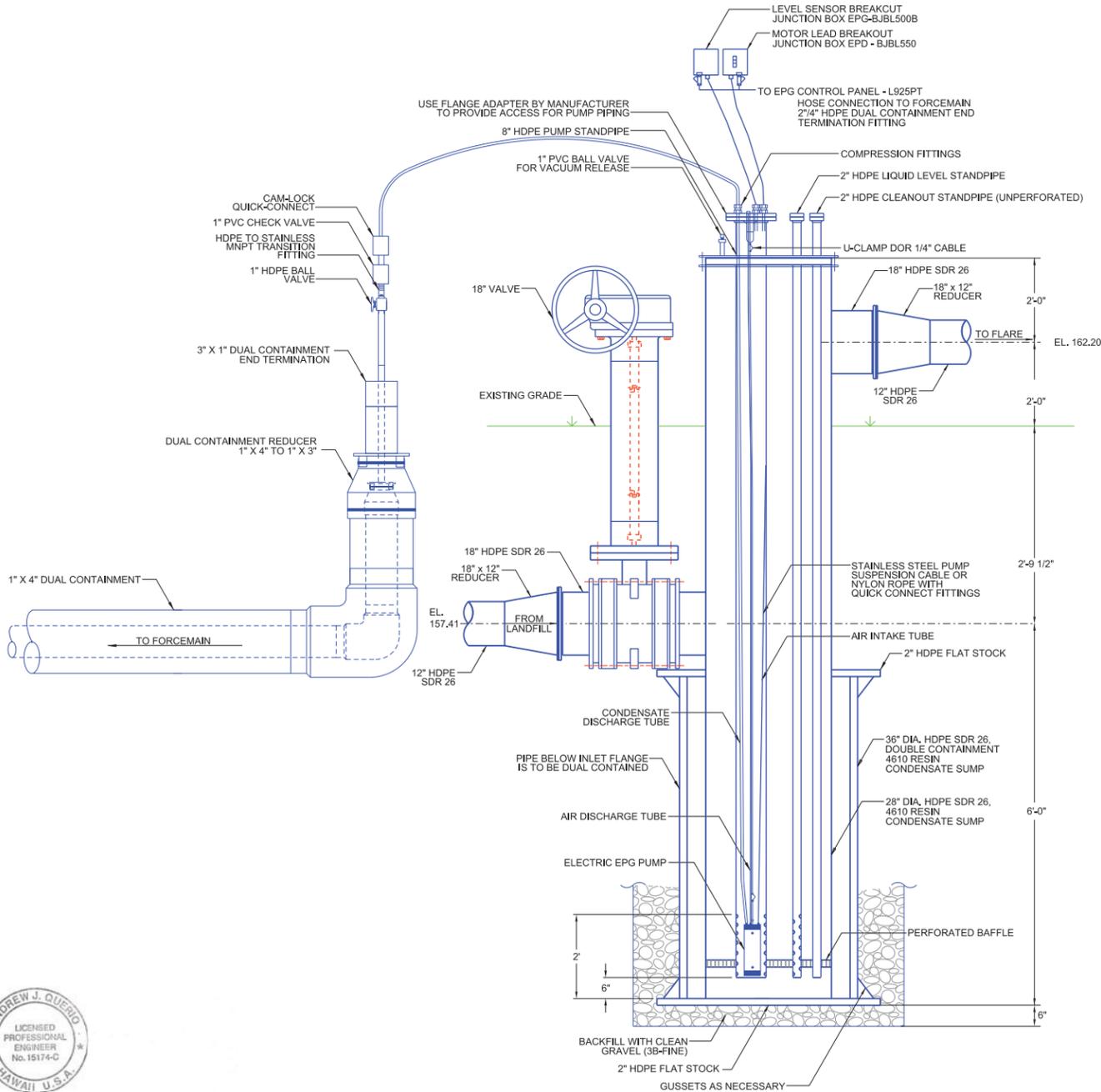
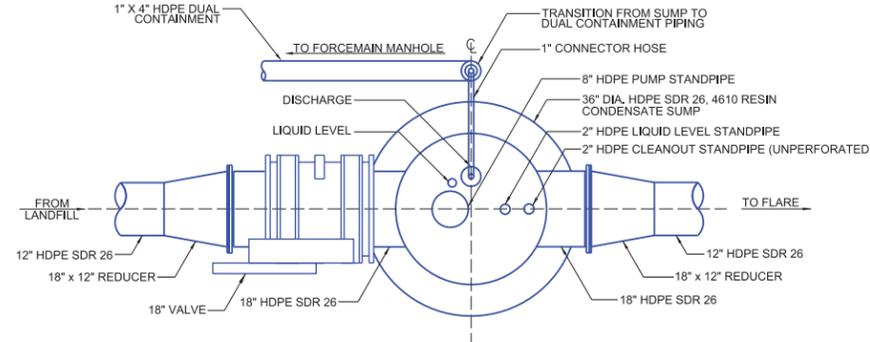
**GAS MANAGEMENT SYSTEM DETAILS**

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L



**COMPONENTS SHOWN OUT OF ORIENTATION FOR CLARITY**

1. 1" TYPE A POLYPROPYLENE MALE ADAPTER X FEMALE NPT
2. 1" 304 S.S. 90 DEG.
3. 1" X 4" 304 S.S. NIPPLE
4. 1" S.S. RAISED HEAD THREADED FLANGE
5. 1" HDPE FLANGE ADAPTER W/ DUCTILE IRON BACKUP RING
6. GUSSETS AS NECESSARY
7. 2" STEEL PULLING HEAD TRANSITION FOR HDPE
8. 1/2" CONDUIT X CORD DIA. LIQUID LIGHT CORD CONNECTOR FOR POWER AND LIQUID LEVEL
9. 1" CHEMICAL RESISTANT HOSE W/ TYPE C POLYPROPYLENE FEMALE COUPLER WITH HOSE SHANK (EACH END)



**CONDENSATE DRIPLEG 1**

- NTS
- NOTES:
1. DISCHARGE LINE FROM DRIPLEG TO BE DUAL-CONTAINED OUTSIDE OF REFUSE LIMITS.
  2. THIS CONFIGURATION IS ADEQUATE FOR A MAXIMUM 60" OF WATER COLUMN VACUUM. THE DEPTH OF THE DRIPLEG MAY BE ALTERED DEPENDING ON VACUUM REQUIREMENTS AT THE TIME OF INSTALLATION.

- NOTES:
1. LANDFILL GAS AND CONDENSATE SYSTEM MAY CHANGE DUE TO SITE CONDITIONS AT THE TIME OF CONSTRUCTION.
  2. ALL PVC PIPE AND FITTINGS ARE SCH 80 EXCEPT AS NOTED.
  3. ALL HDPE PIPE IS SDR-17 OR SDR-26 (DEPENDING ON SIZE AS SPECIFIED IN SUBSEQUENT CONSTRUCTION PLANS) AND ALL FITTINGS ARE SDR-11 UNLESS OTHERWISE NOTED.
  4. COMPACTED CLEAN SAND BEDDING AND BACKFILL IN MAXIMUM LIFTS OF 9".
  5. ALL NUTS, BOLTS, AND WASHERS ARE CADMIUM PLATED UNLESS OTHERWISE NOTED.
  6. ALL UNDERGROUND 2" CONDENSATE DISCHARGE PIPE SHALL BE DUAL CONTAINED.

**CONDENSATE SUMP (NEW) 1**

NTS



Signature: *Andrew J. Querio* 4/30/16  
 03-19-15 Expiration Date of License

DATE	MARCH 2015
PROJECT NO	090605
FILENAME	006 KEK DET3 011415
SHEET NO	6 OF 6
DRAWING NO	6

PREPARED FOR  
**COUNTY OF KAUAI KEKAHA  
 SANITARY LANDFILL**

PREPARED BY  
**EIL**  
 Environmental Information Logistics, LLC

PREPARED FOR  
**KEKAHA SANITARY LANDFILL  
 KEKAHA, KAUAI, HAWAII**

PREPARED BY  
**GAS MANAGEMENT SYSTEM DETAILS**

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18





## **APPENDIX C**

### **SURFACE EMISSIONS MONITORING PLAN**

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## LANDFILL SURFACE EMISSIONS MONITORING PROTOCOL

This surface emission monitoring (SEM) protocol is submitted in compliance with the requirements of the 40 CFR §60.753 (d).

### Sampling Methods and Procedures

A surface concentration below 500 parts per million (ppm) methane above background indicates proper operation of the GCCS. The following test methods and procedures for surface emissions testing satisfy 40 CFR §60.753 (d).

- A portable monitor in general conformance with 40 CFR Part 60, Appendix A, Method 21 will be used to determine the methane concentration at each sampling point. The instrument will be calibrated, according to the manufacturer's recommendations, for methane, diluted to a nominal concentration of 500 ppm in air.
- Monitoring will be performed during typical meteorological conditions.
- The background concentration will be determined by moving the probe inlet upwind and downwind outside the refuse permit boundary of the landfill at a distance of approximately 98 feet (30 meters) in areas without a synthetic cap and approximately 196 feet (60 meters) in areas with a synthetic cap in place.
- The detector probe will be positioned within 2 to 4 inches (5 to 10 centimeters) of the ground.
- A pattern of parallel lines approximately 98 feet (30 meters) or approximately 196 feet (60 meters) apart will be established over a majority of the surface area of the landfill that contains buried refuse. Areas of the landfill with excessive slopes will be excluded from SEM. A monitoring result will be recorded at the appropriate intervals. The anticipated pattern for monitoring of surface emission data is presented on the drawing included in this appendix.
- Any areas where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover, will be monitored.
- Areas with steep slopes or other dangerous areas may be excluded from the surface testing.
- Any detection of 500 ppm or more above background will be recorded as an exceedance. The location of the exceedance will be marked and recorded. Cover maintenance or adjustments to the GCCS will be made and the location will be re-monitored within 10 calendar days of the initial exceedance or, if

inclement weather is observed, in accordance with the SEM variance. If the re-monitoring of the location shows a second exceedance, additional corrective action will be taken and the location will be re-monitored within 10 days of the second exceedance or, once again, in accordance with the SEM variance. A proposed corrective action plan and corresponding timeline will be submitted to DOH for approval for any location where monitored methane concentration equals or exceeds 500 ppm above background three times within a quarterly period.

- Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the 10-day re-monitoring (REM) event or approved alternate time frame shown in Section 6.2.3 will be re-monitored 1-month from the initial exceedance. If the 1-month re-monitoring shows a concentration less than 500 ppm above background, no further monitoring of that location will be performed until the next quarterly monitoring period. If the 1-month re-monitoring shows an exceedance, the location will be re-monitored within 10 calendar days of the second exceedance or, if inclement weather is observed, as specified in Section 6.2.2. A proposed corrective action plan and corresponding timeline will be submitted to the Department for approval for any location where monitored methane concentration equals or exceeds 500 ppm above background three times within a quarterly period.

## **Frequency**

Surface emissions monitoring will be performed quarterly. If the surface emissions monitoring does not exceed 500 ppm above background at any point for three consecutive quarterly monitoring periods in portions/areas of the landfill that are closed or at final grade (i.e. Phase I of the existing Kekaha Landfill), monitoring will be performed annually in the areas/portions that are closed or at final grade. The site will return to quarterly monitoring of the closed/final grade portions/area of the site if any methane reading of 500 ppm or more above background is detected during the annual surface emissions monitoring event.

## **Recordkeeping**

The location and concentration of each exceedance recorded during the surface emissions monitoring will be reported in an annual report to the Administrator. The concentration recorded at each location for which an exceedance was recorded in the previous month will also be included in the annual report. Reports and monitoring records will be maintained with the site records for a period of five years.

## **Table C – 1: SURFACE EMISSION RESPONSE TIME TEST RECORD**

40 CFR §60.755(d)(3) requires performance evaluation of response factor, response time and calibration precision according to 40 CFR 60 Appendix A, Method 21. The requirements are presented below along with locations to record the evaluations.

### **Response Factor:**

Response factor is the ratio of the known concentration of a VOC compound to the observed meter reading when measured using an instrument calibrated with the reference compound specified in the applicable regulation. Since the monitoring instrument is being used to detect methane and the calibration reference compound is methane, the response factor by definition is one. No further evaluation is required.

### **Response Time:**

Response time is the time interval from a step change in VOC concentration at the input of the sampling system to the time at which 9 percent of the corresponding final value is reached as displayed on the instrument readout meter.

Performance Requirement: Method 21 requires the instrument response time to be equal to or less than 30 seconds.

Evaluation Frequency: Prior to placing instrument into service (for the first time or after it was out of service for maintenance or repair). If modification to the sample pumping system or flow configuration is made that would change the response time, a new test is required prior to further use.

Evaluation Procedure: Calibrate instrument with the methane calibration gas. Introduce zero gas into the instrument sample probe. When the meter reading has stabilized, switch quickly to the specified calibration gas. Measure the time from switching to when 90 percent of the final stable reading is attained. Perform this test sequence three times and record the results. Calculate the average response time. Use the following form to document this procedure.

# Kekaha Sanitary Landfill

## SURFACE EMISSION RESPONSE TIME TEST RECORD

DATE: \_\_\_\_\_  
TIME: \_\_\_\_\_

INSTRUMENT MAKE: \_\_\_\_\_  
MODEL: \_\_\_\_\_  
S/N: \_\_\_\_\_

### MEASUREMENT #1:

Stabilized Reading Using Calibration Gas: \_\_\_\_\_ ppm  
90% of the Stabilized Readings: \_\_\_\_\_ ppm  
Time to Reach 90% of Stabilized reading after starting from Zero Air to Calibration Gas  
\_\_\_\_\_ seconds (1)

### MEASUREMENT #2:

Stabilized Reading Using Calibration Gas: \_\_\_\_\_ ppm  
90% of the Stabilized Readings: \_\_\_\_\_ ppm  
Time to Reach 90% of Stabilized reading after starting from Zero Air to Calibration Gas  
\_\_\_\_\_ seconds (2)

### MEASUREMENT #3:

Stabilized Reading Using Calibration Gas: \_\_\_\_\_ ppm  
90% of the Stabilized Readings: \_\_\_\_\_ ppm  
Time to Reach 90% of Stabilized reading after starting from Zero Air to Calibration Gas  
\_\_\_\_\_ seconds (3)

### CALCULATE PRECISION:

$$\frac{(1) + (2) + (3)}{3} = \text{_____ seconds (MUST BE LESS THAN 30 SECONDS)}$$

PERFORMED BY: \_\_\_\_\_

## **Table C – 2: SURFACE EMISSION CALIBRATION PRECISION TEST RECORD**

### **Calibration Precision:**

Calibration precision is the degree of agreement between measurements of the same known value, expressed as the relative percentage of the average difference between the meter readings and the known concentration to the known concentration.

Performance Requirement: The calibration precision must be equal to or less than 10 percent of the calibration gas value.

Evaluation Frequency: Must be completed prior to placing instrument into service, and at subsequent 3-month intervals or at the next use whichever is later.

Evaluation Procedure: Calibrate instrument with the methane calibration gas. Make a total of three measurements by alternately using zero gas and the specified calibration gas. Record the meter readings. Calculate the average algebraic difference between the meter readings and the known value. Divide this average difference by the known calibration value and multiply by 100 to express the resulting calibration precision as a percentage. Use the following form to document this procedure.

# Kekaha Sanitary Landfill

## SURFACE EMISSION CALIBRATION PRECISION TEST RECORD

CALIBRATION DATE: \_\_\_\_\_  
 TIME: \_\_\_\_\_

EXPIRATION DATE (3 MOS.): \_\_\_\_\_

INSTRUMENT MAKE: \_\_\_\_\_  
 MODEL: \_\_\_\_\_  
 S/N: \_\_\_\_\_

MEASUREMENT #1:

Meter Reading for Zero Air:	ppm (1)	
Meter Reading for Calibration Gas:	ppm (2)	

MEASUREMENT #2:

Meter Reading for Zero Air:	ppm (3)	
Meter Reading for Calibration Gas:	ppm (4)	

MEASUREMENT #3:

Meter Reading for Zero Air:	ppm (5)	
Meter Reading for Calibration Gas:	ppm (6)	

CALCULATE PRECISION: 500

$$\frac{[500 - (491)] + [500 - (499)] + [500 - (496)]}{3} \times \frac{1}{500} \times 100$$

% (must be less than 10%)

PERFORMED BY: \_\_\_\_\_

## **Table C – 3: SURFACE EMISSION CALIBRATION PROCEDURE AND BACKGROUND DETERMINATION REPORT**

The calibration procedures in 40 CFR 60 Appendix A, Method 21 must be conducted immediately before commencing a surface monitoring survey. [40 CFR §60.755(d)(4)] Calibration, background readings and monitoring details can be recorded using this form.

### **Calibration Procedure:**

The calibration gas should be methane in air at a nominal concentration of 500 ppm. [See Method 21 for further calibration gas requirements.]

Assemble and start up the analyzer according to the manufacturer's instructions. After the appropriate warm-up period and zero internal calibration procedure, introduce the calibration gas into the instrument sample probe. Adjust the instrument meter readout to correspond to the calibration gas value. Record the calibration information in the table below.

### **Background Concentration:**

Determine the background concentration by moving the probe inlet upwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells. Record the background concentration and location in the following form.

**Kekaha Sanitary Landfill**  
**SURFACE EMISSION**  
**CALIBRATION PROCEDURE AND BACKGROUND DETERMINATION REPORT**

INSTRUMENT MAKE: \_\_\_\_\_  
MODEL: \_\_\_\_\_  
S/N: \_\_\_\_\_

Calibration Procedure

1. Allow instrument to internally zero itself while introducing zero air.
2. Introduce calibration gas into the probe.  
Stable reading = \_\_\_\_\_ ppm
3. Adjust meter to read 500 ppm.

Background Determination Procedure

1. Upwind Reading (highest in 30 seconds): \_\_\_\_\_ ppm (1)
2. Downwind Reading (highest in 30 seconds): \_\_\_\_\_ ppm (2)

Calculate Background Value:

$$\frac{(1) + (2)}{2}$$

Background = \_\_\_\_\_ ppm

PERFORMED BY: \_\_\_\_\_

Date: \_\_\_\_\_  
Time: \_\_\_\_\_ PM \_\_\_\_\_

## **Table C – 4: SAMPLE INDIVIDUAL MONITORING EXCEEDANCE FORM**

Use the following form to record an individual monitoring exceedance and follow-up monitoring activities. This form is only used when a reading of 500 ppm above background is encountered during the surface monitoring. Use a separate form for each initial exceedance.



## **Table C – 5: COVER INTEGRITY FORM**

Use the following forms to record monthly cover integrity.



## Cover Integrity Summary Report

Kekaha Landfill

Month	Inspection Date	Repair Date	Inspector Initials	Cover Integrity Probles Found During Inspection	Comments
January				<input type="checkbox"/> No problems found.	
				<input type="checkbox"/> See detailed Monthly Cover Monitoring form.	
February				<input type="checkbox"/> No problems found.	
				<input type="checkbox"/> See detailed Monthly Cover Monitoring form.	
March				<input type="checkbox"/> No problems found.	
				<input type="checkbox"/> See detailed Monthly Cover Monitoring form.	
April				<input type="checkbox"/> No problems found.	
				<input type="checkbox"/> See detailed Monthly Cover Monitoring form.	
May				<input type="checkbox"/> No problems found.	
				<input type="checkbox"/> See detailed Monthly Cover Monitoring form.	
June				<input type="checkbox"/> No problems found.	
				<input type="checkbox"/> See detailed Monthly Cover Monitoring form.	
July				<input type="checkbox"/> No problems found.	
				<input type="checkbox"/> See detailed Monthly Cover Monitoring form.	
August				<input type="checkbox"/> No problems found.	
				<input type="checkbox"/> See detailed Monthly Cover Monitoring form.	
September				<input type="checkbox"/> No problems found.	
				<input type="checkbox"/> See detailed Monthly Cover Monitoring form.	
October				<input type="checkbox"/> No problems found.	
				<input type="checkbox"/> See detailed Monthly Cover Monitoring form.	
November				<input type="checkbox"/> No problems found.	
				<input type="checkbox"/> See detailed Monthly Cover Monitoring form.	
December				<input type="checkbox"/> No problems found.	
				<input type="checkbox"/> See detailed Monthly Cover Monitoring form.	

The following method will be used as amended pursuant to 40 CFR §60.755(c) and (d) and is included herein as reference. Changes to the method adopted by US EPA after submittal of this plan approval will be used after those changes are published and the following will be void.

### 40 CFR 60 Appendix A, Method 21

#### METHOD 21—DETERMINATION OF VOLATILE ORGANIC COMPOUND LEAKS

##### 1.0 Scope and Application

##### 1.1 Analytes.

Analyte	CAS No.
Volatile Organic Compounds (VOC)	No CAS number assigned.

1.2 Scope. This method is applicable for the determination of VOC leaks from process equipment. These sources include, but are not limited to, valves, flanges and other connections, pumps and compressors, pressure relief devices, process drains, open-ended valves, pump and compressor seal system degassing vents, accumulator vessel vents, agitator seals, and access door seals.

1.3 Data Quality Objectives. Adherence to the requirements of this method will enhance the quality of the data obtained from air pollutant sampling methods.

##### 2.0 Summary of Method

2.1 A portable instrument is used to detect VOC leaks from individual sources. The instrument detector type is not specified, but it must meet the specifications and performance criteria contained in section 6.0. A leak definition concentration based on a reference compound is specified in each applicable regulation. This method is intended to locate and classify leaks only, and is not to be used as a direct measure of mass emission rate from individual sources.

##### 3.0 Definitions

3.1 *Calibration gas* means the VOC compound used to adjust the instrument meter reading to a known value. The calibration gas is usually the reference compound at a known concentration approximately equal to the leak definition concentration.

3.2 *Calibration precision* means the degree of agreement between measurements of the same known value, expressed as the relative percentage of the average difference between the meter readings and the known concentration to the known concentration.

3.3 *Leak definition concentration* means the local VOC concentration at the surface of a leak source that indicates that a VOC emission (leak) is present. The leak definition is an instrument meter reading based on a reference compound.

3.4 *No detectable emission* means a local VOC concentration at the surface of a leak source, adjusted for local VOC ambient concentration, that is less than 2.5 percent of the specified leak definition concentration. that indicates that a VOC emission (leak) is not present.

3.5 *Reference compound* means the VOC species selected as the instrument calibration basis for specification of the leak definition concentration. (For example, if a leak definition concentration is 10,000 ppm as methane, then any source emission that results in a local concentration that yields a meter reading of 10,000 on an instrument meter calibrated with methane would be classified as a leak. In this example, the leak definition concentration is 10,000 ppm and the reference compound is methane.)

3.6 *Response factor* means the ratio of the known concentration of a VOC compound to the observed meter reading when measured using an instrument calibrated with the reference compound specified in the applicable regulation.

3.7 *Response time* means the time interval from a step change in VOC concentration at the input of the sampling system to the time at which 90 percent of the corresponding final value is reached as displayed on the instrument readout meter.

#### 4.0 *Interferences [Reserved]*

#### 5.0 *Safety*

5.1 *Disclaimer.* This method may involve hazardous materials, operations, and equipment. This test method may not address all of the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to performing this test method.

5.2 *Hazardous Pollutants.* Several of the compounds, leaks of which may be determined by this method, may be irritating or corrosive to tissues (e.g., heptane) or may be toxic (e.g., benzene, methyl alcohol). Nearly all are fire hazards. Compounds in emissions should be determined through familiarity with the source. Appropriate precautions can be found in reference documents, such as reference No. 4 in section 16.0.

#### 6.0 *Equipment and Supplies*

A VOC monitoring instrument meeting the following specifications is required:

6.1 The VOC instrument detector shall respond to the compounds being processed. Detector types that may meet this requirement include, but are not limited to, catalytic oxidation, flame ionization, infrared absorption, and photoionization.

6.2 The instrument shall be capable of measuring the leak definition concentration specified in the regulation.

6.3 The scale of the instrument meter shall be readable to  $\pm 2.5$  percent of the specified leak definition concentration.

6.4 The instrument shall be equipped with an electrically driven pump to ensure that a sample is provided to the detector at a constant flow rate. The nominal sample flow rate, as measured at the sample probe tip, shall be 0.10 to 3.0 l/min (0.004 to 0.1 ft<sup>3</sup>/min) when the probe is fitted with a glass wool plug or filter that may be used to prevent plugging of the instrument.

6.5 The instrument shall be equipped with a probe or probe extension or sampling not to exceed 6.4 mm (  $\frac{1}{4}$  in) in outside diameter, with a single end opening for admission of sample.

6.6 The instrument shall be intrinsically safe for operation in explosive atmospheres as defined by the National Electrical Code by the National Fire Prevention Association or other applicable regulatory

code for operation in any explosive atmospheres that may be encountered in its use. The instrument shall, at a minimum, be intrinsically safe for Class 1, Division 1 conditions, and/or Class 2, Division 1 conditions, as appropriate, as defined by the example code. The instrument shall not be operated with any safety device, such as an exhaust flame arrestor, removed.

## *7.0 Reagents and Standards*

7.1 Two gas mixtures are required for instrument calibration and performance evaluation:

7.1.1 Zero Gas. Air, less than 10 parts per million by volume (ppmv) VOC.

7.1.2 Calibration Gas. For each organic species that is to be measured during individual source surveys, obtain or prepare a known standard in air at a concentration approximately equal to the applicable leak definition specified in the regulation.

7.2 Cylinder Gases. If cylinder calibration gas mixtures are used, they must be analyzed and certified by the manufacturer to be within 2 percent accuracy, and a shelf life must be specified. Cylinder standards must be either reanalyzed or replaced at the end of the specified shelf life.

7.3 Prepared Gases. Calibration gases may be prepared by the user according to any accepted gaseous preparation procedure that will yield a mixture accurate to within 2 percent. Prepared standards must be replaced each day of use unless it is demonstrated that degradation does not occur during storage.

7.4 Mixtures with non-Reference Compound Gases. Calibrations may be performed using a compound other than the reference compound. In this case, a conversion factor must be determined for the alternative compound such that the resulting meter readings during source surveys can be converted to reference compound results.

## *8.0 Sample Collection, Preservation, Storage, and Transport*

8.1 Instrument Performance Evaluation. Assemble and start up the instrument according to the manufacturer's instructions for recommended warmup period and preliminary adjustments.

8.1.1 Response Factor. A response factor must be determined for each compound that is to be measured, either by testing or from reference sources. The response factor tests are required before placing the analyzer into service, but do not have to be repeated at subsequent intervals.

8.1.1.1 Calibrate the instrument with the reference compound as specified in the applicable regulation. Introduce the calibration gas mixture to the analyzer and record the observed meter reading. Introduce zero gas until a stable reading is obtained. Make a total of three measurements by alternating between the calibration gas and zero gas. Calculate the response factor for each repetition and the average response factor.

8.1.1.2 The instrument response factors for each of the individual VOC to be measured shall be less than 10 unless otherwise specified in the applicable regulation. When no instrument is available that meets this specification when calibrated with the reference VOC specified in the applicable regulation, the available instrument may be calibrated with one of the VOC to be measured, or any other VOC, so long as the instrument then has a response factor of less than 10 for each of the individual VOC to be measured.

8.1.1.3 Alternatively, if response factors have been published for the compounds of interest for the instrument or detector type, the response factor determination is not required, and existing results may be

referenced. Examples of published response factors for flame ionization and catalytic oxidation detectors are included in References 1-3 of section 17.0.

8.1.2 Calibration Precision. The calibration precision test must be completed prior to placing the analyzer into service and at subsequent 3-month intervals or at the next use, whichever is later.

8.1.2.1 Make a total of three measurements by alternately using zero gas and the specified calibration gas. Record the meter readings. Calculate the average algebraic difference between the meter readings and the known value. Divide this average difference by the known calibration value and multiply by 100 to express the resulting calibration precision as a percentage.

8.1.2.2 The calibration precision shall be equal to or less than 10 percent of the calibration gas value.

8.1.3 Response Time. The response time test is required before placing the instrument into service. If a modification to the sample pumping system or flow configuration is made that would change the response time, a new test is required before further use.

8.1.3.1 Introduce zero gas into the instrument sample probe. When the meter reading has stabilized, switch quickly to the specified calibration gas. After switching, measure the time required to attain 90 percent of the final stable reading. Perform this test sequence three times and record the results. Calculate the average response time.

8.1.3.2 The instrument response time shall be equal to or less than 30 seconds. The instrument pump, dilution probe (if any), sample probe, and probe filter that will be used during testing shall all be in place during the response time determination.

8.2 Instrument Calibration. Calibrate the VOC monitoring instrument according to section 10.0.

8.3 Individual Source Surveys.

8.3.1 Type I—Leak Definition Based on Concentration. Place the probe inlet at the surface of the component interface where leakage could occur. Move the probe along the interface periphery while observing the instrument readout. If an increased meter reading is observed, slowly sample the interface where leakage is indicated until the maximum meter reading is obtained. Leave the probe inlet at this maximum reading location for approximately two times the instrument response time. If the maximum observed meter reading is greater than the leak definition in the applicable regulation, record and report the results as specified in the regulation reporting requirements. Examples of the application of this general technique to specific equipment types are:

8.3.1.1 Valves. The most common source of leaks from valves is the seal between the stem and housing. Place the probe at the interface where the stem exits the packing gland and sample the stem circumference. Also, place the probe at the interface of the packing gland take-up flange seat and sample the periphery. In addition, survey valve housings of multipart assembly at the surface of all interfaces where a leak could occur.

8.3.1.2 Flanges and Other Connections. For welded flanges, place the probe at the outer edge of the flange-gasket interface and sample the circumference of the flange. Sample other types of nonpermanent joints (such as threaded connections) with a similar traverse.

8.3.1.3 Pumps and Compressors. Conduct a circumferential traverse at the outer surface of the pump or compressor shaft and seal interface. If the source is a rotating shaft, position the probe inlet within 1 cm of the shaft-seal interface for the survey. If the housing configuration prevents a complete

traverse of the shaft periphery, sample all accessible portions. Sample all other joints on the pump or compressor housing where leakage could occur.

8.3.1.4 Pressure Relief Devices. The configuration of most pressure relief devices prevents sampling at the sealing seat interface. For those devices equipped with an enclosed extension, or horn, place the probe inlet at approximately the center of the exhaust area to the atmosphere.

8.3.1.5 Process Drains. For open drains, place the probe inlet at approximately the center of the area open to the atmosphere. For covered drains, place the probe at the surface of the cover interface and conduct a peripheral traverse.

8.3.1.6 Open-ended Lines or Valves. Place the probe inlet at approximately the center of the opening to the atmosphere.

8.3.1.7 Seal System Degassing Vents and Accumulator Vents. Place the probe inlet at approximately the center of the opening to the atmosphere.

8.3.1.8 Access door seals. Place the probe inlet at the surface of the door seal interface and conduct a peripheral traverse.

8.3.2 Type II—"No Detectable Emission". Determine the local ambient VOC concentration around the source by moving the probe randomly upwind and downwind at a distance of one to two meters from the source. If an interference exists with this determination due to a nearby emission or leak, the local ambient concentration may be determined at distances closer to the source, but in no case shall the distance be less than 25 centimeters. Then move the probe inlet to the surface of the source and determine the concentration as outlined in section 8.3.1. The difference between these concentrations determines whether there are no detectable emissions. Record and report the results as specified by the regulation. For those cases where the regulation requires a specific device installation, or that specified vents be ducted or piped to a control device, the existence of these conditions shall be visually confirmed. When the regulation also requires that no detectable emissions exist, visual observations and sampling surveys are required. Examples of this technique are:

8.3.2.1 Pump or Compressor Seals. If applicable, determine the type of shaft seal. Perform a survey of the local area ambient VOC concentration and determine if detectable emissions exist as described in section 8.3.2.

8.3.2.2 Seal System Degassing Vents, Accumulator Vessel Vents, Pressure Relief Devices. If applicable, observe whether or not the applicable ducting or piping exists. Also, determine if any sources exist in the ducting or piping where emissions could occur upstream of the control device. If the required ducting or piping exists and there are no sources where the emissions could be vented to the atmosphere upstream of the control device, then it is presumed that no detectable emissions are present. If there are sources in the ducting or piping where emissions could be vented or sources where leaks could occur, the sampling surveys described in section 8.3.2 shall be used to determine if detectable emissions exist.

### 8.3.3 Alternative Screening Procedure.

8.3.3.1 A screening procedure based on the formation of bubbles in a soap solution that is sprayed on a potential leak source may be used for those sources that do not have continuously moving parts, that do not have surface temperatures greater than the boiling point or less than the freezing point of the soap solution, that do not have open areas to the atmosphere that the soap solution cannot bridge, or that do not exhibit evidence of liquid leakage. Sources that have these conditions present must be surveyed using the instrument technique of section 8.3.1 or 8.3.2.

8.3.3.2 Spray a soap solution over all potential leak sources. The soap solution may be a commercially available leak detection solution or may be prepared using concentrated detergent and water. A pressure sprayer or squeeze bottle may be used to dispense the solution. Observe the potential leak sites to determine if any bubbles are formed. If no bubbles are observed, the source is presumed to have no detectable emissions or leaks as applicable. If any bubbles are observed, the instrument techniques of section 8.3.1 or 8.3.2 shall be used to determine if a leak exists, or if the source has detectable emissions, as applicable.

### 9.0 Quality Control

Section	Quality control measure	Effect
8.1.2	Instrument calibration precision check	Ensure precision and accuracy, respectively, of instrument response to standard.
10.0	Instrument calibration	

### 10.0 Calibration and Standardization

10.1 Calibrate the VOC monitoring instrument as follows. After the appropriate warmup period and zero internal calibration procedure, introduce the calibration gas into the instrument sample probe. Adjust the instrument meter readout to correspond to the calibration gas value.

NOTE: If the meter readout cannot be adjusted to the proper value, a malfunction of the analyzer is indicated and corrective actions are necessary before use.

### 11.0 Analytical Procedures [Reserved]

### 12.0 Data Analyses and Calculations [Reserved]

### 13.0 Method Performance [Reserved]

### 14.0 Pollution Prevention [Reserved]

### 15.0 Waste Management [Reserved]

### 16.0 References

1. Dubose, D.A., and G.E. Harris. Response Factors of VOC Analyzers at a Meter Reading of 10,000 ppmv for Selected Organic Compounds. U.S. Environmental Protection Agency, Research Triangle Park, NC. Publication No. EPA 600/2-81051. September 1981.

2. Brown, G.E., *et al.* Response Factors of VOC Analyzers Calibrated with Methane for Selected Organic Compounds. U.S. Environmental Protection Agency, Research Triangle Park, NC. Publication No. EPA 600/2-81-022. May 1981.

3. DuBose, D.A. *et al.* Response of Portable VOC Analyzers to Chemical Mixtures. U.S. Environmental Protection Agency, Research Triangle Park, NC. Publication No. EPA 600/2-81-110. September 1981.

4. Handbook of Hazardous Materials: Fire, Safety, Health. Alliance of American Insurers. Schaumburg, IL. 1983.

### 17.0 Tables, Diagrams, Flowcharts, and Validation Data [Reserved]

**APPENDIX D**

**NSPS APPLICABILITY DETERMINATION LETTERS INDEX**

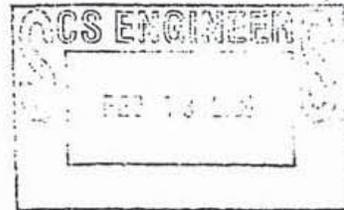
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

FEB 09 2005



4APT-ATMB

L. T. Kozlov, P.E.  
Program Administrator  
Air Resources Management  
Central District  
Florida Department of Environmental Protection  
3319 Maguire Boulevard, Suite 232  
Orlando, Florida 32803-3767

Dear Mr. Kozlov:

The purpose of this letter is to provide you with a written determination regarding proposed changes to the standard operating procedures for landfill gas extraction wells at the Orange County Solid Waste Management Facility. This landfill is subject to 40 CFR Part 60, Subpart WWW (Standards of Performance for Municipal Solid Waste Landfills), and in a request sent to the U.S. Environmental Protection Agency (EPA) Region 4 and to your agency, Orange County proposed changes in standard operating procedures for certain wells in the landfill's active gas collection system. These changes involve an alternative to decommissioning wells where low landfill gas generation rates make it difficult to simultaneously operate wellheads at negative pressure and maintain compliance with oxygen concentration limits. Based upon our review, the changes proposed by Orange County are acceptable. Details regarding the County's proposal and the basis for our conclusions are provided in the remainder of this letter.

Operating requirements for gas collection and control systems (GCCS) are promulgated at 40 CFR §60.753(b), (c), and (d). Under these provisions, wellheads must be operated under negative pressure, the temperature of interior wellheads must be less than 55 °C, gas quality limits for interior wells (either less than 20 percent nitrogen or less than five percent oxygen) must be met, and the methane concentration at the surface of the landfill must be less than 500 parts per million (ppm). Under provisions in 40 CFR §60.755, monitoring to verify compliance with the wellhead pressure, temperature, and gas quality limits must be conducted on a monthly basis. Monitoring to verify compliance with the 500 ppm surface methane concentration limit must be conducted on a quarterly basis.

Orange County's request for approval of changes to its standard operating procedures involves wells where gas flow rates are so low that applying even minimal vacuum results in air infiltration that causes exceedances of the applicable oxygen concentration limit. Shutting such wells down will prevent the air filtration that leads to the oxygen exceedances, but shutting a well down is likely to cause positive pressure in the wellhead as landfill gas builds up. Therefore, simultaneously complying with both

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the negative pressure and oxygen concentration limits in 40 CFR §60.753 can be difficult for wells where gas flow rates have declined over time.

Under provisions in 40 CFR §60.753(b)(3), wells that experience positive pressure after being shutdown to accommodate declining landfill gas flow rates can be decommissioned if permission is granted by the Administrator. As an alternative to decommissioning wells under the provisions, Orange County has proposed to make the following changes to its standard operating procedure for wells where persistent oxygen exceedances are not the result of operations and/or maintenance issues:

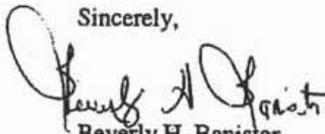
1. Wells where oxygen concentrations do not decline to acceptable levels after more than one hour of reduced vacuum will be shut off until the gas quality recovers.
2. The monthly monitoring required by 40 CFR §60.755 will be conducted for wells that have been shutdown, but positive pressure or elevated oxygen concentrations will not be considered exceedances of the operating limits in 40 CFR §60.753.
3. If monthly monitoring indicates that pressure has built up in the well and the oxygen concentration still exceeds five percent, the well will be opened to relieve the pressure and will be shutdown until it is monitored the following month.
4. If the monthly monitoring indicates that gas quality has improved (i.e., the oxygen concentration has dropped below five percent), the well will be brought back on line until the gas quality declines again.
5. The quarterly methane surface concentration monitoring required under 40 CFR §60.755 will be conducted for wells that have been shutdown. Standard remediation steps, including evaluating the need to return wells to full-time service, will be followed if exceedances of the 500 ppm methane surface concentration limit are detected.

According to Mr. Daniel Morical of Orange County Utilities, the operating procedure changes outlined above would apply to approximately four or five of the 130 wells at its landfill at any one time. Mr. Morical also indicated that there is a high probability of gas quality improving to the point it would be necessary to restart wells that had been shutdown. Based upon our review, the proposed changes to Orange County's standard operating procedures are acceptable because shutting down nonproductive wells, instead of decommissioning them, has the potential to lower overall nonmethane organic compound (NMOC) emissions at the landfill. This potential increase in NMOC control system efficiency stems from the ability to quickly resume gas collection if there are improvements in the gas quality or increases in the gas production rate in an area of the landfill where wells have become nonproductive. If wells in a nonproductive area are decommissioned, instead of merely being shutdown, NMOC

emissions would not be controlled between the time an exceedance is identified and a new well is installed. One condition for approval of the proposed changes in standard operating procedures at the Orange County Solid Waste Management Facility is that facility diagrams must be updated to indicate which wells have been shutdown because landfill gas production rates are too low to permit continuous extraction.

If you have any questions about the determination provided in this letter, please contact Mr. David McNeal of the EPA Region 4 staff at (404) 562-9102.

Sincerely,



Beverly H. Banister  
Director  
Air, Pesticides and Toxics  
Management Division

cc: Daniel Morical  
Orange County Utilities – Solid Waste Division  
5901 Young Pine Road  
Orlando, Florida 32829

## SCS ENGINEERS

November 9, 2004  
File No. 09199036.17

Mr. Dan Morrical, P.E.  
Orange County Solid Waste Division  
5901 Young Pine Road  
Orlando, Florida 32829

Subject: Addendum to the Gas Collection and Control System Design Plan  
Standard Operating Procedure for Landfill Gas Extraction Wells  
Orange County Solid Waste Management Facility, Orange County, Florida  
FDEP Permit No. 0950113-002-AV

Dear Dan:

SCS Engineers (SCS) is providing you this letter for your use in petitioning the United States Environmental Protection Agency (U.S. EPA) to amend the landfill gas collection and control system (GCCS) design plan for the Orange County Solid Waste Management Facility. A similar letter was previously sent to Orange County on December 30, 2003, which was subsequently forwarded to the Florida Department of Environmental Protection (FDEP) Central District office. FDEP recently stated that they did not have the regulatory authority to approve the proposed actions included in this request, and recommended that the County forward the following proposed standard operating procedures to U.S. EPA for their approval.

As you know, in accordance with the New Source Performance Standards (NSPS) for municipal solid waste landfills, Orange County is required to operate each landfill gas (LFG) extraction well in compliance with certain criteria. Per Title 40 of the Code of Federal Regulations (CFR) Part 60.753(b), (c), and (d), Orange County is required to:

- Operate the collection system with negative pressure at each wellhead except under certain conditions such as increased well temperature, when a geomembrane cap is installed and an acceptable pressure limit is specified in the GCCS design plan, or when a landfill fire is present.
- Operate each wellhead with a LFG temperature less than 55 degrees Celsius (131 degrees Fahrenheit) and either a nitrogen level less than 20 percent or an oxygen concentration less than 5 percent by volume.
- Operate the GCCS so that the methane concentration at the surface of the landfill is less than 500 parts per million by volume (ppmv).

The first and third criteria listed above were included in the NSPS by the U.S. EPA in order to require landfill owners/operators to minimize fugitive emissions of LFG to the atmosphere. The second criterion, which is related to oxygen and nitrogen concentration in the gas at each well, is based on historical LFG industry operations and maintenance guidelines aimed at



Mr. Dan Morrical, P.E.  
November 9, 2004  
Page 2

reducing the potential for landfill fires or negatively affecting microbes involved in the anaerobic decomposition of the waste. High oxygen concentrations can occur due to operating the wellfield too aggressively, resulting in the infiltration of ambient air through the cover soils. If the oxygen concentration within a landfill exceeds five percent by volume, the possibility of a landfill fire is greatly enhanced. Note that because most field instruments measure oxygen, and not nitrogen, the method of compliance typically is based on a five percent oxygen concentration, rather than the 20 percent nitrogen requirement at each wellhead.

Unfortunately, the Rule does not provide guidance on how to address an individual criterion when it has the potential to conflict with one of the other criteria. For example, in some situations it may not be possible to maintain compliance with both the vacuum and gas quality requirements of the NSPS. This may be true in the case of a low or diminishing LFG generation rate, when the application of even a small vacuum (i.e., 0.1 to 0.5 inches of water column (in-w.c.)) to a well or collector may cause the oxygen concentration to exceed the NSPS limit of five percent. This typically occurs because LFG is not being generated at a sufficient rate to allow for continuous extraction by the GCCS.

If the LFG generation rate is so low, applying vacuum typically will only worsen the gas quality (i.e., increase the oxygen content), resulting in continued oxygen exceedances. One approach to remedying this situation is to shut down the well for a period of time until gas quality improves and the oxygen concentration declines to below five percent. Once the oxygen concentration is below this level, the well can be reopened and LFG extraction resumed. However, because this approach requires a non-negative pressure at the wellhead, this technique is not compliant with the NSPS.

Therefore, if gas quality cannot be maintained, the only alternative allowed by the NSPS is to decommission the well, provided there are no exceedances of the surface emissions monitoring limit. While such wells could be decommissioned, SCS feels it would be better to leave them in place in case future conditions render them necessary.

#### **PROPOSED STANDARD OPERATING PROCEDURE**

SCS proposes to establish the following standard operating procedure for wells at which poor gas quality is consistently recorded despite the application of minimal vacuum (i.e., less than 0.5 in-w.c.). This standard operating procedure is proposed as an addendum to the existing GCCS design plans for the site. It is not intended for wells at which normal wellfield tuning, maintenance, or repair activities can remediate the exceedances.

For wells at which oxygen exceedances are persistent and not the result of operations and/or maintenance issues, the wellhead valve will be adjusted to minimize vacuum. If after more than one hour of decreased vacuum the oxygen concentration does not decline to allowable levels, the wellhead will be shut off until the gas quality recovers. The well will continue to be monitored on a monthly basis, and the wellhead valve opened to purge any accumulated gas

Mr. Dan Morrical, P.E.  
November 9, 2004  
Page 3

and relieve any pressure that may have developed. If, during the routine monthly monitoring, the oxygen concentration is below five percent, the well will be brought back on line until the gas quality again declines.

Gas concentration and pressure will continue to be monitored and recorded during the months in which the wells are shut off. However, a zero pressure or high oxygen concentration will not be considered an exceedance of the wellhead operating criteria included in 40 CFR 60.753(b) and (c), and remedial actions including rechecks will not be required. If a positive pressure is recorded, the well will be reopened to relieve any pressure and to purge the accumulated gas from the well. If the gas quality has improved, the well will be opened and returned to service. However, if high oxygen concentrations are still present in the well, after purging the well and removing any positive pressure, the wellhead valve will again be closed and the well will not be monitored until the next round of monthly monitoring. Quarterly surface emissions monitoring will continue to be used to demonstrate the effective capture and control of LFG from the landfill. In the case of exceedance of the 500-ppmv surface emissions monitoring limit, standard remediation steps will be conducted, including evaluating the need for returning the well to full-time service.

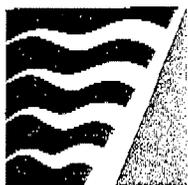
Note that wells under this standard operating procedure will not be physically disconnected from the GCCS, which will allow the County to quickly return the wells to service if the need arises. In the future, if wells are to be permanently decommissioned, the County will submit a formal notice of well decommissioning to FDEP.

Please forward this proposed standard operating procedure/addendum to the GCCS design plan to the U.S. EPA at the following address:

Air Resources Management  
United States Environmental Protection Agency, Region  
Atlanta Federal Center  
61 Forsyth Street, SW  
Atlanta, Georgia 30303-3104

Please copy the FDEP Central District office at the following address:

Air Resources Management  
Florida Department of Environmental Protection  
3319 Maguire Boulevard, Suite 232  
Orlando, Florida 32803-3767



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May 31, 2007

**Kirby Canyon Landfill**  
**P O Box 1870**  
**Morgan Hill, CA 95037**

Attention: **Joe Morse**

Application Number: **15617**  
Plant Number: **1812**  
Equipment Location: **910 Coyote Creek Glf Dr**  
**Morgan Hill, CA 95037**

ALAMEDA COUNTY  
Tom Bates  
Scott Haggerty  
Janet Lockhart  
Nate Miley

CONTRA COSTA COUNTY  
John Gioia  
Mark Ross  
(Chair)  
Michael Shimansky  
Gayle B. Uilkema

MARIN COUNTY  
Herold C. Brown, Jr.

NAPA COUNTY  
Brad Wagenknecht

SAN FRANCISCO COUNTY  
Chris Daly  
Jake McGoldrick  
Gavin Newsom

SAN MATEO COUNTY  
Jerry Hill  
(Vice-Chair)  
Carol Klatt

SANTA CLARA COUNTY  
Erin Garner  
Yoriko Kishimoto  
Liz Kniss  
Patrick Kwok

SOLANO COUNTY  
John F. Silva

SONOMA COUNTY  
Tim Smith  
Pamela Torliatt  
(Secretary)

Jack P. Broadbent  
EXECUTIVE OFFICER/APCO

Dear Applicant:

This is your Authority to Construct the following:

**A-12 Landfill Gas Flare with Condensate Injection System, 5 gallons per minute maximum condensate injection rate, 149 MMBtu/hr**

The equipment described above is subject to condition no. 1437.

**Notification**

**Please contact your assigned Permit Engineer, listed in the correspondence section of this letter, in writing, (by letter, fax, or email) at least three days before the initial operation of the equipment so that we may observe the equipment in operation and verify conformance with the Authority to Construct. Operation includes any start-up of the source for testing or other purposes. Operation of equipment without notification to the District may result in enforcement action. Do not send start-up notifications to the Air Pollution Control Officer.**

**Start-up Period**

After receipt of the start-up letter required above, this Authority to Construct authorizes operation during the start-up period from the date of initial operation noted in your start-up letter until the Permit to Operate is issued, up to a maximum of 90 days. All conditions (specific or implied) of the Authority to Construct are in effect during the start-up period.

**Fees**

District Regulation 3 requires a fee for each new Permit to Operate. You will be invoiced upon receipt of your start-up letter. No permits will be issued until all outstanding fees are paid.

**Implied Conditions**

In the absence of specific permit conditions to the contrary, the throughputs, fuel and material consumption, capacities, and hours of operation described in your permit application will be considered maximum allowable limits. A new permit will be required before any increase in these parameters, or change in raw material handled, may be made.

**Expiration**

In accordance with Regulation 2-1-407, this Authority to Construct expires two years from the date of issuance unless the authority to construct has been renewed.

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**Trade Secret**

Unless you have already designated specifically identified materials in your permit application as trade secret, under the California Public Records Act, all data in your permit application, the permit itself and all permit conditions will be considered a matter of public record and may be disclosed to a third party. Please contact your permit reviewer immediately if you wish to amend your permit application submittals or to designate certain permit conditions as trade secret. Unless we hear from you within ten (10) calendar days of this letter, except for materials which have been previously designated as trade secret, you shall be deemed to have waived any claim of trade secret with respect to all materials in the District's files relating to this permit application.

**Right of Entry**

The Air Pollution Control Officer of the Bay Area Air Quality Management District, the Chairman of the California Air Resources Board, the Regional Administrator of the Environmental Protection Agency, and/or their designees, upon presentation of credentials, shall be granted the right of entry to any premises on which an air pollution source is located for the purposes of:

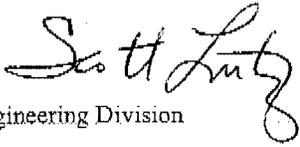
- A. The inspection of the source
- B. The sampling of materials used at the source
- C. The conduct of an emissions source test
- D. The inspection of any records required by District rule or permit condition.

**Correspondence**

Please include you application number with any correspondence with the District. The District's regulations may be viewed online at [www.baaqmd.gov](http://www.baaqmd.gov) If you have any questions on this matter, please call **Tamiko D Endow, Air Quality Engineer II** at (415) 749-4939. Startup information may be faxed to the **Engineering Division** at 415-749-5030.

Very truly yours,

Jack P. Broadbent  
Executive Officer/APCO

by   
Engineering Division

SBL:TDE: ryr



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MANAGEMENT  
DISTRICT  
SINCE 1955

any dust suppressant applications. The dates and description of all paved roadway cleaning activities. All records shall be summarized monthly.

- f. The initial operation date for each new landfill gas well and collector.
- g. An accurate map of the landfill that indicates the locations of all refuse boundaries and the locations of all wells and collectors (using unique identifiers) that are required to be operating continuously pursuant to part 6a. Any areas containing only non-decomposable waste shall be clearly identified. This map shall be updated at least once a year to indicate changes in refuse boundaries and to include any newly installed wells and collectors.
- h. The operating times and the landfill gas flow rate to the Landfill Gas Flare recorded on a daily basis. A monthly summary of the heat input to the Landfill Gas Flare pursuant to part 8 shall be calculated and recorded.
- i. Continuous records of the combustion zone temperature for the Landfill Gas Flare during all hours of operation.
- j. Records of all test dates and test results performed to maintain compliance with parts 12 and 13 above or any applicable rule or regulation.
- k. Records of landfill gas condensate injection throughput and the duration of the injection recorded daily.

All records shall be maintained on site or shall be made readily available to District staff upon request for at least 5 years from the date of entry. These recordkeeping requirements do not replace the recordkeeping requirements contained in any applicable rules or regulations. (basis: Cumulative Increase, 2-1-301, 2-6-501, 6-301, 6-305, 8-2-301, 8-34-301, 8-34-304, 8-34-501, and 9-1-302)

- 16. The annual report required by BAAQMD Regulation 8-34-411 shall be submitted in two semi-annual increments. The reporting period for the first increment of the Regulation 8-34-411 annual report that is submitted subsequent to the issuance of the MFR Permit for this site shall be from December 1, 2002 through August 31, 2003. This first increment report shall be submitted by September 30, 2003. The reporting periods and report submittal due dates for all subsequent increments of the Regulation 8-34-411 report shall be synchronized with the reporting periods and report submittal due dates for the semi-annual MFR Permit monitoring reports that are required by Section I.F. of the MFR Permit for this site. (basis: Regulation 8-34-411 and 40 CFR Part 63.1980(a))
- 17. The gas collection system operating requirements listed below shall replace the well head requirements identified in Regulation 3-4-305.2 through 8-34-305.4 for the specified wells and collectors. All wells and

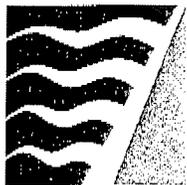
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collectors remain subject to the Regulation 8-34-305.1 requirement to maintain vacuum at each well head.

- a. The Regulation 8-34-305.2 temperature limit shall not apply to the Wells 36, 37, 41, 42, 51, and 52, provided that the landfill gas temperature at each of the wells 36, 37, 41, 42, 51, and 52 does not exceed 145 degrees F (63 degrees C).
- b. The owner/operator shall demonstrate compliance with the alternative wellhead landfill gas temperature limit in 17(a) above by monitoring the temperature of each wellhead on a monthly basis, in accordance with Regulation 8-34-505.
- c. All records to demonstrate compliance with Part 17(a) and all applicable sections of BAAQMD Regulation 8, Rule 34 shall be recorded in a District-approved log and made available to District staff upon request in accordance with Regulation 8-34-501.4, 501.9, and 414.
- d. If the temperatures measured at any of the Part 17(a) wells are found to exceed the temperature limit in Part 17(a), the owner/operator shall take all measures necessary to investigate the possibility of subsurface fires, including landfill gas testing for carbon monoxide (CO) on those landfill gas collection wells in Part 17(a) that exceed the operating temperature limit. If a fire is suspected, the owner/operator shall employ all means as appropriate to extinguish the fire, repair the well(s), and bring the well(s) back into service (basis: Regulation 8-34-301.2, 8-34-303, and 8-34-305, 40 CFR Part 60.755(a) and 60.759)

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
GREAT LAKES NATIONAL PROGRAM OFFICE  
77 WEST JACKSON BOULEVARD  
CHICAGO, IL 60604-3590

APR 26 2004

R-19J

Timothy M. Tilotti  
Vice President  
Wayne Disposal, Inc.  
49350 North I-94 Service Drive  
Belleville, Michigan 48111

Dear Mr. Tilotti:

The United States Environmental Protection Agency (U.S. EPA) has reviewed Wayne Disposal Inc.'s (WDI) revised Final Control Plan (FCP) submitted on February 4, 2004, for its municipal solid waste landfill in Belleville, Michigan. By means of this letter, U.S. EPA fully approves the revised FCP. The approved FCP is enclosed herewith. An earlier FCP submission, which was originally submitted pursuant to the Federal Plan for Municipal Solid Waste Landfills, at 40 C.F.R. Part 62, Subpart GGG, was partially approved on January 7, 2002. That FCP submission described WDI's plan for upgrading its active gas collection and control system (GCCS) at its Site #2. When WDI submitted its FCP for approval by U.S. EPA, it included a request for alternative monitoring, recordkeeping and reporting procedures.

In subsequent exchanges of information, numerous issues were raised and resolved. Your most recent FCP submission addresses these issues, as discussed in Enclosure 1. We reviewed your FCP to assure that it meets the criteria set forth at 40 C.F.R. §§ 60.759 and 60.752(b)(2)(ii)(A) and (B) for active and passive gas collection systems. We also include a discussion of U.S. EPA's partial approval of WDI's requests for alternative monitoring, recordkeeping and reporting procedures in Enclosure 2.

If you have any questions, feel free to contact Jeffrey Gahris, of my staff, at (312) 886-6794.

Very truly yours,

  
Bharat Mathur  
Acting Regional Administrator

2

cc: Dennis M. Drake, Division Chief  
Air Quality Division  
Michigan Department of Environmental Quality

Gerald Avery, Field Operations Supervisor  
Air Quality Division  
Michigan Department of Environmental Quality

Enclosures (2)

ENCLOSURE 1

WAYNE DISPOSAL INC.'S FINAL CONTROL PLAN FOR FONS, OLD WAYNE,  
WAYNE SITE #1, WAYNE SITE #2 APPROVED PURSUANT TO  
THE FEDERAL PLAN FOR MUNICIPAL SOLID WASTE LANDFILLS  
SUBMITTED FEBRUARY 4, 2004

ENCLOSURE 2

U.S. EPA REVIEW AND APPROVAL OF WAYNE DISPOSAL INC.'S FINAL  
CONTROL PLAN FOR FONS, OLD WAYNE, WAYNE SITE #1, WAYNE SITE #2  
AND REQUESTS FOR ALTERNATIVE MONITORING, RECORDKEEPING AND  
REPORTING PROCEDURES

The United States Environmental Protection Agency (U.S. EPA) has reviewed the revised Final Control Plan (FCP) for Wayne Disposal Inc.'s (WDI) municipal solid waste landfill in Belleville, Michigan, submitted by WDI in February 2004. U.S. EPA fully approves the FCP for four contiguous sites - Fons, Old Wayne, Wayne Site #1 and Wayne Site #2 - as meeting the Federal Plan requirements at 40 C.F.R. §§ 62.14353 and 60.752(b)(2).

U.S. EPA partially approved WDI's original FCP submission, which addressed Wayne Site #2 only, on January 7, 2002. Earth Tech, on behalf of WDI, submitted in October 2003 a revised FCP pursuant to the Federal Plan for Municipal Solid Waste Landfills, at 40 C.F.R. Part 62, Subpart GGG. The revised FCP included a passive gas collection and control system for Fons, Old Wayne, and Wayne Site #1. The revision also contained requests for alternative operational standards, monitoring, recordkeeping, and reporting procedures.

Plan approval issues:

1. In its October 2003 FCP submission, WDI requested that U.S. EPA approve a higher operational limit greater than 500 ppm for surface emissions, based on surface scan data, for Fons, Old Wayne and Wayne Site #1. U.S. EPA does not believe it is necessary to approve a higher operational standard. WDI has made representations that the submitted FCP is adequate. Although retrofitting sites with a passive gas collection and control system (GCCS) may not be as manageable as installing an active system, the available data does not show widespread exceedances of the 500 ppm operational standard. Accordingly, U.S. EPA will not relax the 300 ppm standard for these sites. If future surface monitoring following the procedures at 40 C.F.R. § 60.755(c) should show exceedances, WDI has a number of reasonable steps it can take to address the exceedances. These steps include, but are not limited to, the installation of additional passive wells, a reconfiguration of existing flare locations, the use of biologically active mulch, and clay cap improvements, where appropriate. U.S. EPA also expects WDI to conduct appropriate maintenance of the cover systems.
2. The appended FCP includes a schedule for installing the passive flare system, consisting of 18 passive flares for Fons, Old Wayne, and Wayne Site #1. At the time of its FCP submission, WDI anticipated installation by March 15, 2004. It is U.S. EPA's understanding that these flares are fully installed at this time.

3. In its October 2003 FCP submission, WDI also proposed to limit its financial liability for controlling gas emissions from the older sites. Specifically, WDI requested that we consider a limit to the capital expenditures for adjusting the passive system in response to any exceedances of the 500 ppm operational standard. The initial installation cost is \$75,000 to install the vent flare system. WDI proposed to limit the total costs for controlling the older sites to \$140,400. This is equivalent to about \$1400 per Megagram (Mg) of non-methane organic compounds (NMOC) controlled, which is the level of unit costs associated with Site #2 control improvements. This is higher than the NSPS level of \$1200/Mg, which is the level U.S. EPA used for setting NSPS standards. Regardless of the merits of this argument, U.S. EPA will not consider the issue at this time since it involves speculation about the potential for future exceedances. Again, we do not believe there is a need for WDI to spend unreasonable amount of funds to maintain compliance using a passive flare system. In its final FCP submission, WDI accepted U.S. EPA's position on this matter, and indicated its intent to request U.S. EPA's reconsideration of its position at a future date should WDI encounter compliance issues with the passive flare system.
4. The Federal Plan requires performance testing for the passive flares, according to the procedures at 40 C.F.R. § 60.18. WDI had proposed to conduct Method 22 testing at only one passive flare for each landfill site. Since U.S. EPA stated it cannot approve this test waiver, WDI has agreed to test all of the operational passive flares.
5. WDI proposed passive flares for all of the vents, including those that appear to have little or no gas venting. WDI also proposed to operate each flare for at least one year. At the end of each year, WDI will review data logger information. If the flares are operating less than 20 percent of the time due to the lack of landfill gas, WDI will retire the flare. For any given site (Fons, Old Wayne, or Wayne Site #1), WDI may discontinue surface monitoring required by 40 C.F.R. § 60.755(c) when the site is determined to be nonproductive. A nonproductive site is one in which the NMOC generation is determined to be less than one percent of the total for the WDI landfill sites as a whole, as provided by 40 C.F.R. § 60.759(a)(3)(ii), or the flares throughout any of the sites named above have become nonproductive, and subsequently removed because they meet the criteria for flare retirement.

6. The appended FCP also describes WDI's work undertaken to upgrade its active GCCS at Wayne Site #2. WDI has completed this work with the exception of Master Cell #5. In this master cell, 37 gas extraction wells are in place now. The well heads are underground, making them inaccessible for monitoring. WDI plans to replace these wells. Because of ongoing "piggy-back" hazardous waste cell construction occurring vertically above Master Cell #5, the existing wells will be phased out and new horizontal wells installed. WDI's request to conduct monitoring at a common header location is approvable pending installation of the new horizontal wells. In its FCP, WDI agreed to submit final design drawings when they become available.

Requests for alternative monitoring, recordkeeping, and reporting requirements:

When WDI first submitted its FCP for approval by U.S. EPA on April 3, 2001, it included proposed alternative monitoring, recordkeeping and reporting procedures for Wayne Site #2. U.S. EPA had only partially approved the FCP on January 7, 2002. Proposed alternative monitoring for all of the sites, not previously addressed by U.S. EPA, are discussed below:

1. U.S. EPA agrees that the flare systems proposed for the passive GCCS meet the requirements of 40 C.F.R. §§ 60.758(b)(4) and 60.758(c)(4) with the installation of a thermocouple and pressure transmitter, with a data logger to record the presence of a flame and gas pressure.
2. U.S. EPA conditionally approved WDI's request to reduce surface monitoring from 30-meter intervals to 60-meter intervals on January 7, 2002. U.S. EPA finds it acceptable to widen the 30-meter spacing required for surface monitoring in areas to 60 meters, but only after data is collected to show that such widening is appropriate. If three consecutive monitoring events show no exceedances, WDI may adopt 60-meter spacing. This approval will be extended to Fons, Old Wayne, and Wayne Site #2 once data is provided to U.S. EPA.
3. WDI proposes that it treat each "master cell" at Wayne Site #2 as an individual landfill for purposes of skipping from quarterly to annual monitoring of operational standards for closed landfills, per 40 C.F.R. § 60.756(f). WDI argued each cell is a distinct landfill. U.S. EPA agrees that Fons, Old Wayne, Wayne Site #1 and Wayne Site #2 are separate landfills, only for the purposes of complying with

40 C.F.R. § 60.756(f), but will not approve the request for master cells within Wayne Site #2. U.S. EPA believes that the individual cells within Wayne Site #2, since they are interconnected by an active GCCS, function as one landfill.

4. On October 23, 2003, U.S. EPA formally approved WDI's use of a vortex shedding meter for measuring gas flow into the internal combustion engines.
5. 40 C.F.R. § 60.758(c)(1)(i) requires combustion temperatures be maintained at more than 28°C below the level established during stack testing for the internal combustion engines. U.S. EPA agreed in its January 7, 2002 letter that exhaust manifold temperatures may be recorded during performance testing, since it is physically impossible to measure temperatures in the combustion zone. WDI must keep records of monitoring data for 3-hour periods to assure ongoing compliance with the value established during the testing. This request is approved.
6. According to 40 C.F.R. § 60.752(b)(2)(v), three removal criteria must be met in order for a landfill owner or operator to cap or remove an installed GCCS:

(A) the landfill is no longer accepting waste and meets closure criteria at 40 C.F.R. § 258.60,

(B) the landfill operated the GCCS for at least 15 years, and can produce an initial performance test that demonstrates the 15-year period has expired, and

(C) the landfill emits less than 50 Mg/year NMOC (calculated) on three successive test dates.

WDI proposed that for purposes of complying with 40 C.F.R. § 60.755(c)(4)(ii), the 15-year minimum period for operating the GCCS should begin retroactively in 1985.

In order for the 15-year operating period to commence prior to October 6, 2002, WDI must submit an equipment removal report pursuant to 40 C.F.R. § 60.757(e) that addresses the criteria enumerated above. In addition to receiving U.S. EPA approval of the GCCS design plan, WDI must have conducted an initial performance test which demonstrated compliance with the performance standards under 40 C.F.R. § 60.752(b)(2) at the beginning of the 15-year period, and documented ongoing compliance with the operational, monitoring and recordkeeping requirements. If the required

operational and maintenance records that demonstrate continuous compliance with the requirements of the Federal Plan are not available for any time frame after the initial performance test, that operational time frame shall not be counted toward the 15-year minimum control period. U.S. EPA considered the fact that WDI upgraded its GCCS in 2002 in order to comply with the Federal Plan. Since the GCCS would not have been in compliance before 2002, we cannot retroactively apply the 15-year operating period prior to 2002.

7. U.S. EPA agrees that since the sites stopped receiving waste prior to the promulgation of the Federal Plan, it was not possible for WDI to timely submit a "closure report" as required at 40 C.F.R. § 60.757(d).
8. The Federal Plan requires performance testing for the passive flares, according to the procedures at 40 C.F.R. § 60.18. WDI proposed to conduct Method 22 testing, heat content analysis, and flow rate measurements at only one passive flare for each landfill site. These requests were not approved. If WDI finds that some flares have no flow, testing can be waived. WDI has agreed to test all operational flares.



# STATE OF IOWA

THOMAS J VILSACK, GOVERNOR  
SALLY J PEDERSON, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES  
JEFFREY R. VONK, DIRECTOR

March 15, 2006

## CERTIFIED MAIL

Debra McDonald  
Waste Management, Inc.  
125 North Main  
Blue Earth, MN 56013

RE: Facility Number: 95-02-012  
Project Number: 06-126  
Central Disposal Systems Landfill – Updated Design Plan  
Determination request for alternative monitoring

Dear Ms. McDonald:

This letter is to inform you that the Central Disposal Sanitary Landfill (CDSL) NSPS Design Plan for the Landfill Gas Collection and Control System has been received by DNR. For your information the updated design plan will be placed in your facility file.

In the updated Design Plan, CDSL has requested alternatives to 40 CFR Sections 60.753 to 60.758.

### **First Request:**

CDSL has requested flexibility in well placement and design components of the collection system:

Section 60.755(b): "For purposes of compliance with §60.753(a), each owner or operator of a controlled landfill shall place each well or design component as specified in the approved design plan as provided in §60.752(b)(2)(i)..."

CDSL has stated that since the landfill will be open for several more years, it is expected that the industry will develop more efficient methods of collecting gas. Therefore, the design for the gas collection system may be modified in the future to incorporate these new technologies. CDSL is requesting flexibility to modify the design over time to incorporate new technologies, while still meeting the following operational criteria for the NSPS:

Section 60.753(a)(1): "Operate the collection system such that gas is collected from each area, cell or group of cells in the landfill in which solid waste has been in place for:

1. 5 years or more if active;
2. 2 years or more if closed or at final grades."

The facility is proposing to only install permanent vertical wells once final grades are reached and the cell has been active for a minimum of 5 years, closed, or at final grade for a minimum of 2 years. For cells that have been active for 5 years or more and are not yet to final grades, temporary gas extraction wells, horizontal collection trenches and/or passive solar flares will be used for gas extraction until the wells can be installed (i.e. final grades have been reached).

CDSL is further proposing that if the gas collection system is expanded into areas of the landfill that do not yet meet the above age criteria (for example, for odor control purposes), that these wells would not be subject to the monthly monitoring requirements of the NSPS due to the fact that from a waste age standpoint, the area of the landfill where these

wells have been placed is not yet subject to control. Also the wells are periodically raised in the active areas of the landfill in order to avoid being buried in the trash. When they are raised the HDPE lateral line which provides the vacuum is temporarily disconnected until the surrounding lift of trash is brought high enough to reconnect the well. The time frame between when a well is disconnected and raised, and when the waste height is high enough to reconnect the lateral can range from weeks to months. If the wells are not considered to be part of the NSPS monitoring program it does not matter if the vacuum in the well is temporarily removed and not monitored monthly.

With regard to CDSL's request, DNR will allow the landfill to only install permanent vertical wells once final grades are reached and the cell has been active for a minimum of 5 years, closed or at final grade for a minimum of 2 years. For cells that have been active 5 years or more and are not yet to final grade, temporary extraction wells, horizontal trenches and/or passive solar flares will be used for gas extraction until the wells can be installed (i.e. final grades have been reached). Use of the temporary wells should be considered part of the monitoring system when the HDPE lateral line provides the vacuum, however, when the well is not connected to the HDPE lateral line the temporary wells are not required to be part of the NSPS monitoring program. If the gas collection system is expanded into areas of the landfill that do not yet meet the age criteria (i.e. for odor control purposes), DNR will not consider those cells to be subject to the monthly requirements of the NSPS due to the waste age.

**Second Request:**

Well head pressure variance request when using geosynthetic final cover and Exclusion of passive gas vent connections, horizontal collection trenches, and leachate sump/riser connection from operating parameters:

Section 60.753(b): "Operate the collection system with negative pressure at each wellhead except under the following conditions:

1. A fire or increased well temperature. The owner or operator shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the annual reports as provided in 60.757(f)(1);
2. Use of a geomembrane or synthetic cover. The owner or operator shall develop acceptable pressure limits in the design plan;
3. A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes shall be approved by the Administrator"

and:

Section 60.753(c): "Operate each interior wellhead in the collection system with a gas temperature less than 55 degrees C and with either a nitrogen level less than twenty percent or an oxygen level less than five percent. The owner or operator may establish a higher operating temperature, nitrogen, or oxygen value at a particular well. A higher operating value demonstration shall show supporting data that the elevated parameter does not cause fires or significantly inhibit anaerobic decomposition by killing methanogens."

The landfill gas collection and control system may have future connections to leachate sumps and cleanout risers in order to extract gas from the leachate collection system for odor/surface emission control and safety purposes. CDSL is requesting that the nitrogen/oxygen exceedance limits, positive pressure limits and 15 day corrective action timelines not apply to the leachate cleanout riser and leachate sump extraction points.

Based on a review of the information provided to DNR, the leachate sumps/cleanout risers may be exempt from NSPS monitoring.

**Third Request:**

Use of Passive Solar-Powered Flare as a Temporary Mitigative Measure.

CDSL is requesting the use of a passive solar-powered flare be allowed when an upset condition occurs that results in an unexpected release of landfill gas to the atmosphere and that this flare be exempt from the requirements of 60.752(b)(2)(iii). The passive flare will be used to primarily mitigate odor while the facility investigates the cause of the upset condition.

DNR has reviewed this request and will consider it not subject to the requirements of 60.752(b)(2)(iii). The flare is not the primary control system used to reduce NMOC emissions by 98 percent. It should be noted that the flare is being used to control emissions caused by an upset condition and should not be allowed unlimited usage. Upset conditions will occur however they should still be minimized. If the flare is being used to control upset conditions more than 100 hours per twelve-month rolling period then the DNR may need to re-evaluate the purpose of the flare at that time.

**Fourth Request:**

Exclusion of dangerous areas from surface scan requirements:

Section 60.573(d) Operations Standards for Collection and Control Systems: "A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and rationale for any site-specific deviations from the 30 meter intervals. Areas with steep slopes or other dangerous areas may be excluded from surface testing."

When the surface monitoring is initiated the facility proposes to exclude dangerous areas such as roads, the active area, truck traffic areas, and slopes steeper than or equal to 4:1 from surface testing. CDSL is also requesting that areas with ongoing construction of the gas collection system be temporarily excluded from the surface scans, until such time as the collection system is completed and/or functional.

Based on a review of the information provided, DNR will allow the exclusion of the areas identified by CDSL. It should be noted that this exclusion does not prevent DNR from requiring surface testing in the future if DNR deems it appropriate and can be completed safely.

**Fifth Request:**

Alternative well construction:

CDSL proposes to have the ability to use rock for well construction in certain locations, meeting the parameters for a nonporous corrosion resistant material per Section 60.759(b)(1). Based on a review of the information provided DNR will allow limited usage of rock for wells, however, it should not be relied on as a primary use.

**Sixth Request:**

Exclusion to monitoring while raising wells:

At CDSL, new vertical gas extraction wells are often placed in the active area of a landfill. When the wells are raised the HDPE lateral line which applies the vacuum is disconnected. CDSL is requesting that no more than two months of readings will be missed at a particular well if the facility cannot bring the waste height up to the new grade and re-attach the well, the well will be cut back down and re-attached. This request is being made in accordance with 60.752(b)(2)(i)(B).

Based on a review of the information DNR will allow this request.

**Seventh Request:**

Extension of 10-day corrective action time frame for surface scan exceedences that can be repaired by cover repairs:

Section 60.755(c)(4): "Any reading of 500 ppm or more... shall be recorded as monitored exceedance... cover maintenance or adjustments to the vacuum... shall be made and the location shall be remonitored within 10 calendar days after detecting the exceedance...."

CDSL has requested additional time to effect repairs to the cover if the facility monitors an exceedance and it rains shortly thereafter. The 10 day time frame may not provide a long enough time to affect the needed repairs without damaging the cover with heavy equipment.

If this situation occurs at the facility, CDSL proposes to log the range of days available for the surface monitoring, the scheduled date of the surface monitoring, a 5-day weather forecast on the scheduled date, together with a 5- day weather forecast from all earlier days with the range of days available; the current weather conditions; and the cap conditions. The log will be kept with the NSPS files. Re-monitoring of the cover after repairs are made will occur as quickly as possible and will not exceed 30 days.

Based on a review of the information provided, DNR will allow CDSL's request.

**Eighth Request:**

Cover integrity monitoring on closed portions of the landfills to be performed on an annual basis:

Section 60.755(c)(5): "The owner or operator shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis."

CDSL has areas of the landfill that have been closed for several years, received final cover and have been vegetated. CDSL expects damage to the cover from erosion to be minimal and requests an annual inspection schedule for monitoring the final cover.

Based on a review of the NSPS, DNR has concluded that there is no authority for DNR to allow an alternative monitoring schedule. Therefore the request for annual monitoring is not allowed.

**Ninth Request:**

Shutdown limitations:

Section 60.755(e): "The provisions of this subpart apply at all times, except during periods of start-up, shutdown, or malfunction provided that the duration of start-up, shutdown or malfunction shall not exceed 5 days for collection systems and shall not exceed 1 hour for treatment or control devices."

CDSL states that it is impossible to fix some types of control device malfunctions in one hour or less. It is also impossible to do some types of gas system maintenance (such as re-insulating the flare) in five days or less. NESHAP Subpart AAAA requires the preparation of a Start-up, Shutdown and Malfunction (SSM) Plan. The plan must detail the actions to be taken by the site in the event of an SSM event. The duration of each event must be recorded and all such SSM events reported on a semiannual basis.

CDSL is requesting that the one hour/five day shutdown limitations of the NSPS not apply to the facility now that the Landfill NESHAP has been promulgated. These events will now be governed by the more stringent SSM plan recordkeeping and reporting requirements of the Municipal Solid Waste Landfill NESHAP.

Based on a review of the NSPS, DNR has concluded that there is no authority for DNR to allow CDSL this request. If the NSPS had language stating to the effect "per the Administrator's approval" DNR would be able to make a determination as Iowa has been delegated the Administrator of the NSPS & NESHAPs. If CDSL is to pursue this request it must be submitted to EPA.

**Tenth Request:**

Flare reporting when flare not receiving gas:

Section 60.757(f)(3): "Description and duration of all periods when the control device was not operating for a period exceeding one hour, and length of time the control device was not operating"

The facility is requesting that periods when the flare is not operating in excess of one hour need not be reported provided no gas is being fed to the flare during this time.

As the Administrator, DNR interprets the rule to apply only when gas is being sent to the flare. When gas is not going to the flare reporting is not required.

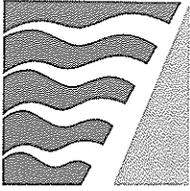
If you have any questions regarding this letter I may be reached at (515) 281-5012.

Sincerely,



Mark Goedken, P.E.  
Construction Permitting  
IDNR Air Quality Bureau

C: Field Office 2



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT  
SINCE 1955

February 6, 2008

Waste Management of Alameda County  
10840 Altamont Pass Rd  
Livermore, CA 94551

Attention: Ken Lewis

ALAMEDA COUNTY  
Tom Bates  
Scott Haggerty  
Janet Lockhart  
Nate Miley

Application Number: 16984  
Plant Number: 2066  
Equipment Location: *same as above*

CONTRA COSTA COUNTY  
John Gioia  
Mark Ross  
Michael Shimansky  
Gayle B. Uilkema

Dear Applicant:

MARIN COUNTY  
Harold C. Brown, Jr.

SUBJECT: CHANGE OF PERMIT CONDITIONS

NAPA COUNTY  
Brad Wagenknecht  
(Secretary)

This letter is to advise you that your application for changes in permit conditions for the following equipment has been approved:

SAN FRANCISCO COUNTY  
Chris Daly  
Jake McGoldrick  
Gavin Newsom

**S-2 Altamont Landfill with Landfill Gas Collection System**

SAN MATEO COUNTY  
Jerry Hill  
(Chair)  
Carol Klatt

Operation of this equipment will be subject to permit condition no. 19235 which is attached. If you have any questions regarding this matter, please call Carol S Allen, Senior Air Quality Engineer at (415) 749-4702.

SANTA CLARA COUNTY  
Erin Garner  
Yoriko Kishimoto  
Liz Kniss  
Patrick Kwok

Very truly yours

Jack P. Broadbent  
Executive Officer/APCO

SOLANO COUNTY  
John F. Silva

SONOMA COUNTY  
Tim Smith  
Pamela Torliatt  
(Vice-Chair)

by Scott Long  
Engineering Division

Jack P. Broadbent  
EXECUTIVE OFFICER/APCO

SBL:CSA  
Attachment: Permit Condition no. 19235

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1. The S-2 Altamont Landfill shall be equipped with a landfill gas collection system, which shall be operated continuously as defined in Regulation 8-34-219, unless the Permit Holder complies with all applicable provisions of Regulation 8, Rule 34, Section 113. Individual wells, collectors, and adjustment valves shall not be disconnected, removed, or completely closed, without prior written authorization from the District, unless the Permit Holder complies with all applicable provisions of Regulation 8, Rule 34, Sections 113, 116, and 117 or with Part 1c below. The gas collection system shall also be operated in accordance with the wellhead requirements described in Part 1d. (Basis: Regulations 8-34-301.1, 8-34-303, 8-34-304, 8-34-305, and 8-34-404)
  - a. The Permit Holder has been issued a Permit to Operate for the landfill gas collection system components listed below as of November 1, 2007. Well and collector locations are described in detail in Permit Application #15498.
    - i. The authorized number of landfill gas collection system components is the baseline count listed below plus any components installed and minus any components decommissioned pursuant to subpart 1b, as evidenced by start-up and decommissioning notification letters submitted to the District.
      - 68 vertical wells
      - 7 horizontal trench collectors (shredded tires may be used as fill material)
      - 1 leachate collection system clean-out riser
  - b. The Permit Holder has been issued an Authority to Construct to allow for the landfill gas collection system alterations described below pursuant to Permit Application #16863. All collection system alterations shall comply with subparts 1b(i-vii) below.
    - i. The authorized collection system alterations are:
      - Install up to 75 additional vertical wells
      - Permanently decommission up to 40 vertical wells
      - Install up to 25 additional horizontal trench collectors

- Permanently decommission up to 10 horizontal trench collectors
  - Modify wellhead monitoring locations, as needed, provided that each landfill gas collection system component identified in Part 1a and each new collection system component installed per Part 1b is adequately represented by a wellhead monitoring location. The Permit Holder shall maintain documentation on site that identifies all landfill gas collection system components that are represented by each wellhead monitoring location.
- ii. The Permit Holder shall apply for and receive an Authority to Construct before altering the landfill gas collection components described subpart 1a. Installing, altering, or permanently decommissioning a vertical well, horizontal collector, or other gas collection component is subject to the Authority to Construct requirement, unless this change constitutes a replacement as defined in subpart 1b(iii) below.
- iii. Replacement of landfill gas collection system components with identical or functionally equivalent components will not be deemed an alteration and will not be subject to the Authority to Construct requirement under the following circumstances. If a well or collector will be shut down and replaced by a new well or collector in essentially the same location as the old component and this decommission/installation will be accomplished in accordance with Regulations 8-34-117 and 8-34-118, then this activity shall be considered a component replacement that is not subject to the Authority to Construct requirement. For each individual well or collector replacement, this subpart authorizes a maximum vacuum disconnection time of five consecutive days for compliance with Regulation 8-34-117.5. The disconnected component and the new component shall not be counted toward the subpart 1b(i) limits; the numbers of replacement wells

- and replacement collectors are not limited. Alterations, repairs, or replacements of non-perforated piping sections (such as risers, laterals, or header pipes), piping connectors, or valves are not subject to the Authority to Construct requirement.
- iv. At least three days prior to initiating operation of a well or collector installed pursuant to subpart 1b, the Permit Holder shall submit a start-up notice to the District that contains the component ID number for each new well or collector and the anticipated initial start-up date for each new component.
  - v. For each well or collector that is permanently decommissioned after June 20, 2007, the Permit Holder shall submit a decommissioning notice to the District within no later than three working days after the component was disconnected from vacuum system. This decommissioning notice shall contain the component ID for each well or collector that was decommissioned, the date and time that each component was disconnected from the vacuum system, and the reason the component was decommissioned.
  - vi. Within six months of installing a new component or permanently decommissioning an existing component, the Permit Holder shall prepare an updated map of the landfill gas collection system that identifies the ID numbers and locations of all operable wells and collectors. On this map or in accompanying documentation, the Permit Holder shall summarize all component changes that were made since the last map was prepared. The previous collection system map, the updated collection system map, and the component change summary shall be provided to District staff upon request.
  - vii. If the Permit Holder has a net reduction (number of decommissioned components minus the number of installed components) of more than five components within a 120-day period, the Permit Holder shall submit a more comprehensive decommissioning notice

to the District. In addition to the information required by subpart 1b(v), this comprehensive decommissioning notice shall include the maps and documentation required by subpart 1b(vi), shall identify all component changes that have occurred but that are not included on the most recently updated map, shall identify any components that are temporarily disconnected from vacuum pursuant to subpart 1c, shall provide estimated vacuum reconnection dates for these components, shall include a list of all well installations that are expected to occur within the next 120 days, and shall discuss the reasons why this reduction in gas collection components is not expected to result in surface emission leaks. Upon request, the Permit Holder shall provide wellhead monitoring data, surface leak monitoring data, records of repair attempts made to date, and other information to support the need for a net collection component reduction of more than five wells. The District may require additional surface monitoring to verify that this net component reduction is not causing landfill surface leaks. The District will notify the Permit Holder in writing of any additional surface monitoring that is required pursuant to this subpart.

- c. The Permit Holder may temporarily disconnect individual wells or collectors from the vacuum system, provided that all requirements of this subpart are satisfied. (Basis: Regulation 8-34-404)
  - i. No more than five (5) landfill gas collection system components (wells or collectors) may be temporarily disconnected from the vacuum system at any one time pursuant to subpart 1c.
  - ii. For each individual well or collector that is disconnected from the vacuum system pursuant to subpart 1c, the total vacuum system disconnection time shall not exceed 120 days during any 12-month period.
  - iii. Collection system components that are disconnected from the vacuum system are not

- subject to wellhead limits (Regulation 8-34-305 or Part 1d, as applicable) or monthly wellhead monitoring requirements (Regulation 8-34-505) during this vacuum disconnection time.
- iv. Wells or collectors that are temporarily disconnected from the vacuum system continue to be subject to the component leak limit (Regulation 8-34-301.2) and the quarterly leak testing requirement (Regulation 8-34-503) at all times. In addition, the Permit Holder shall conduct the following component leak monitoring at each component that has been disconnected from the vacuum system pursuant to subpart 1c: test for component leaks using the procedures identified in Regulation 8-34-602 within 10 calendar days of disconnection from vacuum and again within 1 month of disconnection from vacuum. If a component leak is detected at the well, the Permit Holder shall take all steps necessary to reduce the leak below the applicable limit, including reconnecting the well to the vacuum system, if no other corrective action measures are successful within the time frames allowed by Rule 34.
  - v. For each well disconnection event, the Permit Holder shall record each affected well ID number, all well disconnection dates and times, all well reconnection dates and times, all related monitoring dates and monitoring results in a District approved log. This log shall also include an explanation of why the temporary well shut down was necessary and shall describe all adjustments or repairs that were made in order to allow this well to operate continuously, to reduce leaks, or to achieve compliance with an applicable limit. All records shall be retained for a minimum of five years and shall be made available to District staff upon request.
- d. Each landfill gas collection system component listed in Part 1a shall be operated in compliance with the wellhead limits of Regulation 8-34-305, unless an alternative wellhead limit has been approved for that component and the operator complies with all of the additional requirements identified in this subpart. Components that are subject to an alternative wellhead limit may still use the

Regulation 8-34-414 repair schedule for operator discovered excesses of the alternative limit; however, invoking this repair schedule does replace the monitoring requirements described in Parts 1d(ii-viii). (Basis: Regulations 8-34-305 and 8-34-414)

- i. For each of the wells identified in Part 1d(ii), the Regulation 8-34-305.2 wellhead temperature limit does not apply, and the landfill gas temperature at each wellhead shall not exceed 145 degrees F.
- ii. The wells that are subject to the Part 1d(i) alternative wellhead temperature limit are: #40, #401, #403, #443, #444, #456, #457, and #458.

If any other component has a wellhead temperature of 131 degrees F or higher, the operator may elect to add this component to the above list of alternative temperature limit wells by satisfying all of the following requirements:

- The wellhead temperature shall not exceed 145 degrees F.
- The carbon monoxide (CO) concentration in the wellhead gases shall not exceed 500 ppmv.
- Prior to adding a component to the list in this subpart, the operator shall monitor the gas in the component for CO concentration at least two times, with no more than 15 days between tests. CO monitoring shall continue on a monthly basis, or more frequently if required by subparts 1d(iv-vii), until the operator is allowed to discontinue CO monitoring per subpart 1d(vii).
- The operator shall comply with all applicable monitoring and record keeping requirements in subparts 1d(iii-viii).
- The component shall not exceed any wellhead limit other than temperature and shall have had no excesses of wellhead limits (other than temperature) during the 120 days prior to adding this component to the list in this subpart.
- Within 30 days of adding a component to the list in this subpart, the operator shall notify the District in writing that the operator is requesting to add the component to the Part 1d(ii) list of alternative temperature limit wells. This notification shall include the well ID number, a map of

- the collection system to identify the location of this well, and the dates and results of all monitoring conducted on the well to verify that the above requirements have been satisfied.
- If the Regulation 8-34-414 repair schedule has been invoked for the wellhead temperature excess, and the operator has meet the requirements Sections 414.1 and 414.2, then compliance with the requirements of this subpart shall be deemed an acceptable resolution of the wellhead temperature excess in lieu of the collection system expansion specified in Sections 414.3 and 414.4.
  - iii. The operator shall demonstrate compliance with the alternative wellhead temperature limit in Part 1d(i) by monitoring and recording the temperature of the landfill gas in each wellhead on a monthly basis, in accordance with Regulations 8-34-501.4, 8-34-501.9, and 8-34-505.
  - iv. If the temperature of the landfill gas in a wellhead exceeds 140 degrees F, the operator shall investigate the possibility of a subsurface fire at the wellhead by monitoring for CO concentration in the wellhead gases and by searching for smoke, smoldering odors, combustion residues, and other fire indicators in the wellhead and in the landfill area near this wellhead. Within 5 days of triggering a fire investigation, the operator shall measure the CO concentration in the landfill gas at the wellhead using a portable CO monitor or an EPA approved test method. CO monitoring shall continue according to the frequency specified in subparts 1d(v-vii).
  - v. If the CO concentration is greater than 500 ppmv, the operator shall immediately take all steps necessary to prevent or extinguish the subsurface fire, including disconnecting the well from the vacuum system if necessary. If the well is not disconnected from the vacuum system or upon reconnecting a well to the vacuum system, the operator shall monitor the well for CO concentration, wellhead temperature, and other fire indicators on at least a weekly basis until the CO concentration drops to 500 ppmv or less.
  - vi. If the CO concentration is less than or equal

to 500 ppmv but greater than 100 ppmv, the operator shall monitor for CO concentration at least twice per month (not less than once every 15 days) until the CO concentration drops to 100 ppmv or less. Wellhead temperature and other fire indicators shall be evaluated at each of these semimonthly-monitoring events.

vii. If the CO concentration is less than or equal to 100 ppmv, the operator shall monitor for CO concentration on a monthly basis. CO monitoring may be discontinued if three consecutive CO measurements are 100 ppmv or less and the wellhead temperature during each of these three monitoring events is 140 degrees F or less. If a component has three or more CO measurements of 100 ppmv or less but the wellhead temperature was greater than 140 degrees F, the operator must receive written approval from the District before discontinuing the monthly CO monitoring at that component.

viii. The permit holder shall record the dates and results of all monitoring events required by this subpart in a District approved log. If Part 1d(v) applies, the operator shall also describe all actions taken to prevent or extinguish the fire.

2. All collected landfill gas shall be vented to properly operating landfill gas control equipment as described below in Part 2a. Raw landfill gas shall not be vented to the atmosphere, except for unavoidable landfill gas emissions that occur during collection system installation, maintenance, or repair that is performed in compliance with Regulation 8, Rule 34, Sections 113, 116, 117, or 118 and for inadvertent component or surface leaks that do not exceed the limits specified in 8-34-301.2 or 8-34-303. (Basis: Regulations 2-1-403, 8-34-301 and 8-34-303)

a. The Permit Holder may operate any combination of landfill gas control devices, including: A-15 Landfill Gas Flare, S-6 Gas Turbine, S-7 Gas Turbine, S-23 Internal Combustion Engine, or S-24 Internal Combustion Engine; or may send landfill gas to another facility for additional processing and control; provided that a minimum of 71.47 MM BTU/hour of landfill gas, averaged over any rolling 24 hour period, is collected and controlled by the entire landfill gas control system. The following time periods shall be

excluded from the calculation of this rolling 24-hour average landfill gas collection rate:

- i. time periods when the gas collection system is not operating because the Permit Holder is conducting inspection or maintenance on the landfill gas collection or control system and is operating in compliance with all applicable requirements of Regulation 8-34-113, and
  - ii. time periods when the Permit Holder is attempting to prevent or extinguish a fire and is operating in compliance with all applicable requirements of Regulation 8-34-117, and
  - iii. time periods when the Permit Holder is conducting a source test to determine the appropriate target landfill gas collection rate pursuant to subpart c below, provided that the target landfill gas collection rate during this source test time period is not less than 99% of the limit stated above, and this source test time period does not last more than 120 consecutive hours, and no more than one source test time period exclusion is claimed per calendar year.
- b. To demonstrate compliance with this part, the Permit Holder shall record, on a monthly basis, the total landfill gas collection rate for the entire control system averaged over each rolling 24-hour period during the previous month. In this record, the Permit Holder shall also identify the control devices that were operating, time periods that were excluded from the 24-hour average calculation pursuant to subpart a(i, ii, or iii), and the reason for this exclusion. The Permit Holder shall maintain all records necessary to calculate these rolling 24 hour average landfill gas collection rates including: heat input rates to each on-site control device; flow rate records and methane concentration data for landfill gas that was sent off-site; and start-up and shut down times for each control device. For exclusion time periods, the Permit Holder shall also maintain records of inspection, maintenance, fire prevention, or source test activities that occurred to verify the applicability of this exclusion. All records shall be retained on site or shall be made readily available to District staff upon request for a period of at least five

years from the date on entry.

- c. The target landfill gas collection rate shall be reevaluated at least once every two years in accordance with the following procedures. The Permit Holder may reevaluate the target landfill gas collection rate during any surface emission monitoring event, provided that the Permit Holder complies with subpart a(iii) above. Prior to and during any surface emission monitoring event that is conducted to reevaluate the target landfill gas collection rate limit, the Permit Holder shall:
- i. maintain the total landfill gas collection at no less than 99% of the limit in subpart a and no more than 110% of the limit in subpart a, for at least 48 hours before initiating the surface emission monitoring event and during the surface emission monitoring event,
  - ii. record the date and time that the surface emission monitoring event was initiated and completed,
  - iii. conduct the surface emission monitoring event in accordance with Regulation 8-34-506,
  - iv. record the measured concentration and location of any landfill surface area that was found to have a surface leak above the Regulation 8-34-303 surface emission leak standard,
  - v. measure and record the landfill gas flow rate (in standard cubic feet) to each control device and off-site pipeline in accordance with Regulation 8-34-508,
  - vi. measure and record the methane concentration in the landfill gas that is delivered to each control device and off-site pipeline in accordance with Regulation 8-34-604,
  - vii. calculate and record the hourly heat input rate to each control device and off-site pipeline using a high heating value for methane of 997.7 MM BTU/scf of landfill gas at 68 degrees F and 1 atm for each hour of the surface emission monitoring event, and
  - viii. calculate and record the total landfill gas heat input rate during the monitoring event, the duration of the monitoring event (in hours), and the average hourly landfill gas heat input rate during the monitoring event.

The following procedures shall be used to determine if the subpart a target landfill gas collection rate limit

should be decreased, increased, or remain the same. The target landfill gas collection rate shall be revised in accordance with the procedures identified in Regulations 2-6-414 or 2-6-415.

- ix. If no surface emissions are detected during the surface emission monitoring event and the average hourly heat input rate measured during the event is greater than or equal to the target landfill gas collection rate limit in subpart a, then this limit should remain unchanged. No further action is required.
- x. If no surface emissions are detected during the surface emission monitoring event and the average hourly heat input rate measured during the event is less than the target landfill gas collection rate limit in subpart a, then this limit may be decreased to the average hourly heat input limit measured during the surface emission monitoring event. The Permit Holder may submit permit applications to request that this limit be revised. The Permit Holder must obtain APCO approval before operating at the lower target landfill gas collection rate limit except as allowed under subpart a(iii).
- xi. If surface emissions are detected during the surface emission monitoring event and the average hourly heat input rate measured during the event is less than the target landfill gas collection rate limit in subpart a, then this limit should not be decreased, and the target landfill gas collection rate shall be reevaluated during the next scheduled quarterly surface emission monitoring event. If all surface leaks are corrected in accordance with Regulation 8-34-415, then no further action is required.
- xii. If surface emissions are detected during a surface emission monitoring event and the average hourly heat input rate measured during the event is greater than the target landfill gas collection rate limit in subpart a, then the target landfill gas collection rate shall be reevaluated during the next scheduled quarterly surface emission monitoring event. If all surface leaks are corrected in accordance with Regulation 8-34-415, then no further action is required. If surface emissions are detected during two or

more surface emission monitoring events during a year, then the target landfill gas collection rate limit should be increased to the higher of the two average hourly heat input rates measured during these monitoring events. Within 30 days of conducting the second surface emission monitoring event at which surface leaks are detected, the Permit Holder shall submit permit applications to request a revision of the target landfill gas collection rate.

3. The A-15 Landfill Gas Flare shall be fired on landfill gas. Propane may be used as a start-up fuel only. Landfill gas condensate may be injected into A-15, provided that the condensate injection rate does not exceed 3600 gallons during any day and A-15 complies with all limits in Parts 4-10 and any other applicable emission limits during all times that condensate is being injected into A-15. (Basis: Regulation 2-1-301)
4. The Heat Input to the A-15 Landfill Gas Flare shall not exceed 1704 million BTU per day and shall not exceed 621,785 million BTU per year. (Basis: Offsets and Cumulative Increase)
5. The Landfill Gas Flare (A-15) shall be equipped with both local and remote alarm systems. The local and remote alarms shall be activated whenever the total landfill gas collection for the site is less than the target landfill gas collection rate in Part 2a. When operation of A-15 is necessary to meet the target landfill gas collection rate, the local and remote alarms shall be activated if the flare shuts down unexpectedly or if the combustion zone temperature is less than the minimum temperature required by Part 10 below. (Basis: Regulation 8-34-301)
6. The Landfill Gas Flare (A-15) shall be equipped with one flow meter and one recorder meeting the requirements of Regulation 8-34-508. (Basis: Offsets, Cumulative Increase, and Regulations 2-1-301, 8-34-301, 8-34-501.10, and 8-34-508)
7. Nitrogen oxide (NOx) emissions from the A-15 Landfill Gas Flare shall not exceed either:
  - a. an exhaust concentration of 44 ppmv of NOx, corrected to 3% oxygen, dry basis; or
  - b. an emission rate of 0.06 pounds of NOx (calculated

as NO<sub>2</sub>) per million BTU.  
(Basis: RACT and Offsets)

8. Carbon monoxide (CO) emissions from the A-15 Landfill Gas Flare shall not exceed either:
  - a. an exhaust concentration of 361 ppmv of CO, corrected to 3% oxygen, dry basis; or
  - b. an emission rate of 0.30 pounds of CO per million BTU.(Basis: RACT and Cumulative Increase)
9. The Landfill Gas Flare (A-15) shall comply with either the destruction efficiency or outlet concentration limit specified in Regulation 8-34-301.3.  
(Basis: Offsets, Cumulative Increase, and Regulation 8-34-301.3)
10. The combustion zone temperature of the Landfill Gas Flare (A-15) shall be maintained at a minimum of 1400 degrees Fahrenheit, averaged over any 3-hour period. If a source test demonstrates compliance with all applicable requirements at a different temperature the APCO will revise the minimum combustion zone temperature limit in accordance with the procedures identified in Regulations 2-6-414 or 2-6-415 and the following criteria. The minimum combustion zone temperature for a flare (T<sub>min</sub>) shall be equal to the average combustion zone temperature determined during the most recent complying source test (T<sub>avg</sub>) minus 50 degrees F, provided that the minimum combustion zone temperature is not less than 1400 degrees F:  
$$T_{min} = T_{avg} - 50, \text{ for } T_{avg} \geq 1450 \text{ degrees F}$$
$$T_{min} = 1400, \text{ for } T_{avg} < 1450 \text{ degrees F}$$
(Basis: RACT, Offsets, Cumulative Increase, Toxic Risk Management Policy, and Regulation 8-34-301.3)
11. The concentration of total reduced sulfur compounds in the collected landfill gas shall not exceed 200 ppmv (dry) expressed as hydrogen sulfide (H<sub>2</sub>S). In order to demonstrate compliance with this part, the Permit Holder shall measure the total sulfur content in collected landfill gas in accordance with the monitoring schedule identified in Condition # 18773, Part 10. The landfill gas sample shall be taken from the main landfill gas header. (Basis: Regulation 9-1-302 and Cumulative Increase)
- \*12. The Permit Holder shall submit a permit application for a Change of Permit Conditions, if any site-specific

landfill gas characterization test indicates that the landfill gas at this site contains any of the following compounds at a level greater than the concentration listed below. The Permit Application shall be submitted to the Permit Services Division, within 45 days of receipt of test results indicating a concentration above the levels listed below.  
(Basis: Toxic Risk Management Policy)

Compound	Concentration (ppbv)
Acrylonitrile	500
Benzene	3300
Benzylchloride	600
1,4 Dichlorobenzene	1100
Ethylene Dibromide	300
Ethylene Dichloride	250
Ethylidene Dichloride	1200
Methylene Chloride	2500
Perchloroethylene	2400
1,1,2,2 Tetrachloroethane	550
Trichloroethylene	1400
Vinyl Chloride	1100

13. In order to demonstrate compliance with Regulation 8, Rule 34, Sections 301.3 and 412 and Parts 7 through 12 above, the Permit Holder shall ensure that a District approved source test is conducted annually on the A-15 Landfill Gas Flare. The annual source tests shall be conducted while the flare is operating at or near maximum operating rates and for each of the following operating conditions: (a) while the flare is burning landfill gas without any condensate injection and (b) while the flare is burning landfill gas and condensate is being injected into the flare at or near the maximum injection rate of 2.5 gallons/minute. Each source test shall determine the following:
- landfill gas flow rate to the flare (dry basis);
  - concentrations (dry basis) of carbon dioxide (CO<sub>2</sub>), nitrogen (N<sub>2</sub>), oxygen (O<sub>2</sub>), total hydrocarbons (THC), methane (CH<sub>4</sub>), and total non-methane organic compounds (NMOC) in the landfill gas;
  - stack gas flow rate from the flare (dry basis);
  - concentrations (dry basis) of NO<sub>x</sub>, CO, NMOC, and O<sub>2</sub> in the flare stack gas;
  - NMOC destruction efficiency achieved by the flare; and
  - average combustion zone temperature of the flare during the test period.

The first annual source test for the A-15 Landfill Gas

Flare shall be conducted within 120 days of the initial start up date for A-15. Testing of A-15 while condensate is being injected is not required until the first annual source test that is scheduled to occur after the date that condensate injection commences. Subsequent annual source tests shall be conducted no sooner than 9 months and no later than 12 months after the previous source test. Testing of A-15 while condensate is being injected is not required, if condensate was not injected into the flare during any of the 12 consecutive months prior to the source test date. The Source Test Section of the District shall be contacted to obtain approval of the source test procedures at least 14 days in advance of each source test. The Source Test Section shall be notified of the scheduled test date at least 7 days in advance of each source test. The source test report shall be submitted to the Compliance and Enforcement Division and the Source Test Section within 60 days of the test date. (Basis: RACT, Offsets, Cumulative Increase, Toxic Risk Management Policy, and Regulations 8-34-301.3 and 8-34-412)

14. The Permit Holder shall conduct a characterization of the landfill gas concurrent with the annual source test required by Part 13 above. The landfill gas sample shall be drawn from the main landfill gas header. In addition to the compounds listed in Part 13b, the landfill gas shall be analyzed for the organic compounds listed below, except that acrylonitrile testing shall be conducted once every four years instead of annually. All concentrations shall be reported on a dry basis. The test report shall be submitted to the Compliance and Enforcement Division and the Source Test Section within 60 days of the test date. (Basis: Toxic Risk Management Policy, Cumulative Increase, and Regulation 8-34-412)

Organic Compounds  
acrylonitrile  
benzene  
benzyl chloride  
carbon tetrachloride  
chlorobenzene  
chlorodifluoromethane  
chloroethane  
chloroform  
1,1 dichloroethane  
1,1 dichlorethene  
1,2 dichloroethane

1,4 dichlorobenzene  
dichlorodifluoromethane  
dichlorofluoromethane  
ethylbenzene  
ethylene dibromide  
fluorotrichloromethane  
hexane  
isopropyl alcohol  
methyl ethyl ketone  
methylene chloride  
perchloroethylene  
toluene  
1,1,1 trichloroethane  
1,1,2,2 tetrachloroethane  
trichloroethylene  
vinyl chloride  
xylenes

15. In order to demonstrate compliance with the above conditions, the Permit Holder shall maintain the following records in a District approved logbook.
- a. For the Landfill Gas Flare (A-15), record the date and time for each start-up and shut-down of the flare and the reason for each shut-down.
  - b. Summarize the operating hours for the Landfill Gas Flare (A-15), on a daily basis.
  - c. Calculate and record, on a monthly basis, the maximum daily and total monthly heat input to the Landfill Gas Flare (A-15) based on operating hours for the flare, the landfill gas flow rate recorded pursuant to Part 6, the average methane concentration in the landfill gas as determined by the most recent source test, and a high heating value for methane of 997.7 BTU/ft<sup>3</sup> of landfill gas at 68 degrees F and 1 atmosphere.
  - d. Record the total amount of condensate (gallons/day) injected into the A-15 Landfill Gas Flare for each day that condensate is injected into A-15, and summarize these records on a monthly basis.
  - e. Maintain records of all test dates and test results performed to maintain compliance with Parts 12 and 13 or with any applicable rule or regulation.

All records shall be maintained on site or shall be made readily available to District staff upon request for a period of at least 5 years from the date of entry. These record keeping requirements do not replace the record keeping requirements contained in

any applicable rules or regulations. (Basis: Offsets, Cumulative Increase, 2-6-501, 8-34-301, and 8-34-501)

16. Any emission reductions that may occur due to the shut-down or modification of S-23 IC Engine or S-24 IC Engine cannot be banked or used to generate contemporaneous on site emission reduction credits for other projects. All such emission reductions shall be use to reimburse the District Small Facility Banking Account (SFBA) for the emission reduction credits provided from the SFBA to offset NOx and POC emission increases from this equipment. Furthermore, the Permit Holder shall use any NOx or POC emission reduction credits generated at any of the Permit Holder's facilities, which are located within the District, to reimburse the SFBA for all emission reduction credits provided from the SFBA on behalf of the Permit Holder, before any of these credits could become eligible for banking. (Basis: Regulation 2-4-303.5)
17. [Reserved]
18. The Permit Holder shall comply with the following waste acceptance and disposal limits and shall obtain the appropriate New Source Review permit, if one of the following limits is exceeded:
  - a. Total waste accepted and placed at the landfill shall not exceed 11,150 tons in any day (except during temporary emergency situations approved by the Local Enforcement Agency). (Basis: Regulation 2-1-301)
  - b. The amount of non-hazardous sludge accepted and placed at the landfill shall not exceed 5,000 tons in any day. (Basis: Regulation 2-1-301)
  - c. The maximum design capacity of the landfill (total volume of solid waste placed in the landfill where solid waste has the same meaning as the definition in 40 CFR Part 60.751) shall not exceed 58,900,000 cubic yards. (Basis: Regulation 2-1-301)
  - d. The total cumulative amount of all waste placed in the landfill shall not exceed 47,100,000 tons. Exceedance of the cumulative tonnage limit is not a violation of the permit and does not trigger the requirement to obtain a New Source review permit, if the operator can, within 30 days of the date of discovery of the exceedance, provide documentation to the District demonstrating, in accordance with BAAQMD Regulation 2-1-234.3, that the limit should be higher. (Basis: Regulation 2-1-234.3)

19. Water and/or dust suppressants shall be applied to all unpaved roadways and active soil removal and fill areas associated with this landfill as necessary to prevent visible particulate emissions that persist for more than 3 minutes in any hour. Paved roadways at the facility shall be kept sufficiently clear of dirt and debris as necessary to prevent persistent visible particulate emissions from vehicle traffic or wind.  
(Basis: Regulations 2-1-403, 6-301, and 6-305)
  
20. This Part applies to the acceptance, handling, storage, and on-site reuse of VOC-laden soil. VOC-laden soil is any soil that contains volatile organic compounds, as defined in Regulation 8-40-213, other than contaminated soil. As defined in Regulation 8-40-205, contaminated soil contains more than 50 ppmw of VOC or has a surface concentration greater than 50 ppmv of VOC as C1, and contaminated soil is subject to Part 21 below instead of this part. Materials containing only non-volatile hydrocarbons and materials meeting the requirements of Regulation 8-40-113 are not subject to this part. For each lot of VOC-laden soil accepted at this site, the Permit Holder shall comply with the limits and monitoring procedures identified in either subpart a or subpart b below to demonstrate compliance with the total carbon limits in Regulation 8-2-301.  
(Basis: Regulation 8-2-301)
  - a. Unless the Permit Holder demonstrates compliance with Regulation 8-2-301 in accordance with subpart b below, the Permit Holder shall limit the quantity of VOC laden soil handled per day such that no more than 15 pounds of total carbon could be emitted to the atmosphere per day. In order to demonstrate compliance with this subpart, the Permit Holder shall maintain the following records in a District approved log for all VOC-laden soil accepted at the landfill.
    - i. Record on a daily basis the amount of VOC laden soil accepted for each truckload or each soil lot, as appropriate. This amount (in units of pounds per day) is Q in the equation in subpart a(iii) below.
    - ii. Record on a daily basis the VOC content for each truckload or each soil lot, as appropriate. This VOC Content (C in the equation below) should be expressed as parts per million by weight as total carbon

- (or C1).
- iii. Calculate and record on a daily basis the VOC Emission Rate (E) using the following equation:  $E = Q * C / 1E6$   
This equation may be applied to each truckload or to each soil lot received per day depending on the amount of soil that is represented by the VOC Content data. If the equation is applied to multiple loads per day, the VOC Emission Rate shall be totaled for all loads received each day.
  - iv. Summarize all daily emission rates on a monthly and calendar year basis.
  - v. All records shall be maintained on site or shall be made readily available to District staff upon request for at least 5 years from the date of entry.
- b. Unless the Permit Holder demonstrates compliance with Regulation 8-2-301 in accordance with subpart a above, the Permit Holder shall screen each lot of VOC-laden soil accepted per day for VOC surface emissions to show that each lot of VOC-laden soil is not contaminated soil.
- i. The Permit Holder shall use the testing procedures outlined in Regulation 8-40-604.
  - ii. The screening test shall be representative of the entire lot of VOC-laden soil. The soil surface shall be disturbed prior to screening to ensure that the screening is representative of the entire load.
  - iii. The Permit Holder shall maintain records of all testing conducted to satisfy this subpart and shall record the amount of VOC-laden soil accepted and the highest surface concentration measured pursuant to this subpart. These records shall be maintained for each truckload or each soil lot accepted, as appropriate, provided that the records are made or summarized on at least a daily basis.
  - iv. Summarize the daily soil acceptance rates and the weighted average of the surface concentration records on a monthly basis and for each calendar year.
  - v. All records shall be maintained on site or shall be made readily available to District staff upon request for at least 5 years from the date of entry.

21. This part applies to any on-site activities involving

contaminated soil as defined in Regulation 8-40-205. Unless stated otherwise, all terms, standards, or procedures described in this part have the same meaning as the terms, standards, and procedures described in Regulation 8, Rule 40. (Basis: Regulation 2-1-301, 2-1-403, 8-40-301, 8-40-304 and 8-40-305)

- a. The procedures listed below in subparts b-1 do not apply if the following criteria are satisfied. However, the record keeping requirements in subpart m below are applicable.
  - i. The Permit Holder has appropriate documentation demonstrating that either the organic content of the soil or the organic concentration above the soil is below the "contaminated" level (as defined in Regulations 8-40-205, 207, and 211). The handling of soil containing in concentrations below the "contaminated" level is subject to Part 20 above.
  - ii. The Permit Holder has no documentation to prove that soil is not contaminated, but source of the soil is known and there is no reason to suspect that the soil might contain organic compounds.
- b. The Permit Holder shall provide notification to the Compliance and Enforcement Division of the Permit Holder's intention to accept contaminated soil at the facility at least 24 hours in advance of receiving the contaminated soil. The Permit Holder shall provide an estimate of the amount of contaminated soil to be received, the degree of contamination (range and average VOC Content), and the type or source of contamination.
- c. Any soil received at the facility that is known or suspected to contain volatile organic compounds (VOCs) shall be handled as if the soil were contaminated, unless the Permit Holder receives test results proving that the soil is not contaminated. To prove that the soil is not contaminated, the Permit Holder shall collect soil samples in accordance with Regulation 8-40-601 within 24 hours of receipt of the soil by the facility. The organic content of the collected soil samples shall be determined in accordance with Regulation 8-40-602.
  - i. If these test results indicate that the soil is still contaminated or if the soil was not sampled within 24 hours of receipt by the facility, the Permit Holder must continue to

- handle the soil in accordance with the procedures subparts d-1 below, until the soil has been placed in a final disposal location and adequately covered. Storing soil in a temporary stockpile or pit is not considered treatment. Co-mingling, blending, or mixing of soil lots is not considered treatment.
- ii. If these test results indicate that the soil - as received at the facility - has an organic content of 50 ppmw or less, then the soil may be considered to be not contaminated and need not be handled in accordance with the procedures listed in subparts d-1 below, but shall be handled in accordance with Part 20 above.
- d. Any contaminated soil received at the facility shall be clearly identified as contaminated soil, shall be handled in accordance with subparts e-1 below, and shall be segregated from non-contaminated soil. Contaminated soil lots may not be co-mingled, blended, or otherwise mixed with non-contaminated soil lots prior to treatment, reuse, or disposal. Mixing soil lots in an attempt to reduce the overall concentration of the contaminated soil or to circumvent any requirements or limits is strictly prohibited.
  - e. On-site handling of contaminated soil shall be limited to no more than two on-site transfers per soil lot. For instance, unloading soil from off-site transport vehicles into a temporary storage pile is considered one transfer. Moving soil from a temporary storage pile to a staging area is considered one transfer. Moving soil from a temporary storage pile to a final disposal site is one transfer. Moving soil from a staging area to a final disposal site is one transfer. Therefore, unloading soil from off-site transport into a temporary storage pile and then moving the soil from that temporary storage pile to the final disposal site is allowed. Unloading soil from off-site transport into a staging area and then moving the soil from that staging area to the final disposal site is allowed. However, unloading soil from off-site transport to a temporary storage pile, moving this soil to a staging area, and then moving the soil again to a final disposal site is three on-site transfers and is not allowed.
  - f. Contaminated soil shall either be deposited in a

final disposal site or transported off-site for treatment:

- i. within 90 days, if the soil contains less than 500 ppmw of VOC, or
  - ii. within 45 days, if the soil contains 500 ppmw of VOC or more.
- g. The total amount of contaminated soil disposed of at this site shall not exceed 6000 tons per day. (Basis: Regulation 2-1-301)
- h. All active storage piles shall meet the requirements of Regulation 8-40-304 by using water sprays, vapor suppressants or approved coverings to minimize emissions. The exposed surface area of any active storage pile (including the active face at a landfill) shall be limited to 6000 ft<sup>2</sup>. The types of storage piles that may become subject to these provisions include (but are not limited to) truck unloading areas, staging areas, temporary stockpiles, soil on conveyors, bulldozers or trucks, the active face of a landfill, or other permanent storage pile at the final disposal location.
- i. All inactive storage piles shall meet the requirements of Regulation 8-40-305 including the requirement to cover contaminated soil during periods of inactivity longer than one hour. The types of storage piles that may become subject to these provisions include (but are not limited to) soil on trucks or other on-site equipment, staging areas, temporary stockpiles, and the permanent storage pile at the final disposal location. District approved coverings for inactive storage piles include continuous heavy-duty plastic sheeting (in good condition, joined at the seams, and securely anchored) or encapsulating vapor suppressants (with re-treatment as necessary to prevent emissions).
- j. The Permit Holder must:
- i. Keep contaminated soil covered with continuous heavy-duty plastic sheeting (in good condition, joined at the seams, and securely anchored) whenever soil is to be stored in temporary stockpiles or during on-site transport in trucks. Soil in trucks shall not be left uncovered for more than 1 hour.
  - ii. Establish a tipping area for contaminated soils near the active face that is isolated from the tipping area for other wastes.

- iii. Spray contaminated soil with water or vapor suppressant immediately after dumping the soil from a truck at the tipping area.
- iv. Ensure that all contaminated soil is transferred from the tipping area to the active face immediately after spraying with water or vapor suppressant.
- v. Ensure that contaminated soil in the tipping area is not disturbed by subsequent trucks. Trucks shall not drive over contaminated soil in the tipping area or track contaminated soil out of the tipping area on their wheels.
- vi. Spray contaminated soil on the active face with water or vapor suppressant (to keep the soil visibly moist) until the soil can be covered with an approved covering.
- vii. Limit the area of exposed soil on the active face to no more than 6000 ft<sup>2</sup>.
- viii. Ensure that contaminated soil spread on the active face is completely covered on all sides with one of the following approved coverings: at least 6 inches of clean compacted soil, at least 12 inches of compacted garbage, or at least 12 inches of compacted green waste.
- ix. Ensure that covering of soil on the active face is completed within one hour of the time that the soil was first dumped from a truck at the tipping area.
- k. Contaminated soil shall not be used as daily, intermediate, or final cover material for landfill waste operations unless the requirements of Regulation 8, Rule 40, Sections 116 or 117 have been satisfied.
- l. Contaminated soil is considered to be a decomposable solid waste pursuant to Regulation 8, Rule 34. All contaminated soil disposed of at a site shall be included in any calculations of the amount of decomposable waste in place for annual reporting requirements or for purposes of 8-34-111 or 8-34-304.
- m. The Permit Holder shall keep the following records for each lot of soil received, in order to demonstrate on-going compliance with the applicable provisions of Regulation 8, Rule 40 and this part.
  - i. For all soil received by the facility (including soil with no known contamination), record the arrival date at the facility, the

soil lot number, the amount of soil in the lot, the organic content or organic concentration of the lot (if known), the type of contamination (if any), and keep copies of any test data or other information that documents whether the soil is contaminated (as defined in 8-40-205) or not contaminated, with what, and by how much.

- ii. If the soil is tested for organic content after receipt by the facility, a report with the sampling date, test results, and the date results were received.
- iii. For all on-site handling of contaminated soil, use a checklist or other approved method to demonstrate that appropriate procedures were followed during all on-site handling activities. One checklist shall be completed for each day and for each soil lot (if multiple lots are handled per day).
- iv. For soil aerated in accordance with 8-40-116 or 117 record the soil lot number, the amount of soil in the lot, the organic content, the final placement date, the final placement location, and describe how the soil was handled or used on-site.
- v. For final disposal at a landfill, record on a daily basis the soil lot number, the amount of soil placed in the landfill, the disposal date, and the disposal location.
- vi. Summarize the total amount of contaminated soil disposed of at this site on a monthly and calendar year basis to demonstrate compliance with subpart g.

All records shall be retained for at least 5 years from the date of entry and shall be made available for District inspection upon request.

22. To demonstrate compliance with Parts 18-21 and Regulation 8-34-304, the Permit Holder shall maintain the following records in a District approved logbook.
  - a. Record the total amount of municipal solid waste received at S-1 on a daily basis. Summarize the daily waste acceptance records for each calendar month.
  - b. For each area or cell that is not controlled by a landfill gas collection system, maintain a record of the date that waste was initially placed in the area or cell. Record the cumulative amount of waste placed in each uncontrolled area or cell on

- a monthly basis.
- c. If the Permit Holder plans to exclude an uncontrolled area or cell from the collection system requirement, the Permit Holder shall also record the types and amounts of all non-decomposable waste placed in the area and the percentage (if any) of decomposable waste placed in the area.
  - d. Record the initial operation date for each new landfill gas well and collector.
  - e. Maintain an accurate map of the landfill that indicates the locations of all refuse boundaries and the locations of all wells and collectors (using unique identifiers) that are required to be operating continuously pursuant to Part 1a. Any areas containing only non-decomposable waste shall be clearly identified. This map shall be updated at least once a year to indicate changes in refuse boundaries and to include any newly installed wells and collectors.
  - f. Record of the dates, locations, and frequency per day of all watering activities on unpaved roads or active soil or fill areas. Record the dates, locations, and type of any dust suppressant applications. Record the dates and description of all paved road-cleaning activities. All records shall be summarized on monthly basis.

All records shall be maintained on site or shall be made readily available to District staff upon request for a period of at least 5 years from the date of entry. These record keeping requirements do not replace the record keeping requirements contained in any applicable rules or regulations.

(Basis: Regulations 2-1-301, 2-6-501, 6-301, 6-305, 8-2-301, 8-40-301, 8-34-304, and 8-34-501)

- 23. The annual report required by BAAQMD Regulation 8-34-411 shall be submitted in two semi-annual increments. The reporting period for the first increment of the Regulation 8-34-411 annual report that is submitted subsequent to the issuance of the MFR Permit for this site shall be from December 1, 2003 through April 30, 2004. This first increment report shall be submitted by May 31, 2004. The reporting periods and report submittal due dates for all subsequent increments of the Regulation 8-34-411 report shall be synchronized with the reporting periods and report submittal due dates for the semi-annual MFR Permit monitoring reports that are

Plant No. 2066, Waste Management of Alameda County  
Source No. 2, Altamont Landfill with Landfill Gas Collection System  
Application No. 16984  
**Condition No. 19235**

required by Section I.F of the MFR Permit for this site. A single report may be submitted to satisfy the requirements of Section I.F, Regulation 8-34-411, and 40 CFR Part 63.1980(a), provided that all items required by each applicable reporting requirement are included in the single report. (Basis: Regulation 8-34-411 and 40 CFR Part 63.1980(a))

*End of Conditions*



Regional Compliance Manager  
3474 Atlantic Lane  
Waverly, Virginia 23890

Re: King George LANDFILL Inc.  
King George County LANDFILL  
VADEQ Registration Number: 40903

and

Atlantic Waste Disposal, Inc.  
VADEQ Registration Number: 51278  
Gas Extraction Well Operating Temperature Increase Requests

Dear Mr. Guidry:

By letters dated July 26 and July 30, 2001, you requested that the U.S. Environmental Protection Agency ("EPA"), Region III allow the King George and Atlantic LANDFILLS to increase the wellhead temperature limit for their LANDFILL gas collection system to 65.60 C (150.0 F). Your letters indicate that both LANDFILLS have wells that consistently have temperatures above the 55.0 C (131.0 F) temperature limit specified in 40 C.F.R. Sec. 60.753(c) for LANDFILL gas collection systems. Subsequently, you sent Region III wellhead data on temperature, methane, oxygen, and carbon dioxide for these LANDFILLS. You also have discussed these issues with Bowen Hosford, Air Enforcement Branch, during several telephone conversations.

Region III reviewed the information you provided, other sources of information, and consulted with another EPA Region on this topic. EPA's concern is that temperatures above the regulatory limit are indicative of a LANDFILL fire or that methanogen have been killed. However, as the data you provide shows, methane production at both LANDFILLS has remained high (not less than 45%). IN addition, oxygen content of the LANDFILL gas has remained below 5%. This indicates that anaerobic activity is continuing. You have also provided carbon monoxide sampling results that indicate carbon monoxide is less than 20 ppm at both LANDFILLS. Carbon monoxide level approaching 100 ppm would be cause for concern.

Finally, you have indicated, during conversations with Mr. Hosford, that there is no physical evidence of fire, such as charred materials, on the inside of the pipes in the LANDFILL gas collection system.

Based on these data, Region III's review of some of the literature on this issue (see enclosed article), and discussion with another EPA region, the increased wellhead temperatures do not indicate fires at the Atlantic and King George LANDFILLS. Therefore, pursuant to 40 C.F.R. Sec. 60.13(i), Region III is granting a temperature increase from 55.0 C (131.0 F) to 65.60 C (150.0 F) at the wells specified in the data provided by you. However, Region III will not grant exemptions to the temperature limits for future wells because Region III believes that exemptions or waivers should be granted on the basis of data fo reach wellhead.

If you have any questions or comments, call Mr. Hosford at (215) 814-3158.

Sincerely,

Judith M. Katz, Director

Air Protection Division

Enclosure

cc: Lisa Childress, VADEQ  
Gary E. Graham, VADEQ

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA GEORGIA 30303-8960

FEB 09 2005

4APT-ATMB

L.T. Kozlov, P.E.  
Program Administrator  
Air Resources Management  
Central District  
Florida Department of Environmental Protection  
3319 Maguire Boulevard, Suite 232  
Orlando, Florida 32803-3767

Dear Mr. Kozlov:

The purpose of this letter is to provide you with a written determination regarding proposed changes to the standard operating procedures for landfill gas extraction wells at the Orange County Solid Waste Management Facility. This landfill is subject to 40 CFR Part 60, Subpart WWW (Standards of Performance for Municipal Solid Waste Landfills), and in a request sent to the U.S. Environmental Protection Agency (EPA) Region 4 and to your agency, Orange County proposed changes in standard operating procedures for certain wells in the landfill's active gas collection system. These changes involve an alternative to decommissioning wells where low landfill gas generation rates make it difficult to simultaneously operate wellheads at negative pressure and maintain compliance with oxygen concentration limits. Based upon our review, the changes proposed by Orange County are acceptable. Details regarding the County's proposal and the basis for our conclusions are provided in the remainder of this letter.

Operating requirements for gas collection and control systems (GCCS) are promulgated at 40 CFR Sec. 60.753(b), (c), and (d). Under these provisions, wellheads must be operated under negative pressure, the temperature of interior wellheads must be less than 55 degrees C, gas quality limits for interior wells (either less than 20 percent nitrogen or less than five percent oxygen) must be met, and the methane concentration at the surface of the landfill must be less than 500 parts per million (ppm). Under provisions in 40 CFR Sec. 60.755, monitoring to verify compliance with the wellhead pressure, temperature, and gas quality limits must be conducted on a monthly basis. Monitoring to verify compliance with the 500 ppm surface methane concentration limit must be conducted on a quarterly basis.

Orange County's request for approval of changes to its standard operating procedures involves wells where gas flow rates are so low that applying even minimal vacuum results in air infiltration that causes exceedances of the applicable oxygen concentration limit. Shutting such wells down will prevent the air filtration that leads to the oxygen exceedances, but shutting a well down is likely to cause positive pressure in the wellhead as landfill gas builds up. Therefore, simultaneously complying with both the negative pressure and oxygen concentration limits in 40 CFR Sec. 60.753 can be difficult for wells where gas flow rates have declined over time.

Under provisions in 40 CFR Sec. 60.753(b)(3), wells that experience positive

pressure after being shutdown to accommodate declining landfill gas flow rates can be decommissioned if permission is granted by the Administrator. As an alternative to decommissioning wells under the provisions, Orange County has proposed to make the following changes to its standard operating procedure for wells where persistent oxygen exceedances are not the result of operations and/or maintenance issues:

1. Wells where oxygen concentrations do not decline to acceptable levels after more than one hour of reduced vacuum will be shut off until the gas quality recovers.
2. The monthly monitoring required by 40 CFR Sec. 60.755 will be conducted for wells that have been shutdown, but positive pressure or elevated oxygen concentrations will not be considered exceedances of the operating limits in 40 CFR Sec. 60.753.
3. If monthly monitoring indicates that pressure has built up in the well and the oxygen concentration still exceeds five percent, the well will be opened to relieve the pressure and will be shutdown until it is monitored the following month.
4. If the monthly monitoring indicates that gas quality has improved (i.e., the oxygen concentration has dropped below five percent), the well will be brought back on line until the gas quality declines again.
5. The quarterly methane surface concentration monitoring required under 40 CFR Sec. 60.755 will be conducted for wells that have been shutdown. Standard remediation steps, including evaluating the need to return wells to full-time service, will be followed if exceedances of the 500 ppm methane surface concentration limit are detected.

According to Mr. Daniel Morical of Orange County Utilities, the operating procedure changes outlined above would apply to approximately four or five of the 130 wells at its landfill at any one time. Mr. Morical also indicated that there is a high probability of gas quality improving to the point it would be necessary to restart wells that had been shutdown. Based upon our review, the proposed changes to Orange County's standard operating procedures are acceptable because shutting down nonproductive wells, instead of decommissioning them, has the potential to lower overall nonmethane organic compound (NMOC) emissions at the landfill. This potential increase in NMOC control system efficiency stems from the ability to quickly resume gas collection if there are improvements in the gas quality or increases in the gas production rate in an area of the landfill where wells have become nonproductive. If wells in a nonproductive area are decommissioned, instead of merely being shutdown, NMOC emissions would not be controlled between the time an exceedance is identified and a new well is installed. Once condition for approval of the proposed changes in standard operating procedures at the Orange County Solid Waste Management Facility is that facility diagrams must be updated to indicate which wells have been shutdown because landfill gas production rates are too low to permit continuous extraction.

If you have any questions about the determination provided in this letter, please contact Mr. David McNeal of the EPA Region 4 staff at (404) 562-9102.

Sincerely,

Beverly H. Banister  
Director

Air, Pesticides & Toxics  
Management Division

cc: Daniel Morical  
Orange County Utilities - Solid Waste Division  
5901 Young Pine Road  
Orlando, Florida 32829

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MUNICIPAL SOLID WASTE LANDFILL NEW SOURCE  
PERFORMANCE STANDARDS (NSPS) AND EMISSION  
GUIDELINES (EG) -- QUESTIONS AND ANSWERS

Revised

U.S. Environmental Protection Agency  
Office of Air Quality Planning and Standards  
Research Triangle Park, North Carolina

November 1998

November 1998

MUNICIPAL SOLID WASTE LANDFILL NEW SOURCE  
PERFORMANCE STANDARDS (NSPS) AND EMISSION  
GUIDELINES (EG) -- QUESTIONS AND ANSWERS

**Disclaimer:** *It is important that the user understand the purpose and limitation of the "Municipal Solid Waste Landfill New Source Performance Standards and Emission Guidelines Questions and Answers" file. The questions and answers are not intended to fully represent or be used in place of the regulations. These questions can be used to explore the application of the regulations in different scenarios or to shed light on complex issues. The answers provided are not rules nor are they binding upon the Agency in any context. The EPA may withdraw, modify, or depart from the answers provided in this file at any time without notice. For an understanding of the actual regulatory requirements in any given situation, the reader must consult the appropriate sections of Title 40 of the Code of Federal Regulations (CFR), pertinent Federal Registers and EPA guidance documents, as well as relevant State regulations. We recommend that the EPA Regional Offices and States be consulted for specific applicability determinations.*

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INTRODUCTION AND SOURCES OF ADDITIONAL INFORMATION

The following list of questions and answers are provided as a guide for those subject to the new source performance standards (NSPS) or emission guidelines (EG), as well as those implementing the NSPS or EG. It is the intent of EPA to update this list as new questions and issues are raised. If you have a concern you feel should be addressed here, please fax or E-mail your question to:

---

Questions Concerning	Name	Fax	E-mail
Technical/Rule Implementation	Martha Smith	919-541-2421	smith.martha@epamail.epa.gov
	Mary Ann Warner	919-541-2664	warner.maryann@epamail.epa.gov
Monitoring and Sampling Methods	Foston Curtis	919-541-1039	curtis.foston@epamail.epa.gov
Landfill Air Emissions Model	Susan Thorneloe	919-541-2382	thorneloe.susan@epamail.epa.gov
Part 70 and 71 Permitting	Joanna Swanson	919-541-5282	swanson.joanna@epamail.epa.gov
New Source Review Permitting	Dan DeRoeck	919-541-5593	deroeck.dan@epamail.epa.gov

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Additional information regarding the Municipal Solid Waste Landfill New Source Performance Standards and Emission Guidelines can be obtained from the following documents. These documents are available as indicated; however, a new EPA TTN Website under development will accommodate many of these documents at <http://www.epa.gov/ttn/uatw/landfill/landflpg.html>.

- C Municipal Solid Waste Landfills Proposed Rule and Guideline, May 30, 1991 (56 FR 24468).
  
- C Municipal Solid Waste Landfills Final Rule and Guideline, March 12, 1996 (61 FR 9905). Also available on the TTN Web (<http://www.epa.gov/docs/fedrgstr/EPA-AIR/1996/March>) and in the docket (see address below).

- C Amendments to Municipal Solid Waste Landfills Final Rule and Guideline, June 16, 1998 (63 FR 32743). Available on the TTN Web(<http://www.epa.gov/docs/fedrgstr/EPA-AIR/1998/June>).
- C "Air Emissions from Municipal Solid Waste Landfills - Background Information for Proposed Standards and Emission Guidelines," March 1991, EPA-450/3-90-011(a). This document contains technical information on landfill emissions and controls assembled prior to proposal of the standards. It may be obtained from the U.S. EPA Library in Research Triangle Park, NC or from the docket (see address below).
- C "Air Emissions from Municipal Solid Waste Landfills - Background Information for Final Standards and Guidelines," December 1995, EPA-453/R-94-021. This document summarizes all public comments on the proposed NSPS and EG and the EPA responses. This document may be obtained from the TTN Web, the U.S. EPA Library in Research Triangle Park, or from the docket (see addresses below).
- C "Municipal Solid Waste Landfills, Volume 1: Summary of the Requirements for the New Source Performance Standards and Emission Guidelines for Municipal Solid Waste Landfills," EPA-456R-96-004 (MSW Landfills, Volume 1) has been posted on the TTN Web (see address below) and explains the requirements of the NSPS and EG. Explanations and tools are provided to help implementing agencies determine applicability, ensure compliance, collect and review reports, and conduct inspections. The document will also be available in the docket (see address below) and EPA Regional libraries (Regions I-X).
- C "Municipal Solid Waste Landfills, Volume 2: Summary of the Requirements for Section 111(d) State plans for Implementing the Municipal Solid Waste Landfill Emission Guidelines," EPA-456R/96-005 (MSW Landfills, Volume 2) has been posted on the TTN Web (see address below), and explains the State plan development and approval process. MSW Landfills, Volume 2 outlines and explains the required content of State plans, outlines the timeline and responsibilities for developing and submitting State plans, and answers general questions about how to prepare State plans. The document is also available in the

docket (see address below) and EPA Region Libraries (Regions I-X).

The docket is available at the following address. A reasonable fee may be charged for copying.

U.S. Environmental Protection Agency  
401 M Street, SW  
Washington, DC 20460  
Air and Radiation Docket and Information Center  
Room M-1500 Waterside Mall, Ground Floor  
Phone: (202) 260-7548  
Refer to Docket Number: A-88-09

The U.S. EPA Library in Research Triangle Park address and phone number are as follows:

U.S. EPA Library (MD-33)  
Research Triangle Park, NC 27711  
Phone: (919) 541-2777

Electronic file(s) can be accessed through the EPA Technology Transfer Network Website (TTN Web). The files are located under "OAR Policy and Guidance Information". The TTN Web can be accessed through the World Wide Web at <http://www.epa.gov/ttn/oarpq>. Many of these landfills files are available at <http://www.epa.gov/ttn/uatw/landfill/landflpg.html>. The TTN Web help number is (919) 541-5384.

The EPA Regional offices may also be contacted for assistance. The appropriate contacts are listed below:

Name	Region	Phone	Fax
Jeanne Cosgrove	1	617-565-9451	617-565-4940
Christine DeRosa	2	212-637-4022	212-637-3901
Jim Topsale	3	215-814-2190	215-814-2114
Scott Davis	4	404-562-9127	404-562-9095
Charles Hatten	5	312-886-6031	312-886-0617
Mick Cote	6	214-665-7219	214-665-7263
Ward Burns	7	913-551-7960	913-551-7065
Martin Hestmark	8	303-312-6776	303-312-6409
Patricia Bowlin	9	415-744-1188	415-744-1076
Catherine Woo	10	206-553-1814	206-553-0404



I. OVERVIEW AND APPLICABILITY

A. Overview of Requirements and Applicability

1. Question: What is required of landfills to which the NSPS or the EG applies?

Answer: All sources to which the NSPS or EG applies must submit a design capacity report -- regardless of their size or capacity. Those sources with a design capacity greater than or equal to 2.5 million Mg and 2.5 million m<sup>3</sup> must also submit periodic emissions reports. If those sources emit more than 50 Mg/yr of non-methane organic compounds (NMOC), they are required to comply with the emission control requirements of the NSPS (new landfills) or the EG (existing landfills).

2. Question: A commenter submitted an applicability table to summarize which requirements apply to landfills depending on their size and emission rates and asked if the table was correct for both existing landfills and new landfills as defined under Subparts Cc (EG) and WWW (NSPS).

Answer: The following table is a correct summary of the applicability of the requirements of the NSPS and EG.

Applicability Table based on §§ 60.33c(a) and 60.752

Design Capacity (Million Mg and/or Million m <sup>3</sup> )	Emissions (Mg/yr NMOC)	Design Capacity Report Required	Periodic NMOC Emission Reports Required	Controls Required	Title V Permit Required
<2.5 (Mg or m <sup>3</sup> )	< 50	Yes	No	No	*
<2.5 (Mg or m <sup>3</sup> )	≥ 50	Yes	No	No	*
≥2.5 (Mg and m <sup>3</sup> )	< 50	Yes	Yes	No	Yes
≥2.5 (Mg and m <sup>3</sup> )	≥ 50	Yes	Yes	Yes	Yes

\* The landfills NSPS and EG does not require a part 70 or 71 operating permit for these landfills, but part 70 or 71 requires a permit if the landfill is a major source as defined in part 70 or 71 or is subject to part 70 or 71 for some other reason (e.g., subject to another NSPS or NESHAP). A landfill is a major source and requires a title V permit if the air emissions are > 100 tons/yr or the HAP emissions are >10 tons/yr for one HAP or 25 tons/yr for a combination of HAP's or if it emits major source levels of criteria pollutants such as VOC (major source thresholds are different for attainment and nonattainment areas-- see the definition in 40 CFR section 70.3(a)).

3. Question: What is the difference between the NSPS and the EG? Is there any freedom of ability to modify the standards in the EG which is not available in the NSPS?

Answer: There are two main differences between the NSPS and EG. First, the NSPS applies to new, modified, or reconstructed municipal solid waste (MSW) landfills. The recent amendments (63 FR 32743, June 16, 1998) clarify that a new, modified, or reconstructed landfill is defined as a landfill that commenced construction, modification, or reconstruction on or after May 30, 1991. The EG applies to existing MSW landfills. An existing landfill is defined as a landfill that accepted waste on or after November 8, 1987 and is not new, modified, or reconstructed.

In addition, the NSPS is a single federal rule that applies to all new sources, the EG provides guidance for regulating landfill gas emissions which the States are required to implement through individual State plans. While State plans must generally be as stringent as the EG, there is flexibility, on a case-by-case basis, to apply less stringent limitations or compliance schedules if certain criteria are met (see section V.E. for additional details). State plans could also be more stringent than the EG. (See section II.E for additional details).

4. Question: What is the significance of the November 8, 1987 date that is specified in the EG? Are landfills that accepted waste after this date subject to the EG or the NSPS?

Answer: A cutoff date of 1987 was established to focus on landfills that accepted waste more recently and would thus have a higher emission potential. Another important consideration was the potential difficulty of locating landfills that closed prior to 1987 and establishing responsibility for installation of controls at older closed landfills for which ownership may be uncertain.

The Hazardous and Solid Waste Amendments to RCRA of 1984 required States to establish a permit program or other system of prior approval to ensure that facilities that receive household hazardous waste or small quantity generator hazardous waste are in compliance with 40 CFR part 257, "Criteria for Classification of Solid Waste Disposal Facilities and Practices." This permit program was to be established by November 8, 1987. This date was selected as the regulatory cutoff in the EG for landfills that are no longer receiving wastes because EPA judged States would be able to identify active facilities as of this date. [See pages 24475 and 24476 of the proposal preamble (in the May 30, 1991, Federal Register), Section IV Rationale, Selection of Affected and Designated Facilities]. Landfills that accept waste after this date could be subject to either the EG or NSPS depending upon when they are permitted to exceed 2.5 million Mg

and 2.5 million cubic meters in design capacity (see the following questions and answers).

#### B. Applicability for Modified Landfills

5. Question: If an existing landfill subject to the EG is modified, does it remain subject to the EG or become subject to the NSPS?

Answer: The recent amendments (63 FR 32743) clarify that all landfills that commence modification on or after May 30, 1991 (regardless of size) are classified as new, and subject to the NSPS.

6. Question: What constitutes a "modification"? Some State solid waste regulations specify that a vertical or horizontal expansion constitutes a modification.

Answer: The recent amendments clarify that a modification is an increase in the permitted volume design capacity of a landfill by either vertical or horizontal expansion. For the modification to have occurred, the owner or operator must have commenced construction on the horizontal or vertical expansion. For landfills, modifications that increase capacity and emissions are typically implemented by horizontal (lateral) or vertical (upward) expansion of the existing landfill. If a vertical (upward) or horizontal (lateral) expansion increases the design capacity of the landfill above the previously permitted level then it is a modification. Furthermore, adding a new MSW landfill area at the same location as an existing MSW landfill causes the entire site (contiguous geographic area) to be considered a modified landfill subject to the NSPS. (See section I.D.)

If an existing landfill makes an operational change, then it will continue to be subject to the EG rather than becoming subject to the NSPS. For example, an increase in design capacity may result from not only an increase in the permitted volume of the landfill but also from an increase in the density as documented in the annual recalculation required in § 60.758(f). This density change is not a modification, and does not subject an existing landfill to the NSPS; but if capacity is increased to \$ 2.5 million Mg and 2.5 million m<sup>3</sup> in this way, the landfill would file an amended design capacity report under the EG and perform the NMOC emission rate calculation to determine if control is required.

7. Question: Is there a minimum amount of increase in design capacity that triggers the requirements of the NSPS?

Answer: No, any vertical or horizontal expansion that increases the design capacity is a modification and triggers NSPS applicability for landfills. If the capacity is increased to or above 2.5 million Mg and 2.5 million m<sup>3</sup>, an amended design capacity report must be filed and the landfill must begin calculating the annual NMOC emission rate using the tier procedures in the rule and must submit NMOC emission rate reports.

8. Question: Suppose an MSW landfill is subject to the EG, but the facility then makes a modification that increases the design capacity. Is the entire landfill then subject to the NSPS, or is the "new" modification to the landfill subject to the NSPS while the rest of the landfill remains subject to the EG?

Answer: If the landfill is modified (an increase in the design capacity by vertical or horizontal expansion) after May 30, 1991, then the entire landfill is subject to the NSPS.

#### C. Date of Commenced Construction

9. Question: Does the NSPS apply based on the date of permit issuance or initial waste placement? Which permit should serve as the basis for establishing the date of commenced construction?

Answer: As clarified in the recent amendments (63 FR 32743), a new landfill is a landfill that commences construction, modification, or reconstruction on or after May 30, 1991. The definition of "commenced" is contained in the NSPS General Provisions in 40 CFR 60 subpart A § 60.2. "Commenced means...that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake, within a reasonable time, a continuous program of construction or modification". Depending on the specific case, the date a permit was issued, the date a contract was signed, or the date that physical construction began could be the date of "commenced" construction. Because one or more of these events would need to occur prior to the date of initial waste acceptance, it is likely that the date of waste acceptance would not be the date construction "commenced". The regulatory authority has responsibility for determining the appropriate date considering the sequence of events for the specific landfill.

#### D. Definition of Source/Contiguous Area

10. Question: How are contiguous or adjacent landfills handled? For example, a county landfill, built in the early 1970s, is in the process of closing, however, it is still accepting waste. As an

expansion to the existing landfill, another cell obtained a permit in February 1993, but is still under construction. These two landfill sites are separated by an access road. In order to calculate its emissions, is this considered one landfill or two? Also, is the addition of these cells a modification, or would it be considered a new source? Another county landfill has two cells separated by a county road. Is this considered one landfill or two? A third landfill has cells or sites separated by a golf course.

Answer: A landfill is considered a single landfill if the cells are contiguous and under common ownership or control, even if a road or golf course separates the cells. This is the historical interpretation for source definition for all NSPS, and it has been adopted for landfills. The addition of a cell that increases the permitted volumetric design capacity for one of these landfills would be considered a modification, not the opening of a separate new landfill. A modification causes the entire landfill (the existing cells and the newly permitted cell) to become subject to the NSPS.

11. Question: If a landfill expands by opening a new area, must inactive as well as active areas be controlled? For example, suppose a landfill with a design capacity of 1.6 million m<sup>3</sup> (est 1979) decides to expand such that the design capacity totals 4.0 million m<sup>3</sup>; and therefore it becomes subject to the NSPS. The 1.6 million m<sup>3</sup> will be closed in 1998. Since the site will be inactive, will a flare be required for the closed area or just the new area once 50 Mg/yr of NMOC emissions is exceeded?

Answer: The entire landfill is included in both the design capacity and the NMOC emission rate calculation. The entire area becomes subject to the landfill gas collection and control requirements once the calculated NMOC emission rate equals or exceeds 50 Mg/yr.

#### E. Applicability to Closed Landfills

12. Question: What are the requirements for landfills that close after 1987?

a) Upon reading the rule it appears that these landfills must submit an initial maximum design capacity and initial NMOC emission rate report. Are they required to submit annual reports documenting the NMOC emissions? Since their NMOC emissions are only going to go down it does not seem to make sense to require a closed landfill with NMOC emissions < 50 Mg/yr to submit annual NMOC reports.

b) If a closed landfill has NMOC emissions  $\leq 50$  Mg/yr, what are the retrofit collection/control requirements including design parameters? Are these requirements different than for an active landfill that can design these systems as they grow? Retrofitting may be more expensive.

c) Are closed landfills required to have controls on for 15 years from the date of installation?

Answer: All landfills operating after November 8, 1987, whether closed or open, are required to submit a design capacity report -- regardless of their size or capacity. Only those sources (closed or open) with a design capacity greater than or equal to 2.5 million Mg and 2.5 million m<sup>3</sup> are required to submit an initial NMOC emission rate report. They are also required to submit periodic (e.g., annual) reports until the calculated NMOC emission rate is  $\geq 50$  Mg/yr or until the landfill is closed. If the initial or a subsequent NMOC rate emission report shows emissions of 50 Mg/yr or more, the landfill must install controls or demonstrate, using Tier 2 or 3 procedures, that NMOC emissions are less than 50 Mg/yr.

If the landfill is closed, they can stop doing annual NMOC emission rate calculations and reports, as provided in § 60.752(b)(1)(ii). A "closed" landfill means a landfill in which solid waste is no longer placed, and in which no additional solid waste will be placed without first filing a notification of modification. Once a notification of modification is filed and additional waste is placed in a landfill, it is no longer closed and must resume NMOC emissions reporting.

Closed and active landfills have the same control requirements. These control systems are appropriate for installation in existing landfills, such as closed landfills or existing landfills with waste in place. In either case, the wells are drilled into the existing waste. The collection system of header pipes is installed above the ground. It would generally be easier and cheaper to install a well and collection system in a closed landfill area because it would be separate from the day-to-day landfill operations and no additional waste would be deposited in the area (see section II.B for additional details).

Closed landfills must have controls on for at least 15 years from the date of installation and until the NMOC emissions are less than 50 Mg per year in three successive emission rate reports.

13. Question: What should a State do about a landfill that accepted waste after November 8, 1987 but is now closed? How can the

collection and control system be installed if there are no funds available?

Answer: Once a closed landfill has been identified, the State will need to identify and locate the owner/operator or responsible party. Identifying and locating owners or operators of closed landfills may be difficult. However, only landfills that have accepted MSW since November 8, 1987 are subject to the EG. Therefore, these landfills should have permits that would identify the owner/operator.

The source of funding for collection and control systems on landfills that are closed will vary depending on the landfill ownership and circumstances surrounding its closure. If the landfill is of private ownership, the owner would be responsible for the costs. If the landfill is of State or local ownership the costs could be borne by a reallocation of State or local funds, bonds, or other State or local budget mechanisms.

It is also possible that the State plan could establish a less stringent standard for a specific landfill or class of landfills. To do this, the State must apply to EPA and demonstrate that the criteria listed in § 60.24(f) of subpart B are met. These criteria include (1) unreasonable cost of control resulting from age, location, or design, (2) physical impossibility of installing the necessary control equipment, or (3) other factors specific to the landfills that make application of a less stringent standard significantly more reasonable.

#### F. Applicability to Superfund Sites

15. Question: What is the applicability of the MSW landfill NSPS and EG to superfund sites? Is this a part of their clean-up plan? Who will calculate the design capacity for Superfund sites? Are they required to provide the Design Capacity Report? Also, how does this relate to the preamble language that implies "that the standards may also be determined relevant and appropriate for sites that accepted waste prior to November 8, 1987." Also, if a cell was classified as a Superfund site and closed prior to 1987, is this site considered part of the larger landfill?

Answer: The landfills NSPS or EG apply to MSW landfills including ones determined to be Superfund sites if they have accepted waste since November 8, 1987 or have additional design capacity available for future waste acceptance. This would include the requirement to submit a design capacity report. The design capacity report is required by the NSPS and EG under the Clean Air Act and is

a separate activity from the Superfund clean-up plan. The responsible party should calculate the design capacity.

An MSW landfill Superfund site may be required, under Superfund, to install collection and controls if it is determined that controls are "relevant" and "appropriate" even if the landfill did not receive MSW after November 8, 1987. Superfund landfills are individually reviewed on a case-by-case basis, under Superfund, to determine relevant and appropriate controls. (See the preamble to the final rule [61 FR 9909, March 12, 1996] for additional discussion of Superfund sites.)

The classification of a landfill cell as a Superfund site would not affect the determination of whether or not it is part of the larger landfill. See section I.D. for related questions and answers.

#### G. Independent Power Producers

16. Question: Is an independent power producer located on an MSW landfill exempt from complying with the NSPS/EG?

Answer: If the independent power producer is combusting landfill gas it would be subject to the NSPS or EG.

### II. CONTROL REQUIREMENTS AND COMPLIANCE TIMES

#### A. General

1. Question: What emission controls are required for the NSPS or the EG?

Answer: Both the NSPS and EG require the use of best demonstrated technology (BDT) for reduction of NMOC landfill emissions. BDT for MSW landfills includes: (1) a well designed and well operated gas collection system, and (2) a control device capable of reducing NMOC in the collected gas by 98 percent by weight.

#### B. Design and Installation of Collection Systems

2. Question: For purposes of submitting a collection and control system design plan, does this design submittal cover the entire permitted landfill area (even those areas that are not currently constructed, although permitted)? Since the influence from extraction wells is predicted on the depth of waste, the design of the system will vary as landfilling continues. As such, is the design submittal called out in the NSPS for the entire permitted area, or for only those areas warranting control (i.e., those active

areas that have waste in place that is 5 years or older or closed areas 2 years or older)? This is an important issue. A registered engineer who must sign the design for the entire permitted footprint may not feel comfortable because the interim system installations may be different than his total plan. Please clarify.

Answer: The plan must cover the area to be controlled over the intended period of use (lifetime) of the gas control system, not the entire landfill. As specified in § 60.752(b)(2)(ii), the collection system must be designed to handle the maximum expected gas generation rate from the entire area of the landfill that warrants control over the intended period of use of the gas control or treatment system. Active areas in which the initial waste has been in place 5 years and closed or final grade areas where the initial waste has been in place 2 years must be controlled. As the landfill expands, the collection system must be expanded into areas that meet these criteria. Thus, if a control system is expected to last 15 years (for example), the design plan must take into account all active areas of the landfill that are expected to meet the 2 year/5 year criteria within the next 15 years, given the expected waste acceptance rate. The design plan should include the initial design and plans for system expansion.

3. Question: For those landfills that equal or exceed 50 Mg NMOC/yr, but only have waste in place for 1 or 2 years (have no areas that are active which are 5 years or older or 2 years or older in areas that are closed), is a collection and control system design plan required within 1 year of reporting to the agency that the facility exceeds 50 Mg NMOC/yr?

Answer: A situation where a landfill that has accepted waste for only 1 or 2 years exceeds the 50 Mg/yr emission rate is expected to be infrequent. However, in such a case, the design plan is due within 1 year of the report showing NMOC emissions \$ 50 Mg/yr, unless the owner or operator elects to perform Tier 2 or 3 testing to demonstrate that emissions are less than 50 Mg/yr. The collection and control system must be installed within 30 months of the first report showing emissions over 50 Mg/yr. These systems must be installed in active areas that have waste in place for 5 or more years or areas at final grade that have waste in place for at least 2 years. However, in the commenter's example, if a landfill that had been accepting waste for only 1 year submitted a report showing NMOC emissions \$ 50 Mg/yr, and 30 months after that (e.g., 3 ½ years after the landfill began accepting waste) had no active areas where waste had been in place 5 years and no areas at final grade where waste had been in place 2 years, they could wait to install and operate the collection and control system until an area of the landfill met the 5 year/2 year criteria above.

If the landfill elected to perform Tier 2 testing to demonstrate that NMOC emissions are less than 50 Mg/yr, they would wait to perform Tier 2 measurements until the first waste has been in place for 2 years because the Tier 2 measurement procedures can only be done where waste has been in place for 2 years [see § 60.754(a)(3)]. If Tier 2 shows emissions < 50 Mg/yr, the design plan and control would not be required until after the annual NMOC emission rate reports show that emissions have increased to 50 Mg/yr or more.

4. Question: What are the requirements for installing a collection system in cells that have not yet reached final grade, but are subject to collection, where adjacent cells are being developed? Is it possible to allow landfills to install a collection system in applicable cells only when they reach final grade, provided it is done within a specified time period (i.e., they can't stall reaching final grade to put off installing a collection system)?

Answer: The rule requires collection and control of NMOC from all applicable areas that warrant control (those meeting the 2 or 5 year criteria), regardless of the activity at adjacent cells.

5. Question: Suppose a landfill subject to the NSPS has total NMOC emissions greater than 50 Mg/yr and therefore is required to install a gas collection system. Are there any exceptions to the NSPS requirement to install collection and control systems in active areas where waste has been in place 5 years? For example, suppose one portion of the landfill contains waste that is over 5 years old, but will be covered with an additional 200 feet of waste. The installation of collection wells in this portion of the landfill appears impractical given that the well piping would have to extend at least 200 feet above the present surface of the waste and machinery to place waste would need to maneuver around the wells. What options does this landfill have?

Answer: There are no exceptions to the requirement to install collection systems in active areas where the initial solid waste has been placed for 5 years, however the landfill does not need to install wells that extend into the air. The system can be built incrementally. The landfill can install wells in the existing waste and connect the well headers with lateral piping routed to a control device. After waste is later placed in the area above these wells, new wells can be sunk into the new waste. The new wells will be above the old wells. Landfills should keep the collection system requirements in mind when planning their filling practices, in order to allow efficient collection system design and installation.

### C. Passive Collection Systems

6. Question: Can a landfill use trenches to prevent the off-site migration of gases from the landfill even after a gas collection system is installed?

Answer: The use of trenches to stop off-site migration of landfill gases is often done for safety considerations, often in problem cases where a landfill gas collection system is installed. In some instances, the installed collection system of vertical wells did not capture all the landfill gas, whereas the lateral trenches did. The off-site migration of landfill gas could result in an emergency situation, especially when adjacent properties are operating such that a fire could be started and/or fueled by the migrating landfill gas.

The NSPS allows for the use of alternative system designs to incorporate the many site-specific factors involved with landfill gas system design. Section 60.752(b)(2)(i)(D) states that a wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, or horizontal collection systems, leachate collection components, and passive systems. In the situation where a trench is used to prevent off-site migration, a pipe must be put into a lateral trench to stop the landfill gas migration and lateral gas extraction will be accomplished through a vacuum. The gas collection system and trench gas extraction system are operated simultaneously.

7. Question: For passive collection systems, what kind of liners can be put in as new cells are built? Should the liners be Subtitle D or State equivalent? Do landfills have to put liner on the sides as well as bottom as new cells are built?

Answer: Section 60.752(b)(2)(ii) states that passive collection systems must be installed with liners on the bottom and all sides in all areas in which gas is to be collected. Thus, liners must be installed on the sides as well as the bottom as new cells are built. The NSPS also specifies that the requirements of § 258.40 (RCRA solid waste regulations) be followed for liner installation. Section 258.40 requires that new MSW landfills and lateral expansions be constructed in accordance with a design approved by the Director of an approved State or as specified in § 258.40(e) for unapproved States. Performance standards and criteria for liners are included in § 258.40.

8. Question: The language for collection systems seems inconsistent with the requirement of a negative pressure gradient at

wellheads. The regulation allows the use of either passive or active collection systems, but then goes on to require a negative pressure gradient at each wellhead. A negative pressure gradient can only be accomplished with an active system.

Answer: The rule allows flexibility for the owner or operator to propose the use of alternative collection systems and alternative monitoring in their collection and control system design plan. Specifically, § 60.752(b)(2)(i)(B) allows the owner or operator to "include (in the collection and control system design plan) any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions of §§ 60.753 through 60.758 proposed by the owner or operator." Therefore, when an owner/operator submits a design plan for a passive collection system, they can also specify that the negative pressure requirement does not apply and propose alternative monitoring. The regulatory agency will review the proposed design plan and monitoring requirements, and the landfill will be subject to the specific requirements that are approved.

D. Landfills with Existing Collection and Control Systems

9. Question: Several sites subject to the NSPS already have existing gas collection and control systems. For the purposes of the design plan submittal (due within one year of reporting to the Agency that the facility equals or exceeds 50 Mg NMOC/yr), the landfill owner/operator plans to conduct an inspection of the gas system to ensure that all required monitoring can be conducted and a surface scan to verify that the system collects all the gas from those areas warranting control and meets the criteria stated under § 60.752. These results along with as built documentation of the system will be submitted as part of the collection and control system design submittal. Is this an acceptable demonstration of compliance?

Answer: The general compliance demonstration approach described in the question sounds acceptable. However, keep in mind that the documentation submitted must also show that the criteria in § 60.752(b)(2)(ii) are met (e.g., that the system is designed to handle the maximum expected gas flow rate over the life of the control equipment, that gas will be collected from each area meeting the 5 year/2 year waste in place criteria, and that off-site migration is minimized). Furthermore, if the system does not conform with the specifications for active collection systems in § 60.759, a demonstration of the sufficiency of the alternative design must be included. The landfill will also be required to submit a performance test to show that the control device achieves 98 percent reduction (or must use a flare that meets the criteria specified in § 60.18).

Section 60.757(g) requires information about the collection system design to be submitted with the test report.

10. Question: If existing MSW landfills have a flare system, but do not meet the exact specifications in 40 CFR 60, Subparts Cc and WWW, are they required to "upgrade" and/or replace their system? Or can the State "control" through permitting requirements?

Answer: In general, State plans for existing landfills must be at least as stringent as subpart Cc. This includes compliance with the flare specifications. However, in a few situations the State standards for a specific existing landfill may be less stringent than the EG. In such cases, the State must demonstrate that less stringent requirements are warranted based on specific criteria contained in § 60.24(f) of subpart B. These criteria include unreasonable costs, physical impossibility, or other factors specific to the landfill that make application of a less stringent standard significantly more reasonable. If the State believes that an upgrade of the flare would meet one of these criteria and wants to prescribe less stringent specifications, it could make such a demonstration. These demonstrations must be reviewed by EPA as part of the State plan approval process. Any new landfills that are subject to the NSPS and use a flare to comply with the NSPS control requirements must meet the specifications in subpart WWW and § 60.18.

#### E. Other Control Concerns

11. Question: If a facility submitted the Tier 1 report in June 1996 and that report indicated emissions greater than 50 Mg NMOC/yr, can Tier 2 still be used to demonstrate a lower emissions rate? Some States are allowing the submittal of Tier 2 reports later than the cutoff schedule published in the NSPS.

Answer: The NSPS requires submittal of the Tier 2 report within 180 days of the Tier 1 report.

12. Question: One commenter stated that the maximum 500 ppm methane surface concentration required in monitoring would result in reduced Btu value of the gas they supply to a client. This commenter supplies gas that is 55 percent methane to their client. Remaining below the 500 ppm methane surface concentration would increase the chance of air intrusion in their system. This may result in the methane concentration being reduced to 40 percent methane, which their client is not able to handle. They base their conclusions on California, which has less rain and apparently has more sand in the cover than in Minnesota (In Minnesota it is mostly clay). The

commenter would like to know if the EPA has any information on this issue.

Answer: The purpose for the surface monitoring is to ensure that the landfill cover or cap and gas extraction system are properly designed and operated to ensure capture of the landfill gas. Landfills with properly designed and operated systems should not have air intrusion that would lower the BTU content of the gas. If air intrusion occurs. The owner/operator may need to reduce the vacuum, improve the cover, install additional collection wells, or a combination of these.

#### F. Compliance Times

13. Question: When does a facility become subject to the EG? If the State/local authority has not yet adopted the guidelines, is the facility considered "subject" to them, or must the regulation be adopted first? Is the compliance date for existing landfills 30 months from the effective date of a State standard or 30 months from the date EPA approves the State standard? Is there any "no later date" for complying other than this date? If a landfill is subject to the NSPS (not EG), what is the time frame for compliance with the NSPS rule?

Answer: An existing facility is not subject to any Federal requirements until either a State plan is approved by EPA or a Federal plan is promulgated for existing facilities. A facility becomes subject to the State standard upon the effective date of the State standard. The EG, as recently amended, States that the compliance date for existing landfills  $\geq 2.5$  million Mg and 2.5 million m<sup>3</sup> is 30 months after the initial or subsequent NMOC emission rate report which first shows that NMOC emissions equal or exceed 50 Mg/yr. However, States may adopt compliance schedules more stringent than the EG and NSPS, consistent with 40 FR part 60, subpart B. Section 60.24(c) of subpart B requires "emission standards shall be no less stringent than the corresponding guideline(s) specified in subpart C of this part, and final compliance shall be required as expeditiously as practicable but no later than the compliance times specified in subpart C of this part." There is no later date for complying with the EG. If the State agency does not submit an approvable plan, a Federal plan will be implemented to require control of landfills in that State.

The time frame for NSPS compliance is as follows: A facility must submit a design capacity report by June 10, 1996 or within 90 days after commencement of construction, modification, or reconstruction. If the facility has a design capacity  $\geq 2.5$  million

Mg and 2.5 million m<sup>3</sup>, then it must calculate its NMOC emissions potential using the tier 1 calculations in the rule and report the results. If this report indicates NMOC emissions  $\geq$  50 Mg/yr it must submit a collection and control design plan within 1 year, and install a collection and control system within 30 months of the first report indicating emissions  $\geq$  50 Mg NMOC/yr, unless the landfill performs tier 2 or 3 measurements that show NMOC emissions <50 Mg/yr.

### III. DESIGN CAPACITY DETERMINATIONS

1. Question: The maximum design capacity of a landfill is specified in its solid waste permit. If a landfill was never permitted but has a closure/post-closure plan which specifies the projected volume of waste in place upon closure, can those estimations be used instead of design calculations?

Answer: The landfill owner/operator should use the best credible information to estimate the design capacity in the absence of a permit limit. The basis for the estimate must be fully documented. A closure plan could be a good source of information, but the regulatory agency would likely want the landfill owner to verify it with calculations to be sure it is a reasonable estimate.

2. Question: In § 60.33c(a)(2), does the design capacity include planned but not permitted landfill capacity?

Answer: No. Design capacity is based upon the most recent permit issued by the State, local or Tribal agency responsible for regulating the landfill (plus any waste already in place that is not accounted for in the most recent permit).

3. Question: In determining the design capacity, do Mg take precedence over m<sup>3</sup>?

Answer: Section 60.752(a) of the rule states that the owner or operator may calculate the design capacity in either Mg or m<sup>3</sup> for comparison with the exemption values. Under the NSPS and EG, design capacity is used to determine whether or not a landfill is below the design capacity cutoff. If the design capacity in the permit is below either 2.5 million Mg or 2.5 m<sup>3</sup>, the landfill is exempt (except for design capacity reporting requirements). A landfill with a volumetric permit may choose to calculate design capacity on a mass basis, or vice versa, based on a site-specific density. The initial design capacity report must provide supporting documentation.

For example, a landfill may have a permitted design capacity greater than 2.5 million m<sup>3</sup> by volume; but the landfill may have documented calculations showing that, based on the actual waste density, the design capacity is less than 2.5 million Mg by weight. Because the design capacity is less than 2.5 million Mg, the landfill is below the design capacity cutoff. If such a conversion is made, records must be kept of the annual recalculation of the site-specific density and design capacity with supporting documentation. If such a landfill changes its compaction practices such that the density of the waste placed in the landfill increases, the design capacity could

become greater than 2.5 million Mg, and the landfill would then need to submit an amended design capacity report.

4. Question: What density should be used to convert volume waste to weight of waste?

Answer: If a landfill chooses to convert design capacity from a volume basis to a mass basis for comparison with the 2.5 million Mg exemption level (instead of the 2.5 million m<sup>3</sup> exemption level), the owner or operator must document the calculations. The site-specific density must be recalculated and documented annually.

An appropriate site-specific density should be used and documented since density will depend on the type of waste and compaction practices at the landfill. Landfill densities range from 0.18 to 1.2 Mg/m<sup>3</sup> (300-1800 lbs/yd<sup>3</sup>), with more typical values between 0.5 and 0.6 Mg/m<sup>3</sup> (800-1000 lbs/yd<sup>3</sup>). A landfill's density depends on the composition of the waste, its original density, and its compactability. For example, residential waste, which is usually not as dense as construction debris, is more easily compacted than construction debris. A landfill with more residential waste would be more dense than one with construction waste.

5. Question: Can non-degradable waste such as auto fluff (shredded cars without the metal) or low level petroleum contaminated soil that is used as daily cover be excluded from waste calculations. Also, can process industrial sludge such as paper mill sludge be excluded from waste calculations? What documentation is required to subtract non-degradable waste from the design capacity?

Answer: In a landfill that has municipal solid waste all the waste is included in calculating the design capacity. Non-degradable waste cannot be subtracted from the permitted landfill design capacity. However, nondegradable waste can be subtracted from the mass of solid waste when calculating the NMOC emission rate because such waste would not produce NMOC emissions. Nondegradable waste is defined as waste that does not break down through chemical or microbiological activity. Examples include concrete, municipal waste combustor ash, and metals. Petroleum contaminated soils (PCS) and paper mill sludges likely contain organics that could be emitted as MSW landfill gas emissions. Therefore, emissions from PCS and sludges would need to be accounted for in the emission estimate only. The direct final notice clarifies that documentation of the nature and amount of non-degradable waste needs to be maintained when subtracting the mass of non-degradable waste from the total mass of waste for NMOC emission rate calculations (See question 1 in section IX Miscellaneous).



#### IV. ESTIMATING EMISSIONS

##### A. NMOC vs VOC

1. Question: What is the difference between NMOC and VOC? Is NMOC for landfills only?

Answer: NMOC is non-methane organic compounds, which include volatile organic compounds (VOC) as well as other organic compounds. At this time, NMOC is only used for landfill purposes.

##### B. Tier Calculations

2. Question: When there is insufficient information to use the emissions calculation formulas, can landfill owners/operators use AP-42 emissions calculations?

Answer: No, to determine applicability consistently, the owner/operator must use the equations and Tier 1 default values provided in the NSPS and EG to determine NMOC emissions or develop site-specific values using the Tier 2 or 3 procedures in § 60.754 of the NSPS or EG. The tier calculations are a purposely conservative approach to predict the eventual need for controls. The Tier 1 default values of  $k$ ,  $L_0$ , and  $C_{NMOC}$  in the NSPS and the EG tend to overstate NMOC emission rates to predict the eventual need for controls, to encompass a wide range of landfills, and to encourage site-specific data. The AP-42 calculations are for determining more typical landfill emissions for inventories, PSD and NSR permitting, and other purposes. Two equations are provided in the tier calculations: one for use if the actual year-to-year acceptance rate is known and the other for use if it is unknown. For Tier 1 calculations, the only information needed to use these equations is the mass of solid waste in each section and the age of each section, or the average annual acceptance rate, age of the landfill, and time since closure. Landfills generally have or can calculate the information needed to use the procedures in the NSPS and EG. The AP-42 procedures require the same information.

3. Question: In the promulgated rule § 60.754(a)(1) requires sources to use assumed values of  $k$ ,  $L_0$ , and  $C_{NMOC}$  when calculating emissions for the purpose of applicability. Many sources in Region 9, particularly in Southern California and Arizona, argue that these assumed values should not apply to them because of the arid environment in which they are located. Can other values be used?

Answer: The recent amendments (63 FR 32743) includes a separate default  $k$  value to be used in arid areas (those with 30-year

average annual precipitation of less than 25 inches as measured at the nearest representative official meteorological site). The arid k value accounts for the slower decomposition rate of waste in those areas. This optional k value should allow arid areas to account for the lower gas production rate without having to incur the additional cost of Tier 3 site-specific testing. Furthermore, the 3-tier emission estimation procedure in § 60.754(a)(4) allows any owner/operator to use site-specific values for k and  $C_{\text{NMOC}}$ , based on testing, in lieu of the default constants if a landfill uses Tier 2 or 3 emission estimation procedures. The site-specific values would reflect any unique characteristics that would affect the emission rate of NMOC for that particular landfill.

4. Question: If an existing landfill greater than 2.5 million Mg and 2.5 million  $\text{m}^3$  already has a collection system in place that is controlled, how should it be determined if it emits NMOC greater than/less than 50 Mg/year? Under Tier 1 calculations they would probably show landfill gas emissions  $\leq$  50 Mg/year. Tier 2 calculations also may not be appropriate.

Answer: This issue was raised in one case where Tier 1 calculations for a landfill that already had a control system indicated emissions greater than 50 Mg/yr. The tier procedures in the NSPS do not specifically address how to estimate uncontrolled emissions from already controlled landfills for purposes of determining if the emissions exceed 50 Mg/yr and whether the landfill must meet the NSPS or EG control requirements and emission limits. The State agency reasoned that to determine uncontrolled emissions for a landfill with a collection and control system already in place, it would be appropriate to use the equation and NMOC concentrations measurement procedure in § 60.754(b). This equation is the one used for controlled landfills to determine if uncontrolled emissions have fallen below 50 Mg/yr such that the control system can be removed. It requires measuring NMOC at the common header pipe of the collection system prior to the control device.

Using this approach, landfills that already have collection and control systems would calculate uncontrolled NMOC emissions for the portion of the landfill from which gas is collected using the equation and NMOC concentration measurement procedures in § 60.754(b). (If there are areas of the landfill from which gas is not collected, the tier procedures would be used for these areas.) In order for the equation in § 60.754(b) to be appropriate, the collection system must be well designed and operated. In particular, for an active collection system, a negative pressure should be maintained at the wellheads without excess air infiltration. Also,

if surface monitoring has been done at the landfill, it should show methane concentrations below 500 ppm.

In addition to using the equation found in § 60.654(b) in combination with the actual measured NMOC concentration collected at the header, the NMOC concentration measured at the header (as described in VII.E.13, Testing and Monitoring) could also be used in the equation found in § 60.754(a)(1) to determine if the landfill should be subject to the requirements found in the NSPS or EG.

If total uncontrolled emissions are < 50 Mg/yr, the landfill is not subject to the control requirements of the NSPS or EG, but must continue to submit annual NMOC emission rate reports (unless it is closed). If the annual NMOC report shows that the uncontrolled emission rate has increased to 50 Mg/yr or greater, the landfill would become subject to the control requirements of the NSPS or EG. The landfill would then have 1 year to submit a design plan to either document that the existing system meets the requirements of the NSPS or EG or to specify plans to upgrade the system to achieve compliance. The landfill would need to come into compliance and begin required testing and monitoring within the time frames specified in the NSPS or EG.

5. Question: Can a landfill with uncontrolled emissions \$ 50 Mg/yr install a control system that does not meet NSPS or EG requirements to reduce actual emissions to <50 Mg/yr and thereby avoid being subject to NSPS or EG control requirements?

Answer: No. As explained in the answers to the previous questions, the uncontrolled emission rate is used to determine whether the landfill is subject to NSPS or EG control requirements.

6. Question: Has EPA recognized any alternative models, other than the Landfills Air Emissions Estimation Model? If one is proposed at the State level, what would be the mechanism for getting this model approved?

Answer: Currently the EPA has not approved any models that can be used as alternatives to the Landfills Gas Emissions Model (LandGEM). Version 2.01 of this model and the user's manual can be found on the web at:<http://www.epa.gov/ttn/catc/products.html>. Alternative models should be sent to Susan Thorneloe of EPA/ORD for evaluation (see e-mail address in the Introduction to this document). In order for an alternative model to be approved, it should use the emissions estimation equations in the rule (which are the same as those used in the LandGEM) or another approach that is demonstrated to provide a reasonable measure of landfill gas generation.

7. Question: Does the landfill air emissions model handle the situation where leachate is recycled through the landfill?

Answer: The landfill air emissions model does not contain specific factors that would address the recycling of leachate through the landfill. However, under Tier 3 of the NMOC calculation procedure [§ 60.754(a)(4)] the owner/operator can substitute a site-specific methane generation rate in lieu of the methane generation rate constant ( $k$ ). The site-specific methane generation rate is determined by the owner/operator by using gas flow testing (Method 2E). This site-specific methane generation rate could incorporate the effects of leachate recycling on the methane generation rate for that specific landfill.

C. Estimating Emissions for Inventory or Permitting Purposes

8. Question: Should the equations and assumed default values for  $K$ ,  $L_0$  and  $C_{NMOC}$  in the NSPS and EG for estimating NMOC emissions be used for title V and emission inventory purposes? Should these same values be used for determination of applicability under PSD and nonattainment NSR permitting?

Answer: The Tier 1 default values of  $k$ ,  $L_0$ , and  $C_{NMOC}$  tend to overstate NMOC emission rates for most landfills, and are intended to be used to indicate the need to install a collection and control system or perform a more detailed Tier 2 analysis. It is not recommended that these default values be used for estimating landfill emissions for purposes other than the NSPS and EG. The EPA document "Compilation of Air Pollution Emission Factors" (AP-42) provides emission estimation procedures and default values that can be used for emissions inventories, PSD and NSR permitting, and other purposes.

## V. ELEMENTS OF A STATE PLAN

### A. List of Plan Elements

1. Question: What should be included in a State plan for implementing the EG?

Answer: In some cases, local agencies, tribal agencies, or protectorates of the United States may submit plans for landfills on their jurisdictions. The same guidance applies. The term "State plan" used throughout this document includes plans developed by local or tribal agencies or protectorates. A State plan must include the following components:

1. Identification of enforceable State mechanisms selected by the State for implementing the EG,
2. A demonstration of the State's legal authority to carry out the Section 111(d) State plan as submitted,
3. An inventory of MSW landfills in the State affected by the EG. This includes existing MSW landfills that have accepted waste since November 8, 1987, or have additional capacity for future waste deposition. An existing landfill may be active (currently accepting waste or having additional capacity available for waste deposition) or closed (no longer accepting waste nor having available capacity for future waste deposition),
4. An inventory of NMOC emissions from MSW landfills in the State,
5. Emission standards for MSW landfills that are "no less stringent" than those in the EG<sup>1</sup>,
6. A State process, as specified in § 60.33c(b) of Subpart Cc, for State review and approval of site-specific gas collection and control system design plans,

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<sup>1</sup>On a case-by-case basis, the State may provide for a less stringent standard or a longer compliance schedule if the State demonstrates to EPA that the criteria in § 60.24(f) of Subpart B are met, and the EPA approves the standard or schedule. The State may also provide for a more stringent standard (see section II.F).

7. Compliance schedules extending no later than 30 months after the date the annual NMOC emission rate equals or exceeds 50 Mg/yr<sup>1</sup>,
8. Testing, monitoring, recordkeeping, and reporting requirements,
9. A record of public hearing(s) on the State plan, and
10. Provision for annual State progress reports to EPA on implementation of the State plan.

These components are described in detail in MSW Landfills, Volume 2.

B. Emission Inventories

2. Question: Is an emission inventory required only for major sources or only for landfills with design capacities  $\leq$  2.5 million Mg and  $\leq$  2.5 million m<sup>3</sup>? Is this also true of the emissions report that is to be part of the State plan?

Answer: An emission inventory of all landfills, including those that are not major sources or are  $<$  2.5 million Mg or 2.5 million m<sup>3</sup>, is a required part of the State plan. This is specified in Subpart B [40 CFR  $\S$  60.25]. Subpart B also requires annual updates of the State emissions inventory for all existing landfills, regardless of design capacity. This is discussed further in MSW landfills, Volume 2. However, in view of the limited requirements of the EG and NSPS on owners and operators of small MSW landfills, the EPA will allow States, in limited circumstances, to submit emission inventories as part of State plans without requiring that, in all cases, that States develop emissions data for MSW landfills below 2.5 million Mg or 2.5 million m<sup>3</sup> where development of such data would be unreasonable and impractical. However, where accurate data are already available, or can reasonably be generated without undue expense or effort, States should require and include such data in their State plans. Details of this policy are discussed in a memorandum entitled "Emission Inventories for Existing MSW Landfills with Design Capacities Below 2.5 Million m<sup>3</sup>". The memorandum is available on the EPA TTN under recently issued policy and guidance memorandums at <http://www.epa.gov/ttn>. The memorandum also discusses situations where it may be "unreasonable or impractical" to estimate NMOC emissions.

This easing of the NMOC emission inventory requirement, however, does not relieve States of the obligation to provide, as part of their State plan, an inventory of all existing MSW landfills

within the State. Also, landfills with design capacity \$ 2.5 million Mg and \$ 2.5 million m<sup>3</sup> must submit an annual NMOC emission report to the EPA or State.

3. Question: Can the submittal of design capacities for small landfills substitute for the emission inventory?

Answer: No. The inventory is a requirement as part of subpart B. Also, the public has the right to know what the landfills are emitting. (See the preceding question for an exception to the emission inventory requirement.)

C. Enforceable Mechanisms including Incorporation by Reference or use of Title V Permits

4. Question: If States adopt by reference the NSPS or the EG, will States still have to go through rulemaking, if not, is EPA implying that the States can simply include the requirements in a title V permit? If the latter scenario is true, will the EPA have to receive a copy of the title V permits on or before December 12, 1996, as satisfying section 111(d), and the public hearing requirements as well? In addition, do States have to submit a 111(d) plan if they are adopting the landfill NSPS by reference for both existing and new sources. If the State's rulemaking procedure includes public participation, would this fulfill the required element?

Answer: The State will have to provide the underlying authority through a mechanism that is enforceable by the State such as rulemaking, State operating permit, or regulatory compliance or administrative orders. Title V permits may not have that underlying authority. If a State uses a mechanism other than rulemaking, an Attorney General's opinion is strongly encouraged.

Under 40 CFR § 60.23(a), States are required to adopt and submit to the Administrator a plan implementing requirements of the EG within 9 months after promulgation of the EG. This plan is required regardless of the enforceable mechanism that is chosen. Even if the State adopts the landfill NSPS by reference for both existing and new sources, a State plan is still required to be submitted that has all of the required elements as specified in 40 CFR Subpart B. The rule is only one part of this plan and typically does not contain all of the required elements for a State plan. In addition, even though there was public participation in the development of the rule, a separate public hearing is required on the State plan, of which the rule is only one part.

5. Question: Can States revise their existing landfill rules instead of writing new ones? California stated that they will only need to revise portions of their current landfill rules. Wisconsin stated that they wish to use their existing landfill rules also, because, in their opinion, they are more stringent in some ways. However, since title V permits are a requirement for some landfills, Wisconsin does not believe their State Attorney will allow them to apply (or revise, if necessary) their current State landfill rules (developed in the Solid Waste Division) as a means of regulating MSW landfills under rules not developed from the Air Division.

Answer: To go in a title V permit, the underlying authority such as the rule must be an applicable requirement of the Clean Air Act (CAA). If the State landfill rules are not an applicable requirement of the CAA, a separate rulemaking would likely be needed. This requirement of this rule could then go into title V permits.

6. Question: Can States incorporate the EG by reference?

Answer: Yes, as long as the State demonstrates that it has the legal authority to enforce its rule against a landfill owner or operator. The State may want to add a clause to say that designated facilities under the respective subpart shall comply with the requirements for State plan approval in 40 CFR 60.33c, 60.34c, and 60.35c. This will ensure that the State would be able to enforce its rule directly against sources. Also, some States that incorporate the EG by reference may want to provide an attorney's opinion regarding the State regulation to ensure that the State could enforce the rule directly against a landfill owner or operator.

7. Question: Can the NSPS be adopted as the State rule for existing sources with the provision for the submittal and compliance dates that are specified in the EG?

Answer: Yes, if a State has the legal authority to do this. Any compliance schedule that extends more than 1 year beyond the date of EPA's approval of the plan must include all the increments of progress required under §§60.24(a) and 60.24(e)(1). The NSPS does not contain dates for awarding contracts, initiating construction, and completing construction (unless this date is the same as the compliance date).

#### D. Public Hearings

8. Question: If individual air districts (as in California) have public hearings for the district State plans, does the State also have to have a public hearing for the overall plan?

Answer: No, the individual public hearings will suffice.

E. Stringency of State Standards

9. Question: The Agency has indicated that the State programs must generally be at least as stringent as the EG, and can be more stringent. Does the Act allow for less stringent requirements, as long as there is justification? Can the EPA provide guidance on criteria and specific conditions which may allow for a less stringent emission standard or a longer compliance schedule to apply.

Answer: Section 60.24(f) of subpart B states that:

"On a case-by-case basis for particular designated facilities, or classes of facilities, States may provide for the application of less stringent emission standards or longer compliance schedules than those otherwise required by paragraph (c) of this section, provided that the State demonstrates with respect to each facility (or class of facilities):

- (1) Unreasonable cost of control resulting from plant age, location, or basic process design;
- (2) Physical impossibility of installing necessary control equipment; or
- (3) Other factors specific to the facility (or class of facilities) that make application of a less stringent standard of final compliance time significantly more reasonable."

More specific conditions cannot be provided at this time because the decisions must be made on a case-by-case basis considering the specific situations.

If a State believes that one of these criteria apply and wants to prescribe less stringent specifications, they can make such a demonstration as part of the State plan. These demonstrations must be approved by EPA as part of the State plan approval process.

10. Question: Why would a State plan be more stringent than the NSPS?

Answer: States have the discretion of developing a State plan for implementing the EG, or a State standard for new sources, that is more stringent than the NSPS or EG (see section II.F for additional details). Sometimes, States have more stringent standards to address State and local air quality issues or public health concerns. If a State has a regulation or law that limits its ability to adopt and implement regulations more stringent than the Federal requirements, then such a State should make clear its authority for adopting more stringent requirements than the Federal requirements.

F. Plan Approval Notices, Other State Plans

11. Question: How can I get a copy of a FR notice that has already been published for a State plan?

Answer: 40 CFR Part 62, Approval and Promulgation of State plans for Designated Facilities and Pollutants, lists State plans that have been approved by EPA. Each State plan is referenced to a Federal Register citation by location and date.

12. Question: Which States have developed rules/plans already? Can these State rules be made available to States that are further behind in developing a rule?

Answer: The EPA will keep an up-to-date list of State plan submittals and approvals on the EPA TTN Web at <http://www.epa.gov/ttn/oarpg>. Also you may contact your Regional EPA office for information on which States have adopted rules.

G. SIP Program

13. Question: Since the landfill rule also deals with criteria pollutants (i.e., VOCs), will the State/EPA also have to do a SIP revision?

Answer: The section 111(d) designated pollutant is landfill gas, which includes both toxics and VOC and other elements. The State must prepare a section 111(d) State plan to implement the landfills EG for landfill gas. The NSPS and EG regulate NMOC emissions as a surrogate for landfill gas. Thus, the section 111(d) State plans for landfills must address NMOC. This rule in no way adds to or deletes from any obligation for VOC control or toxics control. Therefore, A SIP revision would not be required because of this rule. However, if a landfill meets a VOC or toxics threshold, that may trigger other requirements, such as PSD review or a MACT standard or title V permit, independent of the NSPS and the EG.

H. Other

14. Question: When is the State delegated authority to implement the EG or NSPS?

Answer: For the EG, States have authority to implement and enforce the EG upon EPA approval of their State plans. For the NSPS, many States have already been given the authority to implement and enforce all NSPS. However, other States have been delegated authority only for certain subparts, but not for all NSPS. Such States may request delegation of the landfills NSPS. A list of States that have been delegated authority appears in 40 CFR 60, § 60.4(b).

## VI. REPORTING REQUIREMENTS

### A. General

1. Question: What format should be used for the reports?

Answer: Appendix H of MSW Landfills, Volume 1 provides an example format for the reports required by the NSPS and EG. States and landfills have discretion to use any format as long as all the information specified by the NSPS or EG is included.

2. Question: To whom should the reports be submitted?

Answer: For landfills subject to the NSPS, the General Provisions of Part 60 require that reports be sent to the appropriate EPA regional office. Reports must also be submitted to the appropriate State air agency contacts where the State has been delegated authority to implement and enforce the NSPS. Addresses for EPA regional offices and State agencies that have been delegated authority are listed in 40 CFR 60, § 60.4.

For landfills subject to the EG, if the State in which the landfill is located has an approved State plan, reports are submitted to the State. If the State or tribal area in which the landfill is located does not have an approved plan that covers that landfill, then a Federal plan will be promulgated. Enforcement of the Federal plan may be delegated to the State or retained by EPA. If a landfill is subject to a Federal plan and enforcement has been delegated to the State, then reports should be sent to both the State and the EPA regional office. If enforcement of the Federal plan has not been delegated, reports should be sent to the EPA regional office.

### B. Design Capacity Reports

3. Question: In developing their section 111(d) plan, do the States need to require all landfills to submit design capacity reports? If a State is addressing the EG by regulating large landfills with Compliance Orders instead of a rulemaking, will they also need to require the small landfills to do design capacity reports? Do States that submit a negative declaration stating that they do not have any large landfills need to require that all of the small landfills submit design capacity reports?

Answer: The State must require that all landfills submit the initial design capacity report unless an alternative approach is approved for the State under § 60.24(f) of 40 CFR 60 subpart B. Submittal and review of these reports helps ensure that the landfill

has correctly calculated their landfill capacity. The State may calculate design capacities for small landfills as part of the State plan as long as the State verifies their calculations with the small landfill owner or operator.

4. Question: Section 60.757(a)(2) lays out the requirements of the design capacity report (map, maximum design capacity from permit or calculations, etc.). If the State already has this information in its records from when the landfill was initially constructed (maybe even 30 years ago), and the information is still accurate, must the landfill owner/operator submit this information himself?

Answer: Unless an alternative reporting approach is approved for the State under § 60.24(f), a report must be submitted. The State may allow the owner/operator to submit a letter indicating that the information has been submitted previously, the date it was submitted, why it was submitted, and a signed statement that the previously submitted information is still current.

5. Question: Is there any lower design capacity below which a facility does not have to submit an initial design capacity report pursuant to § 60.752(a)?

Answer: No, all landfills must submit an initial design capacity report.

6. Question: For the NSPS, is it true that only modifications which result in a maximum design capacity greater than or equal to 2.5 million Mg and 2.5 million m<sup>3</sup> are required to submit an amended capacity report?

Answer: Landfill owners/operators who are already subject to the NSPS but are <2.5 million Mg or 2.5 million m<sup>3</sup> are required to submit an amended design capacity report only if there is an increase in the design capacity to or above 2.5 million Mg and 2.5 million m<sup>3</sup>. Such a capacity increase could be a result of a modification (i.e., an increase in permitted volume by vertical or horizontal expansion) or a change in density if a site-specific density has been used to convert from mass to volume or from volume to mass. The amended design capacity report must be submitted within 90 days of the capacity increase.

If an existing landfill subject to the emission guidelines is modified, then it becomes subject to the NSPS and must submit the NSPS initial design capacity report. This report must be submitted within 90 days after the date the modification is commenced as required by § 60.757(a) of the rule, as recently amended. This

requirement applies even if the modified capacity is <2.5 million Mg or 2.5 million m<sup>3</sup>.

7. Question: The information requested in 40 CFR Part 60 Subparts Cc and WWW (§ 60.757) requires that depth of refuse be specified. The depth of refuse will vary in different cells and will even vary within a single cell when base grades of the cell are sloped to facilitate leachate collection. What is EPA looking for as an acceptable response? A range? Why is this information needed if the permitted volume is specified? Regarding compaction practices, what kind of response is desired? A description of the compaction equipment used? A gate-to-bank compaction ratio with gate density specified? An in-place waste density? With regard to the annual refuse acceptance rate, is this a projected maximum for the life of the landfill, the project waste receipts for the current year, or is it the average waste receipts since the landfill began receiving waste?

Answer: Section 60.757(a)(2)(ii) specifies that the maximum design capacity that is specified in the permit issued by the State, local, or Tribal agency responsible for regulating the landfill be submitted in the initial design capacity report. A copy of the permit may be included. Only if this permitted value is not available, or if the permit is by volume and the owner/operator wishes to convert it to a mass basis (or vice versa) is the owner or operator required to submit engineering calculations supported with data. The direct final rule clarifies that values of appropriate parameters must be submitted with the calculations. The owner/operator must provide sufficient data to support the calculations. If depth varies or waste acceptance rate used in the calculation varies, the calculations and supporting documentation should show what values were used in the calculations and explain why these values were used and how the variation was accounted for. If the design capacity is being converted from volume to mass, or from mass to volume, a site-specific density must be used in the calculations. Supporting documentation must document and justify the density value used in the calculation. Typical landfill densities range from 0.5 to 0.6 Mg/m<sup>3</sup>, but they can range from about 0.18 to 1.2 Mg/m<sup>3</sup>. A landfill's density depends on the composition of the waste, its original density, and its compactability.

#### C. Timing of Reports

8. Question: When must the required reports be submitted? What should the EPA do if design capacity and emission reports are not submitted by June 10, 1996?

Answer: For landfills subject to the NSPS, the initial design capacity report must be submitted no later than:

- C June 10, 1996, for landfills that commenced construction, reconstruction or modification on or after May 30, 1991, but before March 12, 1996.
- C 90 days after the date of commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction on or after March 12, 1996.

The initial NMOC emission rate report (required if the design capacity is  $\geq 2.5$  million Mg and  $\geq 2.5$  million m<sup>3</sup>) must also be submitted by these same dates and may be combined with the initial design capacity report. Subsequent NMOC emission rate reports must be submitted annually thereafter, except as provided in § 60.757(b)(1)(ii) and (b)(3).

For existing landfills, the report is due to the State 90 days after the effective date of the State's section 111(d) plan approval unless a different date is specified in the approved State plan. This due date is consistent with the NSPS. It is also consistent with the recent amendment's (63 FR 32743) clarification that landfills  $\geq 2.5$  million Mg and  $\geq 2.5$  million m<sup>3</sup> become subject to the requirement to submit a Title V permit application 90 days after the effective date of State 111(d) program approval. Design capacity reports would need to be submitted at or before this time to determine which landfills are subject to Title V permitting requirements as well as NMOC emission reporting and control requirements. The report due date will differ from State to State, depending upon how soon the State develops and obtains approval for a State plan for implementing the EG.

The enforcement agency can take enforcement action on those landfill owners or operators that fail to submit reports by the required date. The exact nature of the appropriate enforcement action would be determined by the enforcement agency.

#### D. Monitoring Reports

9. Question: Is there no collection system reporting if the system is passive?

Answer: If the landfill uses a passive collection system, then it must designate and submit parameters to be monitored and reported

that indicate the correct performance of the passive collection system.

## VII. TESTING AND MONITORING

### A. General

1. Question: a) When do monitoring requirements start for existing and new sources? b) For those facilities that have emissions greater than 50 Mg NMOC/yr, but already have a complying gas collection and control system (although not currently approved by the Agency), when does the compliance monitoring begin?

Answer: a) Monitoring starts for both existing and new sources upon startup of the required collection and control system. The first monitoring report is due 180 days after installation and start-up of the new collection and control system, per § 60.757(f). b) In the case of a landfill that is already controlled with a complying system, the landfill owner would submit documentation that the system design meets the requirements of the NSPS or EG at the time the design plan is due. The EPA or the State agency will review the plan. The landfill should begin monitoring within 180 days of becoming subject to the NSPS or EG requirements and submit the first monitoring report.

2. Question: Is surface monitoring required for NMOC?

Answer: No, surface monitoring is required for only methane.

3. Question: Are there any air monitoring standards for landfills in terms of parts per million of NMOCs or methane?

Answer: There are no fence line ambient air monitoring requirements in the standards. Proper collection system design and operation are ensured through landfill surface monitoring for methane and monitoring of operating parameters. In § 60.753(d) of the rule, owners and operators are required to operate collection systems so that the methane concentration is less than 500 ppm above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator is required to conduct surface testing around the perimeter of the collection area and along a path traversing the landfill at 30 meter intervals.

## B. Surface Methane Monitoring

4. Question: One commenter stated that it is infeasible to conduct surface methane sampling in the winter due to icy slopes and the sensitivity of the monitoring equipment in freezing temperatures. Is it acceptable to exempt landfills from surface methane sampling in the winter? Minnesota plans to do this in their rule, requiring monitoring at least three times per year. The timing of the sampling will coincide with other sampling at landfills in Minnesota.

Answer: Section 60.755(c) of the NSPS requires that each owner and operator monitor the surface concentrations of methane on a quarterly basis. However, the NSPS allows some flexibility in this requirement. General flexibility is provided for in the general allowances for alternative programs that the owner/operator can demonstrate would be as effective as the rule. In addition, Section 60.753(d) states that "areas with steep slopes or other dangerous areas may be excluded from the surface testing." Although it would not exempt a landfill from all winter testing, this clause would allow the owner or operator to exclude monitoring of dangerous icy slopes.

Under the authority of § 60.13(i) of the NSPS General Provisions, owners and operators of landfills subject to the Landfill NSPS can submit written requests to the Administrator for alternative monitoring procedures or requirements.

For existing landfills subject to the EG, § 60.24(f) of Subpart B gives States some flexibility for State plans to request EPA approval for "less stringent emission standards or longer compliance schedules." To do this, it must be demonstrated that a particular landfill or class of landfills would incur unreasonable costs, installing controls is a physical impossibility, or there are other factors that make application of a less stringent standard or final compliance time significantly more reasonable. Less frequent monitoring might be considered a less stringent standard. The State should discuss this issue with the EPA Regional Office that will be reviewing their State plan.

5. Question: For monitoring, the rule allows the owner/operator to establish an alternative traversing pattern that ensures equivalent coverage. Would a well-to-well monitoring method be equivalent to the method of monitoring at a 30-meter spacing and where visual observations indicate elevated concentrations of landfill gas (e.g. cracks) as required in the rule?

According to the commenter the monitoring method in the rule would require the landfill to:

1. Mow and resurvey each quarter. The well-to-well path is already mowed as it is used to periodically balance the well field.
2. Walk 9 miles to cover the landfill, whereas, sampling from well to well would only be 2.5 miles.

The commenter believes that one is most likely to see high concentrations between wells.

A possible alternative method would be to have them do the full 9 mile pattern once per year, then well to well the other 3 times. A commenter noted that cracks may not be an issue with a synthetic liner, so they should only be required to monitor from well to well.

Answer: Section 60.753(d) of the NSPS allows the owner and operator to establish alternative traversing patterns that ensure equivalent coverage as the 30 meter interval pattern. Therefore, in order for the commenter to implement their alternative sampling pattern, the commenter must apply to the regulatory authority for approval of an alternative approach.

6. Question: Why didn't the EPA require well-to-well surface sampling in the rule?

Answer: The 30-meter interval sampling pattern provides a systematic method that ensures adequate landfill coverage. Collection system problems or cracks and fissures resulting in areas of high surface emissions could occur at random throughout the landfill, not just on direct lines between wells. The 30-meter traverse pattern assures systematic coverage of the landfill area and will measure surface concentrations at varying distances and directions from wells. The well-to-well sampling pattern would differ from landfill to landfill depending on the spatial configuration of the wells, may be more difficult to define, and may not always ensure adequate coverage.

7. Question: A commenter suggested two options to surface monitoring based on a California model. The first is "integrated sampling", which allows composite sampling over an area. Why did the EPA use a point basis rather than a composite basis for sampling?

The second option suggested was to obtain a range of extraction rates that would meet 500 ppm and then maintain gas extraction within that range, updating the effective range every two years.

Answer: The rule is based on point sampling because the purpose of the testing is to determine where the landfill gas collection system is insufficiently designed or operated. With point sampling the location of the landfill gas emissions is pin-pointed so that the adjacent well vacuum can be adjusted, cover maintenance can be performed, or additional wells can be installed. Integrated sampling provides an average value over an area. This averaging could mask areas of poor system performance by dilution. In addition, integrated sampling has a much lower action level and is more an indicator of emission rate than system performance. Since the purpose of the testing is to identify locations of poor system performance, integrated testing is not indicated.

Regarding the second suggested option, a consistent extraction rate would not work because landfill gas production is a dynamic process that is not consistent in all areas. Also, cracks and fissures can occur at any time and would result in emissions that would not be detected or corrected by maintaining a constant extraction rate.

8. Question: Would remote sensing not be a more efficient, if not more accurate means to measure surface emissions? (By doing two sides I would assume you could even locate hot points.)

Answer: In general, remote sensing would not be feasible for the purpose of monitoring surface methane concentrations. The purpose of performing Method 21 along a pattern that traverses the landfill at 30 m intervals is to cover the entire surface area of the landfill and to identify specific locations of high methane concentration so that cover and collection system performance problems can be identified and corrected. Method 21 uses portable hydrocarbon analyzers that can be easily carried by the person performing the sampling and provides readings for specific locations. Remote sampling would not be an effective way to pinpoint problem spots. With remote sampling, the equipment is set up at a fixed location and monitors along a straight line from one point to another. In order to cover the entire surface area of the landfill, the remote sensing equipment would need to be moved and set up a large number of times. Also, if the surface of the landfill is not flat, this could cause difficulties for remote sensing since measurements must be conducted just above the landfill surface to minimize effects of dispersion and dilution. It should be noted that the NSPS allows landfill owners and operators to apply to use

alternative monitoring methods. If remote sensing or another method would be effective for a particular landfill, they can apply to use it.

C. Gas Flow Monitoring

9. Question: The rule requires a gas flow rate measuring device that records the flow to the control device every 15 minutes or a lock and key to prevent bypass. The commenter stated that their systems are designed to shut everything off (e.g. the blower) if there is a problem, for example, with the flare. Can they disregard the gas flow/lock & key requirements as long as their system is designed with no means to bypass the control device?

Answer: The gas flow measurement or lock and key requirements would not apply to a system that is designed such that there is no physical means to bypass the gas flow before it reaches the control device.

D. Use of Alternative Test Methods

10. Question: Can test data obtained using TO-14 be used in lieu of data obtained using Method 25C? The enabling document provides only one reason for not allowing TO-14--the cost. Is there another reason, or are the methods otherwise equivalent?

A landfill already has test data using this method and shows that one of Minnesota's larger landfills would not be subject to the standard because of too low of an NMOC concentration. This landfill has a gas extraction system already.

Answer: The rule requires that landfills measure NMOC, which includes numerous organic components. TO-14 (toxic organic test #14) measures specific toxic compounds which may not total to NMOC. Therefore, Test Method 25C must be used.

11. Question: Would EPA accept the site-specific testing conducted in compliance with the Chapter 115 rule in nonattainment areas?

Answer: Testing must meet the requirements in the NSPS and EG, in terms of test methods and procedures. A landfill owner or operator or State could apply to use a different method if they can demonstrate that it is equivalent.

E. Test Methods 18 and 25C

12. Question: Does Method 18 give lower NMOC results than Method 25C? A recent talk given at a conference indicated this and concluded that, although Method 18 is somewhat more costly, it should be the preferred method due to the lower results it gives.

Answer: No comparison studies have been done to indicate that Method 18 gives lower NMOC results than Method 25C. Method 18 was allowed as a flexibility option in case some unforeseen special need developed. Method 18 is significantly more costly than Method 25C. With Method 18, the sample must be analyzed for all of the compounds on the latest AP-42 list. This means calibrating an analyzer at 3 points for each compound. As a minimum, each calibration point requires duplicate injections. This results in a burdensome calibration of approximately 246 injections. Add to this the requirement to obtain an acceptable recovery of each 10th sample which is spiked with approximately 40 compounds. If Method 18 is performed correctly, the time and expense required will greatly exceed that of Method 25C.

13. Question: Can NMOC samples be collected from passive vent systems or collection system headers already in place? This will give a more representative sample and help protect synthetic membranes used at some landfills. In sampling for landfill gas, the method requires one to insert the ss probe 3 feet into the landfill. How does one accomplish this through a HDPE geomembrane cap, without destroying cap integrity?

Answer: Sampling using Method 25C or 18 may be done for two purposes: (1) Tier 2 calculations to determine the NMOC emission rate as specified in §60.754(a), and (2) testing after installation of collection and control systems to calculate NMOC emission rate for purposes of determining whether the control system can be removed, as specified in § 60.754(b).

For the purposes of tier calculations, Tier 1 calculations are performed first. Tier 1 uses default values and does not require any sampling. Owners are not required to perform Tier 2 sampling. However, if Tier 1 shows NMOC emissions  $\leq 50$  Mg/yr, a landfill owner may elect to perform Tier 2 sampling to try to demonstrate that emissions are  $< 50$  Mg/yr. Method 25C or 18 is used for Tier 2. The rule (§ 60.754(a)) requires at least two sample probes per hectare of landfill surface where waste has been in place for at least 2 years, up to a total of 50 samples. Method 25C provides specifics on the collection of the samples using the sample probes. If the landfill already has a collection and control system and is being sampled to determine whether the system can be removed, the sample is taken from the common header pipe as described in § 60.754(b).

Many landfills with covers such as that described in the question have in place passive vents (venting to the atmosphere). If passive vents are in place, a sample could be taken through these, but with caution. If collection lines and a control system are in place, it is possible to tap into the collection lines to withdraw a sample, again with caution (i.e., allowing minimal oxygen to enter to avoid creating an explosive situation).

Testing passive vents and header systems is evaluated on a case-by-case basis. The landfill needs to contact the EPA and State agency with a written request and diagram so that the specific plan can be reviewed to assure that the sample will be representative. The main criteria for passive systems are that at least 2 wells be located per hectare and the sampling location can be made leak-tight. Many passive systems are vertical vents connected to a network of horizontal tubing that traverses the landfill. With this arrangement, the 2 vertical wells/hectare criterion may be met with fewer wells if samples representative of the affected area can be taken. Sampling at collection system headers is allowable if they will provide representative samples and the gas is collected before any condensate traps. A minimum of 3 samples must be taken from headers to constitute a compliance test. Therefore, it is acceptable to take samples from either passive vents or collection system headers to avoid degradation of cap integrity if the criteria discussed above have been met including the securing of prior approval.

Furthermore, the rule allows for alternative procedures to determine the NMOC concentration if the method has been approved by the Administrator.

14. Question: For GC/FID method 25C, is it necessary to analyze all 100 species known to be present in LFG? If not, which compounds should be included, and how is total NMOC determined? Should air toxics be identified individually for health risk assessment? How about evaluating odor potential?

Answer: Method 25C does not speciate (or separate) individual organic compounds. Rather, the procedure provides a single peak of all the organic compounds except methane. The instrument response to the peak is referenced to a single calibration peak. Individual toxics cannot be reported using Method 25C and do not need to be reported. The NSPS and EG do not require health risk assessment or evaluation of odor potential.

15. Question: Method 18 is allowed in the final rule to analyze NMOC concentrations. What sampling procedure should be followed if method 18 is used for analysis of the samples?

Answer: Method 18 specifies sampling equipment and procedures. It requires samples be taken by one of three means: 1) Tedlar bag, 2) direct instrumental interface, or 3) adsorption tube. In addition, a detailed discussion of the procedures is discussed in Section 5 of Method 18 (see 40 CFR Part 60, Appendix A, Method 18). Section 60.754(a) and (b) also provide specifications for sample probe location and number of samples for Tier 2 or control system removal testing. Alternative testing media will be considered on a case-by-case basis.

16. Question: What are the requirements for composite sampling with Method 25C?

Answer: Composite sampling with Method 25C is allowed under § 60.754. In compositing, samples from more than one probe are collected in a single evacuated cylinder. The following conditions are required for acceptable compositing.

- (a) A cylinder's composite samples must be of equal volume
- (b) Equal sampling must be documented by recording the appropriate flow rate/sampling time/tank vacuums
- (c) Each composite sample must have a minimum volume of 1 liter
- (d) The tank must be under vacuum after the last composite sample is collected vacuum

17. Question: Is a nitrogen analysis of each sample required for Method 25C? What if some samples show nitrogen analyses higher than 20% but corresponding oxygen levels are very low and do not reflect the ratio in ambient air?

Answer: A nitrogen analysis for leak determination is required of all Method 25C samples. In cases where the sample nitrogen analysis is greater than 20% but an additional oxygen analysis is less than 5%, the samples may be considered valid for purposes of leak determination only. If samples are collected from other purposes, they may not be representative of normal landfill conditions.

18. Question: For the Method 25C analysis, can less than triplicate injections be performed?

Answer: All Method 25C analytical injections must be performed in triplicate.

19. Question: There is a DOT container size limitation of 2.5 liters when shipping methane at certain concentration levels. Method 25C specifies 4-liter canisters as a minimum.

Answer: Containers smaller than 4 liters will be allowed to comply with this DOT limitation. However, in most cases where the sample tank is filled to 325 mm with dry helium as prescribed before sampling, this critical methane limit will not be exceeded.

F. Test Method 21

20. Question: When using Method 21 for monitoring methane concentration, does one move continuously across the surface? Doesn't method 21 require sampling time be related to response time of the instrument? Does this mean that the sample must stop at intervals? If so, what intervals?

Answer: The sampler should walk slowly across the surface, there is no need to stop.

VIII. NONATTAINMENT NEW SOURCE REVIEW/PREVENTION OF SIGNIFICANT DETERIORATION PERMITTING ISSUES

1. Question: What are the requirements for NSR? What are the thresholds? Will landfill owners and operators of new or modified landfills also be required to install controls to meet New Source Review (NSR)? Do States have to amend their NSR rules on the same track as this rule?

Answer: Nonattainment NSR applies to new or modified major stationary sources located in nonattainment areas. Nonattainment areas are areas not meeting air quality standards for one or more air pollutants. If a new landfill locates in a nonattainment area and emits, or has the potential to emit, major amounts of a nonattainment pollutant then nonattainment NSR applies. The major source threshold for nonattainment NSR may vary for different air pollutants. For example, the major source threshold for ozone nonattainment areas ranges from 100 tons per year to as low as 10 tons per year depending on the severity of the ozone problem. A modification at an existing landfill may be subject to nonattainment NSR if the existing landfill is a major source for the nonattainment pollutant and the modification results in a significant net emissions increase of the nonattainment pollutant. For ozone nonattainment areas the significant threshold for VOC and NO<sub>x</sub> is any increase for extreme areas, 25 tpy for serious and severe areas, and 40 tpy for all other ozone nonattainment areas. The technology requirement for nonattainment NSR is that the source meet the lowest achievable emissions rate, known as LAER. In meeting LAER it is likely that pollution controls or other emissions reduction techniques may be needed. In general, nonattainment NSR also requires that the proposed emissions increase of the nonattainment pollutant (or its precursors in some cases) be offset by actual emissions reductions from existing sources. Other nonattainment NSR requirements include an alternatives analysis and a certification that all major sources owned by the applicant in the State are in compliance, or on a schedule for compliance, with air program requirements. For new or modified landfills in nonattainment areas the air pollutants of concern are typically VOC and NO<sub>x</sub> (both precursors of ozone) and CO. The NO<sub>x</sub> and CO emissions are typically products of combustion.

The major NSR requirements for prevention of significant deterioration (PSD) apply to new or modified major stationary sources in attainment areas. An area is attainment for an air pollutant if area is in compliance with the ambient air quality standard for the pollutant. The PSD requirements apply if a new landfill will emit, or has the potential to emit, major amounts of one or more PSD regulated pollutants. In general, the PSD major source threshold for

new landfills is 250 tons per year of any PSD regulated pollutant. For PSD the technology requirement is best available control technology (BACT). For example, in meeting BACT for new or modified landfills, controls may be needed for NO<sub>x</sub>. Also, under PSD the applicant must demonstrate that the proposed emissions will not violate ambient air quality standards and increments, not adversely impact Class I areas, and must consider the impacts on soils, vegetation, and visibility. For existing landfills that are major sources, the PSD requirements apply to modifications that result in a significant net emissions increase of a PSD regulated pollutant. For modifications, a PSD significance level of 50 tpy for landfill gas emissions (measured as NMOC) has been established concurrent with promulgating the NSPS and EG.

The EPA's NSR regulations for nonattainment areas are set forth at 40 CFR 51.165, 52.24 and Part 51, Appendix S. States with existing nonattainment areas were required by the Act to have nonattainment NSR rules adopted by November 15, 1992. The EPA's PSD program rules are at 40 CFR 52.21 and 51.166. States' PSD rules should be amended within nine months after the effective date of the change to EPA's PSD rules to add landfill gases. Landfill owners or operators are encouraged to contact the appropriate State or local air permitting authority to discuss construction permitting requirements prior to landfill construction or modification.

2. Question: If small landfills are only required to report their design capacity, how would a State determine if they had an emissions increase of NMOC that may or may not be subject to NSR?

Answer: The NSPS and EG only require reporting of design capacity for purposes of determining applicability of the NSPS or EG. However, State construction permit programs may apply independently to new or modified landfills. State major NSR programs apply to new landfills that may be major sources as defined in the NSR program or modifications of existing major sources that have a significant net increase in emissions. In other words, State preconstruction approval programs are not determined by the applicability of the NSPS and EG.

## IX. MISCELLANEOUS

1. Question: What should be done about landfills that have asbestos in them where the location of the asbestos is not accurately documented? Would controls be required if asbestos is present throughout the landfill?

Answer: The NSPS [§ 60.759(a)(3)(i)] states that segregated areas of asbestos or nondegradable materials may be excluded from collection if there is documentation of the nature, date of deposit, amount, and location of the material. The reason for the exclusion is that such areas would not emit NMOC. If asbestos is co-mingled with MSW, these areas will emit NMOC. If a landfill requires control and the location, amount, and date of deposit of asbestos is not documented, or if the asbestos is co-mingled with MSW, collection and control systems will need to be installed throughout the landfill, including areas that may contain asbestos. Asbestos in landfills may also be subject to the asbestos NESHAP regulations.

2. Question: Is there any prohibition from using chemical contaminated soils for landfill daily cover if the soil has not first been treated to remove the NMOCs?

Answer: If the spill is a hazardous waste under RCRA, it could not be put in an MSW landfill. If the soil is determined to be a non-hazardous waste, then there would be no Federal restrictions on using the soil as cover material or disposing of it in an MSW landfill. However, some States specifically exclude these materials from landfills.

3. Question: Is EPA aware of any energy tax credit program that is operating now or anticipated in the immediate future that would provide a tax credit for landfills installing gas collection and energy recovery systems?

Answer: There are currently two Federal programs potentially available for landfill gas energy recovery systems:

1. the Federal tax credit under section 29 of the IRS code for production and sale of gas from biomass, and
2. the Department of Energy (DOE) renewable energy production incentives program (REPI).

The section 29 tax credit offers privately owned landfills approximately 1 cent/kilowatt hour (kWh) (or \$1.00/million Btu) for projects that involve the beneficial use of landfill gas. To

qualify, the landfill needs to have signed a binding gas rights agreement for the sale of their gas to another party by December 31, 1996. They also needed to have installed the landfill gas collection system by June 30, 1998.

REPI offers municipally owned landfills that produce electricity from landfill gas approximately 1.5 cents/kWh. The final rule for this program was published in the Federal Register on July 19, 1995. Applications must be submitted to DOE between October 1 and December 31 of each year. However, REPI is subject to annual appropriations by Congress, and in some years there may not be sufficient allocations to pay all projects the full amount.

In addition, State and local agencies are beginning to establish programs to promote or provide incentives for utilizing renewable energy sources including landfill gas. A report summarizing some of these State and local programs can be obtained by calling toll-free landfill methane outreach program hotline at 1-888-782-7937. The hotline can also provide other general landfill gas-to-energy information.

4. Question: It was mentioned that there is litigation on the rule. How does this affect the State plan schedule?

Answer: The landfill rule remained in effect, throughout the litigation settlement discussions and States were required to have submitted their plans by December 1996. As a result of litigation settlement agreements, a Federal Register notice to revise the rule was published on June 16, 1998 and the revisions become effective on August 17, 1998. These revisions are mainly clarifications and do not change the basic control, monitoring, recordkeeping or reporting requirements of the rule. The revisions do not change the required content or due date of State plans. States that have not already submitted State plans are encouraged to submit them as soon as possible. (Indeed many States are actively working on their State plans.) A Federal plan is being developed to cover landfills in States that do not submit an approvable State plan.

5. Question: Are NMOC emissions creditable for the Attainment Demonstration? If so, at what rates? (Region VI)

Answer: Yes, if the emissions were included in the 1990 base year inventory and the emissions and reductions in those emissions were accounted for in the rate of progress plan. This inventory served as the basis for determining rate of progress emissions reductions that would be necessary to achieve a 15 percent reduction in VOC emissions by 1990 and 3 percent per year thereafter until

attainment of the ozone standard. The portion of NMOC emissions that are VOC will need to be calculated for use in the attainment demonstration and rate of progress demonstration.

6. Question: Is an MSW landfill that burns landfill gas and produces electricity for sale to the grid subject to title IV acid rain requirements?

Answer: An MSW landfill is not subject to title IV acid rain requirements as long as the landfill is not burning a supplemental fuel. Burning a supplemental fuel such as coal, oil, or natural gas could trigger title IV acid rain program requirements.



November 7, 2006

***Submitted Via Electronic Mail and Posted to Docket***

[a-and-r-docket@epa.gov](mailto:a-and-r-docket@epa.gov)

**Docket ID No. EPA-HQ-OAR-2003-0215**

Air and Radiation Docket and Information Center  
U.S. Environmental Protection Agency (6102T)  
1200 Pennsylvania Ave., NW  
Washington, DC 20460

Dear Ms. Rackley:

The Solid Waste Association of North America (SWANA) and National Solid Wastes Management Association (NSWMA) would like to express its appreciation to EPA for addressing a significant portion of the comments in a very constructive manner as put forth in our comments on October 14, 2004 and subsequently discussed in our November 10, 2005 meeting. We are encouraged that EPA recognizes the unique nature of landfill operations as it relates to this proposed rulemaking and has structured the regulations to encourage energy recovery from landfill gas.

Our memberships, representing local governments and private sector members in the 50 states, are involved in all aspects of municipal solid waste management with particular expertise at operating landfills and associated landfill gas systems. SWANA and NSWMA have jointly developed the following comments in response to the proposed amendments to the Standards of Performance for Municipal Solid Waste Landfills (NSPS), to the Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills (EG), to the National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills (NESHAP) and to the Federal Plan Requirements for Municipal Solid Waste Landfills (GGG):

**Definition of MSW Landfill Owner / Operator, Definition of MSW Landfill Gas Collection, Control or Treatment System Owner / Operator and Allowance for Offsite Control or Treatment**

SWANA and NSWMA are pleased that EPA is structuring regulations to encourage energy recovery from landfill gas especially in light of the rising cost of

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fossil fuels. Beneficial use projects should be the ultimate landfill gas management goal. The constructive resolution of the "Third Party" issue has always been one of the more important issues facing the landfill industry because of the dampening effect unresolved liability could have on the beneficial use projects. We believe the current EPA proposal will go a long way to resolving this issue. The ability for owners and/or operators to continue to subdivide liability with respect to compliance with the NSPS/EG/GGG/NESHAP rules is consistent with historical practices and is a vital step forward for a workable regulatory approach. Comments presented here are meant to strengthen the proposed approach by indicating where in the proposal the goal for providing equitable divisions of compliance for multiple owner/operators, is not met.

In SWANA's July 2002 letter regarding third party operational issues, SWANA stressed the importance of providing the greatest level of flexibility to all MSW third parties. In that light, we recommended that third parties be given the option to certify that they would be willing to accept liability.

EPA's current proposed language uses a similar approach in requiring that all parties maintain a "list" that shows very specifically which aspects of the NSPS requirements each party is willing to comply with. We support this approach, however, SWANA and NSWMA must stress that the approach should be voluntary, not a requirement. If this approach is mandatory, then all existing landfills that have third party operations must establish a list of responsibility. The reality is that in many situations relationships between parties may not allow for that level of constructive dialogue. In fact, in a worst-case example, in the absence of substantive contracts a third party may find it advantageous not to cooperate since under the current proposed language, liability may default back to the landfill owner. In a best-case example, very solid contracts specifying compliance obligations between a landfill owner and the third party may be in place that negate the need for developing "list."; a mandatory obligation is just more "paper work." Having presented a "worst" and "best" case, we believe that there are many cases in between where this concept is workable. Once again, the goal of the proposed amendments should be to encourage beneficial use projects. We believe EPA should provide a host of options to achieve this end and recommend that EPA make the "list" approach voluntary.

We are encouraged by EPA's attempt to define gas collection and control system operating responsibilities through the proposed definition of *Municipal solid waste landfill gas collection, control, or treatment system owner/operator*. In order to further clarify the division of owner/operator compliance responsibilities, SWANA and NSWMA recommend that in Section 60.751 the proposed definition be replaced with three distinct definitions, as presented below:

**“landfill gas collection system owner/operator” means an entity that owns or operates any stationary equipment for the collection of landfill gas pursuant to §60.752(b)(2)(ii).**

**“landfill gas treatment system owner/operator” means an entity that purchases the landfill gas from the municipal solid waste landfill owner/operator and owns or operates any stationary equipment for the treatment of landfill gas pursuant to §60.752(b)(2)(iii)(D).**

**“landfill gas combustion system owner/operator” means an entity that purchases untreated landfill gas from the municipal solid waste landfill owner/operator and owns or operates any stationary equipment for the combustion of landfill gas.**

We also have a concern with the requirement, as outlined in §60.758 (g) and, §63.1980 (j) that *all entities involved are responsible for compliance with missing items*. It is the situation where *all* entities involved hold responsibility that the proposed amendments are trying to avoid. This leads to difficult contract disputes and legal bickering that eventually discourage third party developers from attempting to utilize landfill gas in a beneficial manner. We recommend that in the absence of the compliance list, liability remain with owner/operator of the affected equipment, as defined above. This provides incentive for all parties engaged in collection and control activities to complete a comprehensive list of compliance responsibilities for the affected MSW Landfill.

In §60.750 (a) and §62.14352 (g), if the MSW landfill and the associated gas collection, control and/or treatment system are under *common control*, the entity exercising such control is responsible for specified requirements. This language is contrary to the goal of clearly specifying who has liability for compliance. *Common control* is never clearly defined as it applies to the proposed regulations and can only add a significant level of ambiguity to the proposal. As stated above, it is the situation where *all* entities involved hold responsibility, that the proposed amendments are trying to avoid, yet the introduction of the concept of *common control*, as explained in the Preamble to the proposed regulation, does just that. More specifically, the Preamble states on page 53275 that:

*It is important to note that in cases of common control, although the owner/operator of the single source (e.g., the owner/operator of the landfill and/or gas collection, control, and/or treatment system) is ultimately responsible for ensuring compliance at the source, enforcement action could be taken by EPA or a State against the owners/operators of individual affected sources/emission units in addition to the owner/operator of the single source.*

In the absence of any examples or explanations to the contrary, *common control* under this proposed wording, appears to provide EPA all the rights to take enforcement action against all entities owning or operating a source. If all landfill owners and operators are willing through a voluntary action establish a comprehensive list of compliance responsibly then issues of common control need not be considered. In addition, we believe that because of the ambiguous use of *common control* in the proposal individual EPA Regions may draw different interpretations on how to apply common control decisions. Once again, this is contrary to the need for clarity on NSPS liability with the goal to encourage beneficial projects. Therefore, we recommend all references to *common control* be removed to avoid confusion. EPA always has the authority to make common control decisions in any situation.

If EPA decides not to proceed with our recommendation, we suggest the EPA specifically state that "*separately owned and/or operated landfill gas control and/or treatment operations should not be considered to be under common control of the landfill owner/operator.*"

In the Preamble, EPA requests comment on two alternatives to the proposed approach. In both approaches, and much more so for Alternative #2, excess liability is placed on the landfill owner, while each individual source maintains its responsibility for compliance, as well as potential liability. In Alternative #1, for instance, it is proposed that in cases of *flagrant violations*, future liability shift back to the landfill owner/operator. The use of subjective terminology such as *flagrant* and even *minor* with regard to violations, bring uncertainty to contractual relationships and set the stage for abuse by both individual owner/operators and regulators. In Alternative #2, it is very clear that all parties will be held responsible for non-compliance with landfill owner/operators being held to the highest standard. As EPA correctly points out, *There are some concerns that this alternative approach could inhibit the beneficial use of landfill gas.* We agree, and strongly recommend that EPA not consider either alternative since both are counter to encouraging energy production from landfill gas.

### **Landfill Gas Treatment Systems**

EPA has established a new definition for *Treatment* based upon contacts with manufacturers of combustion devices who provided fuel specifications. SWANA and NSWMA recommend that the *treatment* definition be modified to read:

*Treatment system means a system that compresses the landfill gas, has an absolute filtration rating of 10 microns or less and achieves a degree of de-watering consistent with specifications for good combustion supplied by the manufacturer or supplier of the combustion equipment. Any treatment system for which a site-specific EPA or NSPS-delegated state or local agency applicability determination or written, or through a written*

*Title V permit determination by a NSPS-delegated state or local agency has been issued that the treatment system satisfies 40 CFR 60.752(b)(2)(iii)(C) is deemed to meet this definition.*

SWANA and NSWMA recommend that all existing projects that have received written applicability determinations or approvals from EPA or delegated state/local authority that the existing treatment system meets 40 CFR §60.752(b)(2)(iii)(C) requirements as of the effective date of the final rule be exempt from any further action. In these cases, EPA has already evaluated the adequacy of the project's treatment system.

For new projects, or existing projects seeking to comply with 40 CFR §60.752(b)(2)(iii)(C), SWANA and NSWMA believe that the 20 degree dew point suppression is not practical for reasons described below. Therefore, in addition to revising the definition of treatment, SWANA and NSWMA recommend that manufacturer's/supplier's specifications for treatment be obtained by the gas treatment system owner/operator. Further, SWANA and NSWMA recommend that a site-specific preventive maintenance plan (PMP) be developed and included as part of the Start-up Shutdown and Malfunction Plan. Such PMP would be available on-site for agency inspection. The PMP would include provisions for periodic monitoring and recording of the gas treatment system operations to demonstrate proper operation in accordance with manufacturer's/supplier's specifications/standards. The periodic monitoring requirements for filtration should not be more stringent than weekly monitoring and recording of differential pressure to support appropriate preventive maintenance activities and to assure that a catastrophic failure of the treatment system is prevented. Compliance with the PMP would be used in lieu of any specified requirement for continuous monitoring and recording of treatment system parameters and would allow site-specific determination of the best procedure for achieving and monitoring treatment system performance as envisioned in the rule.

In support of our recommendations, it is important to understand that treatment system design and operation vary according to the type and size of the beneficial use project. Some engine facilities operate in cold climates where the landfill gas can be cooled from the wellhead to temperatures in the 40-degree range simply because of ambient conditions. In cases like this it is impossible to meet the proposed definition. Also, verifying the temperature is difficult because of varying inlet and outlet conditions that can vary depending upon the pressures in the system. Accounting for these conditions could require multiple points of measure plus an algorithm to determine compliance. In addition, a dew point suppression standard does not account for water removal that may be occurring in other parts of the gas collection system, such as in header lines where condensate is continually being collected. In fact, long pipeline runs may remove significant

amount of liquid, perhaps even equivalent to that removed by active dew point suppression.

Operating data exists for boiler systems that confirms such systems have operated successfully for two decades, fully meeting all NSPS requirements with only minimal gas treatment, filtration and moisture separators. There are also numerous engine facilities operating around the country, many that have received EPA exemptions, that only use coalescing filters for moisture removal, compression, and air-to-air heat exchanges. Many of these facilities have source tested the combustion devices and have demonstrated compliance with the 98% destruction efficiency, or 20 ppm NMOC, as hexane NSPS requirements, with this level of treatment. SWANA and NSWMA can supply this data upon request from EPA. Other examples exist where gas sent offsite to an end user has only mechanical filtration and compression for moisture removal before entering a pipeline for transport to a local utility. In all these cases treatment is far less than a 20-degree dew point suppression.

From a developer, or landfill gas combustion system owner/operator perspective, it is important to realize that utilization of improperly treated landfill gas will result in potentially significant financial losses due to excessive equipment maintenance costs and downtime; this does not make business sense. Therefore, the level of treatment necessary for the efficient and long-term operation of the end use equipment should be determined on a case-by-case basis, based upon sound engineering. The real-world examples of landfill gas combustion equipment operating with treatment systems very different than what EPA proposes demonstrates that a "one size fits all" approach is not practical. Not only is it impractical, but also requiring existing projects to meet the proposed definition can be financially damaging to the industry, and most importantly, may be unnecessary.

#### **1-Hour/5-Day Downtime of Gas Collection and Control Systems**

SWANA and NSWMA support EPA's determination that a GCCS often cannot be reasonably brought back on-line after a downtime event in less than one hour. In fact during most downtime events it could take multiple days to return the GCCS to operating condition. We also support EPA's decision to clearly define that the 1-hour threshold should only be applied to free venting of LFG after a control device goes off-line and before the gas mover equipment can be shutdown to prevent untreated gas from passing through the control device.

However, we are concerned with language contained within the draft preamble, which seems to suggest that the current version of the NSPS does contain a 1-hour limit on control device downtime, regardless whether free venting is occurring. It has been the MSW landfill industry's position and interpretation since the original NSPS was promulgated in 1996 that the 1-hour threshold was

always a free venting standard. This is particularly important to us since, as you know, there have been several enforcement actions filed under this 1-hour provision, and your preamble language would seem to suggest that those actions are viable and can be enforced until this rule change takes effect. SWANA and NSWMA, therefore, request that EPA revise the preamble language to clarify that the 1-hour standard was originally meant to be a free venting standard and that any other interpretation is inaccurate.

Further, §60.757(f)(3) of the NSPS rule still requires sites to report all instances where the control/treatment device was not operating for more than 1 hour. This appears to contradict the intent of §60.755(e) which eliminates the 1-hour requirement. Wording of §60.757(f)(3) should be revised to require reporting of all instances where free-venting of landfill gas occurred for more than 1 hour in duration.

With respect to the proposed elimination of the 5-day provision, SWANA and NSWMA are appreciative of EPA's efforts to give the landfills flexibility in determining a reasonable limit on total downtime for a GCCS through the SSM provisions of the NESHAPs rule. However, we are concerned that the proposed language would give too much discretion to state or local agencies in determining a maximum downtime limit, and those agencies could select something less than 5 days. The MSW landfill industry has always felt that 5 days is a reasonable maximum limit for GCCS downtime and are willing to commit to it as a regulatory threshold. Keeping the 5-day limit will ensure that there is a upper end time limit for downtime allowed under the rule, allow consistency across the country, and prevent state or local agencies from selecting shorter time frames, thereby eliminating the flexibility USEPA is trying to create.

As an alternative, SWANA and NSWMA would support the use of the SSM process for determining a maximum allowable downtime for a particular site as long as there is a provision in the rule which specifies that the allowable downtime cannot be less than 5 days.

On another note, in order to make the remainder of the NSPS regulations consistent with the removal of the 1-hour downtime limitation, the reporting section of the NSPS needs to be revised as follows:

40 CFR §60.757(f)(3): Description and duration of all periods when the control device or treatment system was not operating for a period exceeding one hour and length of time the control device or treatment system was not operating, ***only if the valves in the collection and control system contributing to venting of gas to the atmosphere were not closed within one hour.***

### **SSM Provisions**

The proposed rulemaking makes several changes to the SSM provisions within the NESHAPs rule, beyond the 1-hour and 5-day requirements. One of these changes is the clear delineation that routine maintenance events should be included in the SSM plan. The MSW landfill industry has always believed that the SSM requirements include routine maintenance, so we do not take issue with your inclusion of this requirement in the rule. Because of this, it is unnecessary to require that a routine maintenance plan be added to each SSM plan, which has already been developed by MSW landfill owners/operators. Instead, making it clear that routine maintenance events are regulated SSM events should be sufficient for this rulemaking. Further, the industry already includes routine maintenance events in semi-annual SSM reports, so this change is unnecessary but acceptable to us.

The second change to the SSM requirements is the removal of the cross-referencing table to the NESHAPs general provisions (40 CFR Part 63, Subpart A) and replacement with all specific requirements contained within 40 CFR Part 63, Subpart AAAA. SWANA and NSWMA are supportive of this change as the cross-referencing element was always unclear and hard to follow.

The third change is described as a minor change to the block averaging requirement for 3-hour temperature values in the NESHAPs rule to be consistent with what is reportedly contained within the NSPS rule. This includes the removal of the allowance to exclude SSM events from the calculation of 3-hour block averages for determining compliance with the minimum temperature requirement under the NSPS. SWANA and NSWMA take serious issue with this requirement. Inclusion of SSM events in 3-hour block averages will lead to numerous temperature deviations due to low temperature at almost all landfills. When a control device goes off-line for SSM events the temperature will drop to ambient levels (versus operating levels over 1400 F for flares), and when this is averaged with any operating time, deviations will inevitably exist.

This would result in a temperature deviation for almost any SSM event of more than a few minutes in duration and leave us at the mercy of state and local regulators, who could take enforcement action regardless of whether our SSM plans were implemented or not. As an example, if a flare normally operates and is tested at 1500 ° F, then its minimum temperature for compliance would be 1450 ° F per the rule. During an SSM event, the flare temperature would drop quickly toward the ambient temperature of the surrounding area. It is not uncommon for flare temperatures to drop below 500 ° F within minutes. Assuming an SSM event of 10 minutes (common automatic restart cycle for many flares) and an average temperature during the SSM event of 500 ° F, the 3-hour block average including this SSM event would be 1444 ° F, which would be a deviation of the minimum temperature requirement. So, in this case, the flare

could actually restart as it is designed to do, and yet a temperature deviation would still result. This is clearly an unworkable situation.

The MSW landfill industry has always viewed the NESHAPs rule language of exclusion of SSM events from the block average calculation as a clarification of unworkable rule language within the NSPS. With this proposed rulemaking, we would return to this unworkable situation for temperature calculations. As such, SWANA and NSWMA strongly request that the proposed rule be revised to continue to allow exclusion of SSM events for the 3-hour block average calculations for both the NSPS and NESHAPs rules.

### **Removal of GCCS Requirements for Closed Landfills**

EPA requested comments on approaches for addressing removal of controls in closed landfill areas and specific criteria that could be applied to determine which areas warrant control and which may remove control. As stated succinctly in the preamble to the proposed rules, there are many situations in the landfill industry in which an old, closed portion of a landfill has been inappropriately drawn into the NSPS because of its location to an adjacent, newer facility. This can lead to problems when gas production in the older areas has fallen off so significantly that it is difficult if not impossible for this portion of the site to comply with the NSPS operational standards.

Further, many closed landfills installed gas collection and controls systems prior to the NSPS, EG and Federal GGG requirements. The current rule language states that the minimum 15-year duration for gas system operations begins with the date of the initial performance test required by the NSPS or EG/Federal GGG rules. For sites subject to the NSPS, initial performance tests of the control system likely occurred during December 1998 and June 1999. However, for the sites subject to either state/local EG rules or the Federal GGG Plan, the initial performance test dates occurred as late as October 2002 to April 2003. Typically closed landfills are subject to the state EG or Federal GGG requirements and not the NSPS requirements. Therefore at many closed sites the useful life of the equipment (i.e., 15 years) has already been surpassed.

There are several potential solutions to address declining gas flows and gas quality at closed landfills for consideration which include the following:

For a closed MSW landfill, not co-located with other landfill units (active or closed), the closed MSW landfill should be able to remove NSPS control requirements once the site demonstrates it emits less than 25 Mg/yr NMOC based on actual landfill gas flow in accordance with §60.754(b) irrespective of the age of the gas collection and control system. The 50 Mg/yr NMOC threshold should be maintained where sites can demonstrate 15-years of gas system operations in accordance with existing rule requirements. SWANA and NSWMA

recommend that the NSPS (also applies to appropriate sections in the EG / GGG rules) rule language under 40 CFR 60.752(b) be revised as follows:

*The collection and control system may be capped or removed provided that the conditions of paragraphs (b)(2)(v)(A), and either (B) or (C) are met:*

- (A) *The landfill shall be a closed landfill as defined in § 60.751 of this subpart. A closure report shall be submitted to the Administrator as provided in § 60.757(d); and*
- (B) *The collection and control system shall have been in operations a minimum of 15 years and following the procedures specified in § 60.754(b) of this subpart, the calculated NMOC gas produced by the landfill shall be less than 50 megagrams per year on three successive test dates. The test dates shall be no less than 90 days apart, and no more than 180 days apart; or*
- (C) *For a closed landfill not co-located with other landfill units, follow the procedures specified in § 60.754(b) of this subpart, the calculated NMOC gas produced by the landfill shall be less than 25 megagrams per year on three successive test dates. The test dates shall be no less than 90 days apart, and no more than 180 days apart.*

As for closed landfill units or areas co-located with active landfill units, several options exist within the confines of the existing rules. These include:

1) For a closed landfill unit or area co-located with active landfill units the site should be able to remove NSPS control requirements based on 15-years from the initial well installation date for the affected landfill or area, not the date of NSPS or EG performance test. This is similar to the language found in Ohio's EG program (OAC 3745-76-07(B)(2)(e)). The USEPA approved OEPA's EG program on October 6, 1998. 2) Include a provision for a 10% NMOC threshold for non-producing areas in order to address declining flows from closed landfill units or areas of an MSW landfill. The 10% NMOC threshold may be determined in accordance with 40 CFR §60.754(b) as gas collection is installed in these areas.

The non-producing area(s) would not be subject to monthly wellhead monitoring requirements or obligation to meet pressure, temperature and oxygen standards for wells located in the closed area(s). This proposed provision is **in addition to the existing 1% NMOC threshold** already provided for in 40 CFR §60.759(a)(3)(2) for non-producing areas without a gas collection system.

To demonstrate that the 10% threshold is still protective of the environment, the site would continue to conduct monthly cover integrity inspections and quarterly surface emissions monitoring. If readings above 500 ppm are not detected in non-producing area(s) after three consecutive quarters, then the site could defer to annual surface emissions monitoring as allowed in 40 CFR §60.756(f). If exceedance(s) are detected (above 500 ppm), then apply corrective actions in

accordance with 40 CFR §60.755(c)(4). The site would re-initiate quarterly monitoring until three consecutive quarterly events demonstrate no exceedances of 500 ppm standard. The site would then defer to annual monitoring as allowed in 40 CFR 60.756(f). Monthly cover integrity inspections and surface emissions monitoring would cease once the landfill met the following condition:

*When a 1% NMOC threshold is achieved for non-producing area(s) as determined in accordance with 40 CFR 60.754(b).*

Following are three case studies which illustrate the importance of developing options for addressing closed landfill areas.

Landfill A is located in a mountain region of the Western United States and has one older, closed area and one active area, which are physically separated on the landfill property. The overall site is subject to the NSPS and has a GCCS in place. Because the older area is such a large distance from the main active area and because of the poor quality of LFG from this area, the older area has its own separate GCCS with an activated carbon unit for a control device.

The older area can only generate approximately 30-35 scfm of LFG on a continuous basis with a methane content of 29-32 % on average (about 20 scfm at 50% methane). None of the wells in the older area can meet NSPS wellhead standards without an HOV allowance, and surface emissions have not been detected in this area, even before the GCCS was installed.

For the above reasons, it was felt that this older area of the site would be a good candidate for an exemption from having to operate a GCCS in compliance with the NSPS. However, the only option available under the rule was to demonstrate that the area's NMOC emissions were less than 1% of the total NMOC emissions for the site. When this analysis was completed using NSPS protocols, it was discovered that the older areas was still purportedly generating over 10% of the site-wide total for NMOCs and would not drop to 1% until the year 2050.

However, when the actual LFG flow data from this area is used to complete an NMOC emissions analysis, the percentage drops to 0.81 % in 2006. Clearly, with all of the above information, this area of the site should not be required to have a GCCS under the NSPS rule but the 1% threshold and the requirement to operate the GCCS for a minimum of 15 years prevents this exemption from being granted.

Landfill B is located in a desert region of the Southwestern United States and has one recently closed area and one active area, which are physically separated on the landfill property. The overall site is subject to the NSPS and has a GCCS in place for the recently closed area; the active area is not required to have control under the NSPS at this time.

The site was originally required to install a GCCS under the NSPS because of projected NMOC emissions of greater than 50 Mg/year using NSPS protocols. This was primarily due an extremely high NMOC concentration that was detected during a Tier 2 study. Since the GCCS has been installed, the site is only able to produce approximately 217 scfm of LFG on a continuous basis with a methane content of 29 % on average (about 126 scfm at 50% methane). Most of the wells at the site cannot meet NSPS wellhead standards without an HOV allowance, and no surface emissions have been detected, even before the GCCS was installed. Also, the amount of LFG at the site is not enough to continuously operate the LFG flare, so the GCCS is on a timer system with two hours of operation per day.

For the above reasons, it was felt that the NSPS applicability for this site should be re-evaluated, and a Tier 2 study was recently conduct using samples collected from the main header to the LFG system. These data are much more representative of the average NMOC concentration for the site (because the GCCS draws from the entire refuse volume) as compared to the previous Tier 2 study completed with the probe method where only the newer, uppermost waste could be sampled.

Using the new Tier 2 value, the site's NMOC emissions are projected to be less than 50 Mg/year for the landfill's entire life with the highest value being 21 Mg/year. In 2006, the NMOC emissions would be 14.1 Mg/year using NSPS protocols but only 0.36 Mg/year using actual LFG flow data from the site.

This site is another example of a landfill that should not be required to have a GCCS under the NSPS but the requirement to operate the GCCS for a minimum of 15 years prevents this from changing. The NSPS never established any provisions to allow a site that was incorrectly classified as requiring a GCCS to subsequently demonstrate that the emissions are less than 50 Mg/year and avoid the requirement without first operating for 15 years.

Landfill C received a small expansion in volume prior to its closure in 1993, and has been subject to the NSPS since promulgation of the regulations in 1996. The active gas collection system at the landfill was installed during closure activities in the 1990's. Collected gas is sent to a five engine plant. An open flare is available to provide backup control. Three gas compressors at the plant are the "gas mover" equipment. A utility flare is available as backup.

A site-specific NMOC sample was collected several years ago from this facility and based on existing gas flow rates and this concentration, the facility's NMOC emissions are well below the 50 Mg/year threshold. However, the USEPA denied a request to establish the "start date" for the gas system operations as when the first well was installed, vs. the date of the initial NSPS performance test, since the facility could not demonstrate that it had conducted all required

NSPS monitoring and recordkeeping from the date the gas system was installed (which was prior to the promulgation of the NSPS regulations). NSPS compliance at this facility has cost over \$1,000,000 to date.

**OTHER SPECIFIC COMMENTS:**

**Temperature Monitoring** We agree that eliminating initial performance test for sources not of concern, such as the 44 megawatts boilers is a good simplification of the regulatory burden. This principle of not testing insignificant source should apply to small boilers or heaters as well.

**Bioreactor Provisions** SWANA and NSWMA support USEPA's clarification that the moisture content of the waste should be measured on a weight wet basis, which is consistent with how the industry already performs this calculation.

**Definition of Household Waste** - The definition of household waste needs to be expanded to not only exclude yard waste but also non-putrescible construction and demolition materials. There is a concern, for example, that roof shingle from a residential home could be deemed to make a construction and demolition landfill into a "municipal solid waste" landfill for NSPS purposes, and impose unnecessary and unduly expensive Title V permitting obligations on these facilities and result in enforcement action. Title V permitting for such facilities would potentially be required even though such facilities would not require gas collection and control systems, based solely on the size of the C&D landfill and the acceptance of a single roof shingle. If construction and demolition material from houses after a hurricane or other disaster are deemed to be "municipal waste", then C&D landfills would have a disincentive to accept such material because they would be unnecessarily subject to Title V permitting as a result of Landfill NSPS applicability. Given the public policy implications, the definition of household waste should specifically exclude non-putrescible construction and demolition materials.

**Design Plan Approvals** – We appreciate the EPA for addressing the issue of design plan approvals. The review and approval of the NSPS Design Plans has not been consistent from state to state, or even within the same state, from district to district. Some states have never approved design plans, even though we are now on the 10 year anniversary of the NSPS promulgation.

The agency's suggestion to allow landfills to have a "de facto" approval of their design plan after a certain time period has elapsed is an excellent option, and we support this.

With respect to the time frame for agency review of an initial design plan, the USEPA's February, 1999 document "Municipal Solid Waste Landfills, Volume 1:

Summary of the Requirements for the New Source Performance Standards and Emission Guidelines for Municipal Solid Waste Landfills” stated the following (on page 2-38):

“The implementing agency must approve the design of a gas collection and control system prior to installation. The review and comment interval for approving a design plan is expected to take approximately 6 months from the date the plan is submitted, leaving approximately 12 months for installing the alternative gas collection and control system.”

This six month timeframe for review and approval of the initial design plans is very reasonable, since it leaves at least one year for the landfill to prepare construction level drawings and specifications for the first phase of the approved design, as well as solicit bids, and ultimately install the system. Therefore, since the design plan has to be professionally designed and certified by a Professional Engineer along with ultimately achieving compliance through quarterly surface emissions monitoring and monthly testing and monitoring, we strongly support the De Facto approval of design plans if approval is not provided by the Administrator after 6 months of submittal.

With respect to time frames for updates or revisions to design plans, a four month time frame should be more than adequate, as the proposed revisions to an existing plan should require a less extensive review than a brand new plan prepared from scratch.

A related issue is the absence of consistent regulatory review and approval of higher operating value demonstrations, alternative timeline requests and well decommissioning requests. Some state agencies have established internal procedures to review and approve these requests on a timely basis, while other state agencies have no internal programs. The lack of response by an agency leaves a site in an awkward compliance position. If an alternative timeline as allowed in 40 CFR §60.755(a) and (c) is requested and no written response provided by the Agency, is the facility operating in or out of compliance with the NSPS? Because facilities have only two options for addressing wellhead and surface emission exceedances, i.e., expand the system within 120 days of the initial exceedance or seek approval for an alternative remedy/timeline, the facility could be considered out of compliance if the approval is never granted and the system is not expanded within the 120-day timeframe. Since expanding the system is not always the best way to correct an exceedance, and a facility may not be able to determine the appropriate course of action within 15 days of an initial well exceedance, we propose two different options to address these situations. One is to replace the 15-day timeframe with 60 days to address the initial exceedance prior to having to submit an alternative timeline request or decommission a well. Secondly if the well or area still exhibits an exceedance of the operating criteria which will occur for more than 60 days we believe that the

Administrator should have a much shorter timeframe to review the requests before a "de facto" approval would be allowed; i.e. 30 days. If the approval is not granted within an expeditious timeframe, it would leave little time to perform the expansion activity. Again, since the wellfield is required to be monitored monthly along with performing quarterly surface emissions monitoring we believe that the performance of the wellfield will not be impacted.

**Cover penetrations** - The third issue the EPA has asked for comment deals with surface monitoring locations and requests comment on the interpretation of cover penetrations. The EPA has taken the draft position that the quarterly monitoring path should include the monitoring of every cover penetration, since "cover penetrations can be observed visually and are clearly a place where gas would be escaping from the cover, so monitoring of them would be required by the regulatory language." We disagree with this interpretation.

To assume that all cover penetrations, including gas extraction wells, are a place where gas is escaping is unwarranted since the gas system is under vacuum. Also, it has been our experience that most cover penetrations do not leak, and therefore, there should not be a default assumption that they represent places where surface emissions are likely occurring. In addition, there are several facilities which are closed and are capped with a flexible membrane liner. This type of cover is very effective in not allowing gas to escape.

Further, if visual or other observations (e.g., breach in seal around penetration, desiccation of the cover material at the interface of penetration and the cover material, LFG odor in immediate vicinity, etc.) indicate possible elevated concentrations of landfill gas around cover penetrations in the solid waste area where the collection system is required those areas are currently being monitored as a part of the quarterly surface emissions testing.

The proposed requirement would be very difficult to perform at many landfills especially since there are landfills which have over 1,000 cover penetrations with only a small fraction of them potentially causing surface emissions. Therefore SWANA and NSWMA recommends the following rule changes as described below.

The Agency should clarify that any obligation to perform surface monitoring in the vicinity of a penetration of the landfill cap is limited to the area within the perimeter of the municipal waste disposal area. Second, any requirement to perform surface monitoring in the vicinity of a penetration in the cap should apply only where such penetration extends fully through the cap, rather than constitutes a surficial breach or inconsistency. This limitation would eliminate the need to automatically perform surface monitoring around survey poles, gas line or leachate line markers and other commonplace items that are intentionally placed within the cap but only within the top several inches of the surface. Third,

the obligation to perform surface monitoring in the vicinity of a landfill cap penetration should not apply to gas collection wells or other components maintained under vacuum unless there are visible signs of a crack or breach in the seal around the penetration as noted above. Finally, we would like to point out the regulation for monitoring surface penetrations needs to be clear that monitoring is to be performed at the landfill surface (i.e. at a point within 5 to 10 cm of the surface).

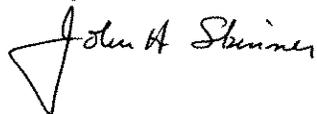
**Previous Request for Rule Clarification**

A letter from SWANA dated October 14, 2004 detailed 22 issues within the NSPS rule where SWANA sought clarification. These issues were discussed with USEPA staff in a meeting on November 10, 2005, which was summarized in meeting notes dated, January 24, 2006. Several of these issues are covered in the draft rulemaking; however, others are not.

For the issues not addressed in the rulemaking, we hereby request that EPA either specifically cover those issues in the draft rulemaking or clarify in the preamble that certain issues will be handled in another manner, such as through applicability determinations or revisions to one of the guidance documents associated with the NSPS rule.

Thank you in advance for consideration of our views. We look forward to working with EPA on this very important issue and offer to meet with you to discuss these comments as part of the final rulemaking process. If you have any questions regarding these collective comments, please contact Mr. Frank Caponi, SWANA's Landfill Gas Technical Division Director at (562) 699-7411 x2460, or Mr. Ed Repa of NSWMA at 202-244-4700.

Respectfully submitted,



John H. Skinner, Ph.D.  
SWANA Executive Director and CEO



Bruce Parker  
President and CEO NSWMA

**Appendix B**  
**HELP Model Analysis of Alternative Cover Design**



# CALCULATION SHEET



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Project No. 60197394

Client County of Kaua'i Subject Final Cover

Prepared By TCR Date 8/9/12

Project Kekaha Landfill Equivalency Analysis

Reviewed By NKW Date 8/9/12

Cell 2, Phase II

Approved By KJB Date 8/10/12

## FINAL COVER EQUIVALENCY ANALYSIS

### Objective

Evaluate and compare the infiltration through the proposed Kekaha Landfill Phase II cover and the permitted bottom liner to determine the effectiveness of the proposed cover. Infiltration through the cover and bottom liner is estimated using the USEPA Hydraulic Evaluation of Landfill Performance Version 3.07 (HELP) computer modeling program.

### Design Criteria and Assumptions

1. This analysis was performed to evaluate the effectiveness of the proposed final cover for the Phase II landfill.
2. The required cover specified in HAR Section 11-58.1-17 requires the same or less infiltration as the bottom liner.
3. The bottom liner will be evaluated with 12 inches of head, which is the maximum head allowed by HAR during the post closure care period.

### *HELP Model Version 3.07 Input:*

1. Solar radiation data can be default data, user input or synthetically generated by the HELP model. Synthetically generated solar radiation data for Honolulu, Hawaii was used to simulate site weather conditions.
2. Temperature, precipitation, and average wind speed data was obtained from site records from January 2001 through December 2010. Missing data is viewed by the model as a "0". Therefore, to avoid skewing the data, missing temperature data for 2001, 2002, and 2008 was filled in using temperatures from days adjacent to the missing data. The data missing in 2004 was filled in using data from the same dates in 2003. Data is missing for a total of 5 days in April of 2001 and 2002. Data from 2004 is missing from April 9 through May 3, and May 26 through June 19. For 2008 data is missing from January 30 through February 3<sup>rd</sup>. There is no missing data from 2003, 2005, 2006, 2007, 2009, and 2010.
3. Geomembrane liner pinhole density and size were assumed to account for possible manufacturing defects during geomembrane production. The HELP Model User's Guide for Version 3.07 states that the pinhole density for a typical geomembrane is 0.5 to 1 pinhole per acre. One pinhole per acre was assumed to be present.
4. The placement quality for the geomembrane liner was assumed to be "good". A placement quality of "good" according to the HELP Model User's Guide "assumes good field installation with well prepared, smooth soil surface and geomembrane wrinkle control". The HELP Model User's Guide suggests 1 to 4 installation defects for an installation quality of "good". Two installation defects per acre were assumed for the geomembrane liner. This also reflects full time CQA during geomembrane installation.
5. Only the relatively gentle top slopes of the landfill are used in the HELP analysis. The relatively gentle slopes allow the maximum infiltration through the cover.
6. The initial moisture content of the final cover layers was computed by the HELP model software to be steady state conditions.

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7. For the cover analysis the curve number was calculated by the HELP model based on the soil type and final cover slopes. Through the use of top deck diversion berms or other engineered features, the shallowest, longest slope for the cover will be 3 percent and 200 feet. The slope and length are based on the flatter top areas of the landfill.
8. The HAR allows a maximum of 1 foot of head on the bottom liner during the post closure period. The head on the bottom liner directly affects the amount of infiltration through the bottom liner. A larger head produces greater infiltration. To determine the performance of the permitted bottom liner with a maximum of 1 foot of head the HELP model analysis of the bottom liner includes the GCL, geomembrane and only 1 foot of the drainage layer. The bottom liner HELP analysis was performed only to determine infiltration through the liner with a maximum of 1 foot of head. Therefore, rainfall and weather data does not impact the results but were input to allow the HELP model software to perform the desired calculations.
9. To maintain a head at a maximum of 1 foot during the bottom liner analysis, only the bottom liner was modeled, no run-off was allowed, and the top sand layer was modeled as a vertical percolation layer. This analysis setup maintained the head on the liner near the HAR allowed depth.
10. The permitted bottom liner system consists of a GCL and 60-mil HDPE geomembrane.
11. A one-acre design area was used for modeling purposes to compute unit quantities.
12. Permitted Bottom Liner Inputs for existing Phase II (see also Table 2):
  - 12 inches of drainage layer
  - Geomembrane
  - GCL
  - No vegetation on cover (does not affect this analysis)
  - Evaporative zone depth = 1 inch (minimum required for HELP Model software requirements) (does not affect this analysis)
  - Maximum leaf area index = 0 (recommended by HELP Model for Bare ground conditions) (does not affect this analysis)
  - Fraction of area allowing runoff = 0 percent
  - Runoff curve number = 84.7 (HELP model calculated, Soil No. 2, 0.51 percent slope-minimum allowed by HELP software, 1-foot slope length) (does not affect this analysis)
  - Length of model run = 10 years (length of run based on length of available data, solar radiation data was synthetically generated for 10 years)
13. Proposed Final Cover Inputs (see also Table 1):
  - 6 inch topsoil/vegetative layer
  - 12 inch vegetative/protective soil layer
  - Geocomposite drainage layer
  - Geomembrane
  - 6 inches soil grading layer (the top 6 inches of intermediate cover)
  - Good vegetation on cover
  - Evaporative zone depth = 22 inches (recommended by HELP Model for fair vegetation conditions for Honolulu, Hawaii) Note that the HELP model uses an actual evaporative zone depth based on the cover soil depths. The maximum evaporative zone depth is

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limited to 22 inches.

- Maximum leaf area index = 2 (recommended by HELP Model for fair vegetation conditions)
- Fraction of area allowing runoff = 100 percent
- Runoff curve number = 82.2 (HELP model calculated, Soil No. 9, 3 percent slope, 200-foot slope length)
- Length of model run = 10 years (length of run based on length of available data, solar radiation data was synthetically generated for 10 years)

*Help Model General Layout*

**Table 1: Proposed Final Cover – HELP Model Layout**

(Layer Number) Layer Description	Flow	Thickness	Saturated Hydraulic Conductivity	Soil Type/ Texture Number
(1)vertical percolation	↓	6 inches	$1.9 \times 10^{-4}$ cm/sec	Topsoil/Vegetative Layer/#9
(1)vertical percolation	↓	12 inches	$4.2 \times 10^{-5}$ cm/sec	Vegetative/Protective Soil Layer/#12
(12)lateral drainage	→	0.197 inches	$1.0 \times 10^{+1}$ cm/sec	Geocomposite/ #20
(13)40-mil LDPE geomembrane Liner	↓	0.04 inch	$4.0 \times 10^{-13}$ cm/sec	LDPE geomembrane/#36
(14)barrier soil layer	↓	6 inches	$1.2 \times 10^{-4}$ cm/sec	Soil grading layer /#10

**Table 2: Bottom Liner – HELP Model Layout**

(Layer Number) Layer Description	Flow	Thickness	Saturated Hydraulic Conductivity	Soil Type/ Texture Number
(1)vertical percolation	↓	12 inches	$6.0 \times 10^{-3}$ cm/sec	Drainage Layer/#61
(13)60-mil HDPE geomembrane Liner	↓	0.06 inch	$2.0 \times 10^{-13}$ cm/sec	HDPE geomembrane/#35
(14)Geosynthetic Clay Layer	↓	0.24 inches	$3.0 \times 10^{-9}$ cm/sec	Bentonite mat/#17

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**Table 3: Soil Texture Properties**

Soil Texture	Soil Classification		Comments, Properties, and Uses
	USDA	USCS	
61	FS	SW	Sand drainage layer. Based on HELP model default soil no. 2 with the hydraulic conductivity changed from $5.8 \times 10^{-3}$ cm/sec to $6 \times 10^{-3}$ cm/sec.
36	---	---	HELP model default parameters for Low Density Polyethylene (LDPE) geomembrane.
20	---	---	HELP model default parameters for geocomposite (drainage net, 0.5 cm/0.197 inches thick)
18	---	---	HELP model default parameter for municipal solid waste.
17	---	---	HELP model default parameter for a bentonite mat (0.6 cm/0.24 in. thick).
12	SiCL	CL	Used for vegetative/protective cover. HELP model default parameter.
10	SCL	SC	Used for soil grading layer. HELP model default parameter.
9	SiL	ML	Used for topsoil/vegetative cover. HELP model default parameter.

**Note: All soil properties are defaults of the HELP Model, Version 3.07 unless otherwise designated.**

### Calculations

Calculations performed by the HELP Model are included in the output located in Attachments 1 and 2. See Table 4 for the modeling results based on peak average annual values.

**Table 4: Calculated Results From HELP Analysis Output**

Parameter	Average Annual Value	
	Proposed Final Cover	Permitted Bottom Liner
Total Rainfall	18.94 inches	18.94 inches
Average head: Cover Geomembrane	0.017 inches	---
Infiltration through final cover	6.755 cf/acre	---
Average head: Bottom Liner Geomembrane	---	11.450 inches
Infiltration through bottom liner system	---	8.019 cf/acre

NOTE: Refer to the attached HELP model output files Attachment 1 for the bottom liner, file name "BotLine1.out", and Attachment 2 for the proposed final cover, file name "PropCov2.out".

### Conclusion

The evaluation of the proposed cover shows that the proposed cover allows less infiltration than the permitted bottom liner (see Table 4). The proposed final cover which includes a geocomposite, 40-mil geomembrane, and grading layer allows approximately 6.755 cf/acre of surface water infiltration. The permitted bottom liner which includes a 60-mil geomembrane and GCL allows approximately 8.019 cf/acre of infiltration.

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Client County of Kaua'i Subject Final Cover Prepared By TCR Date 8/9/12

Project Kekaha Landfill Equivalency Analysis Reviewed By NKW Date 8/9/12

Cell 2, Phase II Approved By KJB Date 8/10/12

### References

1. "Engineering Report, Kekaha Landfill Phase II, Kekaha, Kauai, Hawaii," prepared by Harding Lawson Associates, dated August 5, 1993.
2. "Engineering Report, Kekaha Landfill Phase II, Second Vertical Expansion to 85' MSL, Kekaha, Kauai, Hawaii," prepared by Earth Tech, dated November 2004.

**Attachment 1**

Permitted Bottom Liner HELP Model Output



LAYER 2

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TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3	- GOOD

LAYER 3

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TYPE 3 - BARRIER SOIL LINER

MATERIAL TEXTURE NUMBER 52

THICKNESS	=	0.24	INCHES
POROSITY	=	0.7500	VOL/VOL
FIELD CAPACITY	=	0.7470	VOL/VOL
WILTING POINT	=	0.4000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.7500	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.499999997000E-08	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

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NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 2 WITH BARE GROUND CONDITIONS, A SURFACE SLOPE OF 1.% AND A SLOPE LENGTH OF 1. FEET.

SCS RUNOFF CURVE NUMBER	=	84.70	
FRACTION OF AREA ALLOWING RUNOFF	=	0.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	1.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	0.176	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	0.437	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.024	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	5.163	INCHES
TOTAL INITIAL WATER	=	5.163	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

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 NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM  
 HONOLULU HAWAII

STATION LATITUDE = 21.33 DEGREES  
 MAXIMUM LEAF AREA INDEX = 0.00  
 START OF GROWING SEASON (JULIAN DATE) = 0  
 END OF GROWING SEASON (JULIAN DATE) = 367  
 EVAPORATIVE ZONE DEPTH = 1.0 INCHES  
 AVERAGE ANNUAL WIND SPEED = 3.47 MPH  
 AVERAGE 1ST QUARTER RELATIVE HUMIDITY = 72.00 %  
 AVERAGE 2ND QUARTER RELATIVE HUMIDITY = 66.00 %  
 AVERAGE 3RD QUARTER RELATIVE HUMIDITY = 66.00 %  
 AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 70.00 %

NOTE: PRECIPITATION DATA FOR KEKAHA/SITE HAWAII  
 WAS ENTERED FROM AN ASCII DATA FILE.

NOTE: TEMPERATURE DATA FOR KEKAHA/SITE HAWAII  
 WAS ENTERED FROM AN ASCII DATA FILE.

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING  
 COEFFICIENTS FOR HONOLULU HAWAII  
 AND STATION LATITUDE = 21.33 DEGREES

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ANNUAL TOTALS FOR YEAR 2001

	INCHES	CU. FEET	PERCENT
PRECIPITATION	9.41	34158.316	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	9.396	34107.504	99.85
PERC./LEAKAGE THROUGH LAYER 3	0.003047	11.060	0.03
AVG. HEAD ON TOP OF LAYER 2	11.5015		
CHANGE IN WATER STORAGE	0.011	39.752	0.12
SOIL WATER AT START OF YEAR	5.163	18742.437	
SOIL WATER AT END OF YEAR	5.174	18782.189	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00

SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.001	0.00

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ANNUAL TOTALS FOR YEAR 2002

	INCHES	CU. FEET	PERCENT
PRECIPITATION	6.03	21888.908	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	6.190	22471.096	102.66
PERC./LEAKAGE THROUGH LAYER 3	0.003014	10.940	0.05
AVG. HEAD ON TOP OF LAYER 2	11.4241		
CHANGE IN WATER STORAGE	-0.163	-593.130	-2.71
SOIL WATER AT START OF YEAR	5.174	18782.189	
SOIL WATER AT END OF YEAR	5.011	18189.061	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.003	0.00

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ANNUAL TOTALS FOR YEAR 2003

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.37	48533.125	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	12.366	44887.062	92.49
PERC./LEAKAGE THROUGH LAYER 3	0.002993	10.863	0.02
AVG. HEAD ON TOP OF LAYER 2	11.3681		

CHANGE IN WATER STORAGE	1.001	3635.182	7.49
SOIL WATER AT START OF YEAR	5.011	18189.061	
SOIL WATER AT END OF YEAR	5.424	19688.801	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.588	2135.442	4.40
ANNUAL WATER BUDGET BALANCE	0.0000	0.014	0.00

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ANNUAL TOTALS FOR YEAR 2004

	INCHES	CU. FEET	PERCENT
PRECIPITATION	23.64	85813.227	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	18.271	66321.961	77.29
PERC./LEAKAGE THROUGH LAYER 3	0.003018	10.955	0.01
AVG. HEAD ON TOP OF LAYER 2	11.4073		
CHANGE IN WATER STORAGE	5.366	19480.303	22.70
SOIL WATER AT START OF YEAR	5.424	19688.801	
SOIL WATER AT END OF YEAR	5.424	19688.801	
SNOW WATER AT START OF YEAR	0.588	2135.442	2.49
SNOW WATER AT END OF YEAR	5.955	21615.744	25.19
ANNUAL WATER BUDGET BALANCE	0.0000	0.003	0.00

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ANNUAL TOTALS FOR YEAR 2005

	INCHES	CU. FEET	PERCENT
PRECIPITATION	15.52	56337.633	100.00

RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	21.885	79442.008	141.01
PERC./LEAKAGE THROUGH LAYER 3	0.003084	11.193	0.02
AVG. HEAD ON TOP OF LAYER 2	11.5947		
CHANGE IN WATER STORAGE	-6.368	-23115.570	-41.03
SOIL WATER AT START OF YEAR	5.424	19688.801	
SOIL WATER AT END OF YEAR	5.011	18188.975	
SNOW WATER AT START OF YEAR	5.955	21615.744	38.37
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.001	0.00

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ANNUAL TOTALS FOR YEAR 2006

	INCHES	CU. FEET	PERCENT
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PRECIPITATION	34.76	126178.836	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	34.757	126168.187	99.99
PERC./LEAKAGE THROUGH LAYER 3	0.003057	11.099	0.01
AVG. HEAD ON TOP OF LAYER 2	11.5251		
CHANGE IN WATER STORAGE	0.000	-0.445	0.00
SOIL WATER AT START OF YEAR	5.011	18188.975	
SOIL WATER AT END OF YEAR	5.011	18188.529	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.005	0.00

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ANNUAL TOTALS FOR YEAR 2007

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	INCHES	CU. FEET	PERCENT
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PRECIPITATION	23.58	85595.414	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	15.166	55053.887	64.32
PERC./LEAKAGE THROUGH LAYER 3	0.002973	10.792	0.01
AVG. HEAD ON TOP OF LAYER 2	11.3162		
CHANGE IN WATER STORAGE	8.411	30530.736	35.67
SOIL WATER AT START OF YEAR	5.011	18188.529	
SOIL WATER AT END OF YEAR	5.424	19688.801	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	7.997	29030.465	33.92
ANNUAL WATER BUDGET BALANCE	0.0000	0.000	0.00

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ANNUAL TOTALS FOR YEAR 2008

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	INCHES	CU. FEET	PERCENT
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PRECIPITATION	28.54	103600.219	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	21.822	79214.789	76.46
PERC./LEAKAGE THROUGH LAYER 3	0.003079	11.178	0.01
AVG. HEAD ON TOP OF LAYER 2	11.5602		
CHANGE IN WATER STORAGE	6.715	24374.223	23.53
SOIL WATER AT START OF YEAR	5.424	19688.801	
SOIL WATER AT END OF YEAR	5.424	19688.801	
SNOW WATER AT START OF YEAR	7.997	29030.465	28.02

SNOW WATER AT END OF YEAR	14.712	53404.687	51.55
ANNUAL WATER BUDGET BALANCE	0.0000	0.026	0.00

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ANNUAL TOTALS FOR YEAR 2009

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.56	49222.816	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	28.275	102636.484	208.51
PERC./LEAKAGE THROUGH LAYER 3	0.003061	11.113	0.02
AVG. HEAD ON TOP OF LAYER 2	11.5382		
CHANGE IN WATER STORAGE	-14.718	-53424.703	-108.54
SOIL WATER AT START OF YEAR	5.424	19688.801	
SOIL WATER AT END OF YEAR	5.418	19668.785	
SNOW WATER AT START OF YEAR	14.712	53404.687	108.50
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.076	0.00

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ANNUAL TOTALS FOR YEAR 2010

	INCHES	CU. FEET	PERCENT
PRECIPITATION	20.98	76157.414	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	12.483	45314.129	59.50
PERC./LEAKAGE THROUGH LAYER 3	0.002949	10.705	0.01
AVG. HEAD ON TOP OF LAYER 2	11.2592		

CHANGE IN WATER STORAGE	8.494	30832.564	40.49
SOIL WATER AT START OF YEAR	5.418	19668.785	
SOIL WATER AT END OF YEAR	5.424	19688.801	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	8.488	30812.547	40.46
ANNUAL WATER BUDGET BALANCE	0.0000	0.017	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 2001 THROUGH 2010

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	2.17 0.28	1.55 1.03	3.20 0.97	0.84 1.08	0.45 2.15	0.73 4.48
STD. DEVIATIONS	2.80 0.25	1.80 1.33	6.51 0.63	0.68 1.60	0.39 2.10	0.46 5.94
RUNOFF						
TOTALS	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
STD. DEVIATIONS	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
EVAPOTRANSPIRATION						
TOTALS	1.988 0.264	2.003 1.008	2.934 0.996	2.451 0.791	1.360 1.543	1.208 1.516
STD. DEVIATIONS	1.357 0.196	1.537 1.206	1.702 0.696	2.363 0.949	2.030 0.780	1.869 1.400
PERCOLATION/LEAKAGE THROUGH LAYER 3						
TOTALS	0.0003 0.0003	0.0002 0.0003	0.0003 0.0002	0.0002 0.0003	0.0003 0.0003	0.0002 0.0003
STD. DEVIATIONS	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000

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 AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)  
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DAILY AVERAGE HEAD ON TOP OF LAYER 2  
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AVERAGES	11.5872	11.5423	11.6710	11.4410	11.2596	11.3905
	11.2796	11.3416	11.4295	11.4851	11.5575	11.4088
STD. DEVIATIONS	0.3422	0.3722	0.3122	0.4197	0.3200	0.3595
	0.2892	0.3352	0.2779	0.3855	0.2597	0.3964

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 2001 THROUGH 2010  
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	INCHES		CU. FEET	PERCENT
	-----		-----	-----
PRECIPITATION	18.94 ( 8.940)		68748.6	100.00
RUNOFF	0.000 ( 0.0000)		0.00	0.000
EVAPOTRANSPIRATION	18.061 ( 8.8180)		65561.71	95.364
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.00303 ( 0.00005)		10.990	0.01599
AVERAGE HEAD ON TOP OF LAYER 2	11.449 ( 0.112)			
CHANGE IN WATER STORAGE	0.875 ( 7.2057)		3175.89	4.620

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PEAK DAILY VALUES FOR YEARS 2001 THROUGH 2010

	( INCHES )	( CU. FT. )
PRECIPITATION	10.69	38804.699
RUNOFF	0.000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.000009	0.03233
AVERAGE HEAD ON TOP OF LAYER 2	12.000	
SNOW WATER	0.00	0.0000
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.4370
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0240

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FINAL WATER STORAGE AT END OF YEAR 2010

LAYER	( INCHES )	( VOL/VOL )
1	5.2439	0.4370
2	0.0000	0.0000
3	0.1800	0.7500
SNOW WATER	8.488	

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## **Attachment 2**

Proposed Final Cover HELP Model Output



LAYER 2

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TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 12

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4710	VOL/VOL
FIELD CAPACITY	=	0.3420	VOL/VOL
WILTING POINT	=	0.2100	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2066	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.419999997000E-04	CM/SEC

LAYER 3

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TYPE 2 - LATERAL DRAINAGE LAYER

MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1968	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC
SLOPE	=	3.00	PERCENT
DRAINAGE LENGTH	=	200.0	FEET

LAYER 4

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TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.04	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3	- GOOD

LAYER 5

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TYPE 3 - BARRIER SOIL LINER

MATERIAL TEXTURE NUMBER 52

THICKNESS	=	0.24	INCHES
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POROSITY	=	0.7500	VOL/VOL
FIELD CAPACITY	=	0.7470	VOL/VOL
WILTING POINT	=	0.4000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.7500	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.499999997000E-08	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

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NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A FAIR STAND OF GRASS, A SURFACE SLOPE OF 3.% AND A SLOPE LENGTH OF 200. FEET.

SCS RUNOFF CURVE NUMBER	=	82.20	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	18.2	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	3.414	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	8.825	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	3.331	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	3.594	INCHES
TOTAL INITIAL WATER	=	3.594	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

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NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM HONOLULU HAWAII

STATION LATITUDE	=	21.33	DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00	
START OF GROWING SEASON (JULIAN DATE)	=	0	
END OF GROWING SEASON (JULIAN DATE)	=	367	
EVAPORATIVE ZONE DEPTH	=	18.2	INCHES
AVERAGE ANNUAL WIND SPEED	=	3.47	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	72.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	66.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	66.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	70.00	%

NOTE: PRECIPITATION DATA FOR KEKAHA/SITE HAWAII WAS ENTERED FROM AN ASCII DATA FILE.

NOTE: TEMPERATURE DATA FOR KEKAHA/SITE HAWAII

WAS ENTERED FROM AN ASCII DATA FILE.

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING  
COEFFICIENTS FOR HONOLULU HAWAII  
AND STATION LATITUDE = 21.33 DEGREES

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ANNUAL TOTALS FOR YEAR 2001

	INCHES	CU. FEET	PERCENT
PRECIPITATION	9.41	34158.316	100.00
RUNOFF	0.365	1325.132	3.88
EVAPOTRANSPIRATION	9.046	32835.191	96.13
DRAINAGE COLLECTED FROM LAYER 3	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0000		
CHANGE IN WATER STORAGE	-0.001	-2.023	-0.01
SOIL WATER AT START OF YEAR	3.594	13045.956	
SOIL WATER AT END OF YEAR	3.593	13043.934	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.015	0.00

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ANNUAL TOTALS FOR YEAR 2002

	INCHES	CU. FEET	PERCENT
PRECIPITATION	6.03	21888.908	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	6.112	22187.967	101.37

DRAINAGE COLLECTED FROM LAYER 3	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0000		
CHANGE IN WATER STORAGE	-0.082	-299.058	-1.37
SOIL WATER AT START OF YEAR	3.593	13043.934	
SOIL WATER AT END OF YEAR	3.511	12744.876	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.002	0.00

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ANNUAL TOTALS FOR YEAR 2003

	INCHES	CU. FEET	PERCENT
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PRECIPITATION	13.37	48533.125	100.00
RUNOFF	0.004	13.176	0.03
EVAPOTRANSPIRATION	12.464	45244.805	93.22
DRAINAGE COLLECTED FROM LAYER 3	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 5	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0000		
CHANGE IN WATER STORAGE	0.902	3275.111	6.75
SOIL WATER AT START OF YEAR	3.511	12744.876	
SOIL WATER AT END OF YEAR	4.413	16019.986	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.034	0.00

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ANNUAL TOTALS FOR YEAR 2004

	INCHES	CU. FEET	PERCENT
PRECIPITATION	23.64	85813.227	100.00
RUNOFF	1.699	6166.105	7.19
EVAPOTRANSPIRATION	16.340	59313.301	69.12
DRAINAGE COLLECTED FROM LAYER 3	2.3715	8608.397	10.03
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0117		
CHANGE IN WATER STORAGE	3.230	11725.398	13.66
SOIL WATER AT START OF YEAR	4.413	16019.986	
SOIL WATER AT END OF YEAR	7.643	27745.385	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.015	0.00

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ANNUAL TOTALS FOR YEAR 2005

	INCHES	CU. FEET	PERCENT
PRECIPITATION	15.52	56337.633	100.00
RUNOFF	2.583	9376.111	16.64
EVAPOTRANSPIRATION	10.433	37871.871	67.22
DRAINAGE COLLECTED FROM LAYER 3	6.6364	24090.125	42.76
PERC./LEAKAGE THROUGH LAYER 5	0.000007	0.025	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0327		
CHANGE IN WATER STORAGE	-4.132	-15000.510	-26.63
SOIL WATER AT START OF YEAR	7.643	27745.385	
SOIL WATER AT END OF YEAR	3.511	12744.876	

SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.007	0.00

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ANNUAL TOTALS FOR YEAR 2006

	INCHES	CU. FEET	PERCENT
PRECIPITATION	34.76	126178.836	100.00
RUNOFF	4.935	17915.826	14.20
EVAPOTRANSPIRATION	19.167	69576.062	55.14
DRAINAGE COLLECTED FROM LAYER 3	10.6575	38686.891	30.66
PERC./LEAKAGE THROUGH LAYER 5	0.000011	0.041	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0520		
CHANGE IN WATER STORAGE	0.000	0.000	0.00
SOIL WATER AT START OF YEAR	3.511	12744.876	
SOIL WATER AT END OF YEAR	3.511	12744.876	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.013	0.00

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ANNUAL TOTALS FOR YEAR 2007

	INCHES	CU. FEET	PERCENT
PRECIPITATION	23.58	85595.414	100.00
RUNOFF	2.830	10273.613	12.00
EVAPOTRANSPIRATION	14.101	51187.535	59.80

DRAINAGE COLLECTED FROM LAYER 3	5.8811	21348.545	24.94
PERC./LEAKAGE THROUGH LAYER 5	0.000006	0.023	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0288		
CHANGE IN WATER STORAGE	0.767	2785.679	3.25
SOIL WATER AT START OF YEAR	3.511	12744.876	
SOIL WATER AT END OF YEAR	4.278	15530.556	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.017	0.00

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ANNUAL TOTALS FOR YEAR 2008

	INCHES	CU. FEET	PERCENT
	-----	-----	-----
PRECIPITATION	28.54	103600.219	100.00
RUNOFF	9.007	32694.285	31.56
EVAPOTRANSPIRATION	13.622	49446.723	47.73
DRAINAGE COLLECTED FROM LAYER 3	4.8139	17474.564	16.87
PERC./LEAKAGE THROUGH LAYER 5	0.000005	0.019	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0234		
CHANGE IN WATER STORAGE	1.098	3984.601	3.85
SOIL WATER AT START OF YEAR	4.278	15530.556	
SOIL WATER AT END OF YEAR	5.376	19515.156	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.024	0.00

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ANNUAL TOTALS FOR YEAR 2009

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.56	49222.816	100.00
RUNOFF	0.588	2136.029	4.34
EVAPOTRANSPIRATION	14.495	52617.121	106.90
DRAINAGE COLLECTED FROM LAYER 3	0.0126	45.607	0.09
PERC./LEAKAGE THROUGH LAYER 5	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-1.536	-5575.955	-11.33
SOIL WATER AT START OF YEAR	5.376	19515.156	
SOIL WATER AT END OF YEAR	3.840	13939.201	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.014	0.00

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ANNUAL TOTALS FOR YEAR 2010

	INCHES	CU. FEET	PERCENT
PRECIPITATION	20.98	76157.414	100.00
RUNOFF	3.066	11128.597	14.61
EVAPOTRANSPIRATION	11.540	41890.117	55.00
DRAINAGE COLLECTED FROM LAYER 3	3.9776	14438.622	18.96
PERC./LEAKAGE THROUGH LAYER 5	0.000004	0.015	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0194		
CHANGE IN WATER STORAGE	2.397	8700.039	11.42
SOIL WATER AT START OF YEAR	3.840	13939.201	

SOIL WATER AT END OF YEAR	6.237	22639.240	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.023	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 2001 THROUGH 2010

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
	-----	-----	-----	-----	-----	-----
PRECIPITATION						
-----						
TOTALS	2.17	1.55	3.20	0.84	0.45	0.73
	0.28	1.03	0.97	1.08	2.15	4.48
STD. DEVIATIONS	2.80	1.80	6.51	0.68	0.39	0.46
	0.25	1.33	0.63	1.60	2.10	5.94
RUNOFF						
-----						
TOTALS	0.258	0.126	0.469	0.001	0.000	0.000
	0.000	0.059	0.000	0.043	0.169	1.383
STD. DEVIATIONS	0.817	0.293	1.419	0.001	0.000	0.000
	0.000	0.185	0.000	0.136	0.477	2.802
EVAPOTRANSPIRATION						
-----						
TOTALS	1.344	1.575	1.761	1.239	0.437	0.728
	0.296	0.930	1.015	0.807	1.296	1.306
STD. DEVIATIONS	0.867	0.789	1.405	1.084	0.403	0.422
	0.233	1.139	0.610	0.999	0.633	1.100
LATERAL DRAINAGE COLLECTED FROM LAYER 3						
-----						
TOTALS	0.5937	0.1169	1.0072	0.0725	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0428	0.0768	1.5251
STD. DEVIATIONS	1.8731	0.2537	2.9888	0.2294	0.0000	0.0000
	0.0000	0.0000	0.0000	0.1352	0.2429	2.1790
PERCOLATION/LEAKAGE THROUGH LAYER 5						
-----						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

-----  
 AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)  
 -----

DAILY AVERAGE HEAD ON TOP OF LAYER 4  
 -----

AVERAGES	0.0347	0.0075	0.0589	0.0044	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0025	0.0046	0.0891
STD. DEVIATIONS	0.1095	0.0163	0.1747	0.0139	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0079	0.0147	0.1274

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 2001 THROUGH 2010  
 -----

	INCHES		CU. FEET	PERCENT
	-----	-----	-----	-----
PRECIPITATION	18.94	( 8.940)	68748.6	100.00
RUNOFF	2.508	( 2.7897)	9102.89	13.241
EVAPOTRANSPIRATION	12.732	( 3.7176)	46217.07	67.226
LATERAL DRAINAGE COLLECTED FROM LAYER 3	3.43506	( 3.63372)	12469.274	18.13750
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.00000	( 0.00000)	0.013	0.00002
AVERAGE HEAD ON TOP OF LAYER 4	0.017	( 0.018)		
CHANGE IN WATER STORAGE	0.264	( 2.0421)	959.33	1.395

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PEAK DAILY VALUES FOR YEARS 2001 THROUGH 2010

	(INCHES)	(CU. FT.)
PRECIPITATION	10.69	38804.699
RUNOFF	8.091	29369.3809
DRAINAGE COLLECTED FROM LAYER 3	1.23090	4468.16846
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.000001	0.00499
AVERAGE HEAD ON TOP OF LAYER 4	2.230	
MAXIMUM HEAD ON TOP OF LAYER 4	3.903	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	24.9 FEET	
SNOW WATER	0.00	0.0000
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.4533
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.1831

\*\*\* Maximum heads are computed using McEnroe's equations. \*\*\*

Reference: Maximum Saturated Depth over Landfill Liner  
by Bruce M. McEnroe, University of Kansas  
ASCE Journal of Environmental Engineering  
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 2010

LAYER	(INCHES)	(VOL/VOL)
1	1.5793	0.2632
2	4.4124	0.3677
3	0.0650	0.3299
4	0.0000	0.0000
5	0.1800	0.7500
SNOW WATER	0.000	

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**Appendix C**  
**Final Cover Drainage Layer Capacity**  
**and Slope Stability**



# CALCULATION SHEET



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<b>Project</b> <u>Kekaha Landfill</u>	<b>Drainage Layer Capacity</b>	<b>Reviewed By</b> <u>BPS</u>	<b>Date</b> <u>8/26/13</u>
<b>Phase II Vertical Expansion</b>	<b>And Slope Stability</b>	<b>Approved By</b> <u>KJB</u>	<b>Date</b> <u>8/26/13</u>

## FINAL COVER DRAINAGE LAYER CAPACITY AND SLOPE STABILITY

### Objective

Evaluate the final cover slope stability under static and seepage conditions for the proposed Phase II and Cell 1 Vertical Expansion at Kekaha Landfill that incorporates the use of geosynthetics and soil materials.

### Design Criteria & Assumptions

1. The attached final cover cross section is applicable (Figure 1).
2. A 100-year 24-hour rain event of 12 inches is the assumed rain event for the seepage condition.
3. Interface friction angle testing as well as transmissivity testing should be completed prior to construction and use of the proposed materials. This calculation is completed to evaluate the acceptability of the proposed drainage materials under expected normal loadings and minimum interface friction angles. Material and interface friction angle testing requirements are presented in accompanying Engineering Report.
4. The geocomposite drainage layer will consist of a HDPE geonet with a nonwoven geotextile heat-bonded to both sides.
5. A factor of safety of 1.5 will be used to determine slope stability under static conditions (consistent with past permitted approvals). A factor of safety of 1.2 and a drainage layer capacity greater than one ( $DLC \geq 1$ ) will be used to assess stability for seepage conditions (short-term condition) in defining minimum material requirements. By defining a  $DLC \geq 1$  all infiltration through the protective cover soil will be managed in the thickness of the geocomposite drainage layer. Under short-term conditions, the final cover protective cover soil layer above the geocomposite drainage layer is assumed to be at field capacity, a temporary condition.
6. This analysis is completed only on the final cover sideslope (3.5:1) as this represents the steepest slopes, required overall stability of the cover system, and drainage performance of the geocomposite.
7. The calculation also assumes that the drainage from the proposed crown of the facility is day lighted or drained prior to the 3.5:1 slopes.
8. Seismic analysis will not be completed as the site specific horizontal peak ground acceleration is 0.06 g and is less than 0.10 g required by Subtitle D for analysis (Reference 1).

# CALCULATION SHEET



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## Calculations

The stability of the final cover is primarily dependent upon the shear resistance of the weakest interface, slope length, slope inclination, and the seepage condition. The following information was collected/selected before conducting the actual stability analysis.

### Material/Design Properties

Final cover material properties are based upon Appendix B of Reference 1 for unit weight. Final cover soil is expected to be imported to the facility for construction.

Protective Cover Soil (well graded sand, Reference 1):

Unit weight, moist	$\gamma_{\text{moist}} = 110 \text{ pcf} = 17.3 \text{ kN/m}^3$
Unit weight, saturated (assumed)	$\gamma_{\text{saturated}} = 120 \text{ pcf} = 18.9 \text{ kN/m}^3$
Permeability	$k_{\text{c.s.}} = \text{varies}$
Thickness (permitted)	$h_{\text{c.s.}} = 18 \text{ inches} = 457.2 \text{ mm}$
Internal friction angle	$\phi_{\text{c.s.}} = 30 \text{ degrees (conservative)}$

### Runoff Coefficient:

Runoff coefficient (RC) is an estimated percentage of precipitation allowed to runoff the final cover. The runoff coefficient is dependant upon the type of soils and slope steepness. The proposed protective cover soil will consist of on-site well graded sands. The runoff coefficient based upon Reference 5 (Attachment 1) is estimated at:

Clayey soils, slopes greater than 7% RC = 0.25 to 0.35  
Sandy soils, slopes greater than 7% RC = 0.15 to 0.20

For conservative design, a runoff coefficient of RC = 0.15 has been used for the 3.5:1 slope (28.6% slope). If a lower permeable soil is used (i.e. clayey soils), then the amount of expected runoff will increase and reduce the overall infiltration to the geocomposite, further increasing this calculation conservatism.

### Slope Inclination:

Slope inclination:  $\beta = 3.5\text{H}:1\text{V} = \tan^{-1} (1/3.5) = 15.9 \text{ degrees}$

### Design rainfall intensity (Reference 7):

100-year, 24-hour storm event	$I = 12 \text{ inches/24 hours}$
	$I = (12/24) \text{ inches/hour} = 0.50 \text{ inches/hr}$
	$I = 12.7 \text{ mm/hr}$

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## Geocomposite Drainage Layer Properties:

Geocomposite thickness (geonet only):  $t_{\text{composite}} = 200$  mil or 5 mm  
(Per GSE, Attachment 2)

Transmissivity is determined by applying the following equation (References 8 and 9)

$$\theta_{\text{allow}} = \left( \frac{\theta_{100}}{RF_{CR} * RF_{CC} * RF_{BC}} \right)$$

where:

$\theta_{\text{allow}}$  = allowable transmissivity,  $m^2/\text{sec}$   
 $\theta_{100}$  = 100 hour transmissivity data,  $m^2/\text{sec}$   
 $RF_{CR}$  = Reduction factor for creep  
 $RF_{CC}$  = Reduction factor for chemical clogging  
 $RF_{BC}$  = Reduction factor for biological clogging

Gradient for transmissivity testing is equal to  $\sin \beta$  (Reference 9) or  $\sin (15.9 \text{ degrees}) = 0.274$ .

Since this is a final cover system, the overburden or loading applied to the geocomposite is equal to the thickness of the final cover soils multiplied by the unit weight. For the proposed final cover cross section the overburden is (1.5 feet \* 120 pcf) = 180 psf. Accounting for construction equipment placing the soils, which would include a dozer with a maximum 5 psi surface pressure, the resulting overburden is (180 psf + (5 psi \* 144 in<sup>2</sup>/sf)) = 900 psf. Equipment loading is considered temporary. Therefore, assuming an overburden loading of 1,000 psf for 100 hours is conservative.

The 100 hour transmissivity data ( $\theta_{100}$ ) for 200 mil GSE Fabrinet geocomposite with a 6 or 8 oz geotextile with a boundary condition of soil to geocomposite to geomembrane is determined using Figure A-3 of Reference 9 (Attachment 3) for 1,000 psf loading, 100 hour seat time, at a gradient of 0.27:

$$\theta_{100} = 1.7 \times 10^{-4} \text{ m}^2/\text{sec}, \text{ say } \rightarrow 1.5 \times 10^{-4} \text{ m}^2/\text{sec}$$

Reduction factors of  $RF_{CC}$  and  $RF_{BC}$  are selected from Table 4.4 of Reference 9:

$RF_{CC} = 1.1$  (assumes low alkaline soils)  
 $RF_{BC} = 1.5$  (assumes very little to no root growth into geocomposite)

Reduction factor of  $RF_{CR}$  (creep) is determined based upon increasing overburden stress. Creep reduction factors for cover applications are much smaller than those for liner systems. Based upon Section 4.3.4 and Appendix B - Table B-1 of Reference 9,  $RF_{CR} = 1.1$  for GSE 200 mil HyperNet Geonet (geonet core for the geocomposite).

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Solving allowable transmissivity:

$$\theta_{allow} = \left( \frac{1.5 \times 10^{-4} \text{ m}^2 / \text{sec}}{1.1 * 1.1 * 1.5} \right) = \left( \frac{1.5 \times 10^{-4} \text{ m}^2 / \text{sec}}{1.82} \right) = 8.24 \times 10^{-5} \text{ m}^2 / \text{sec}$$

Permeability:

$$k_d = \left( \frac{8.24 \times 10^{-5} \text{ m}^2 / \text{sec}}{5 \text{ mm}} \right) \left( \frac{100 \text{ cm}}{1 \text{ m}} \right)^2 \left( \frac{10 \text{ mm}}{1 \text{ cm}} \right) = 1.65 \text{ cm/sec}$$

Maximum slope length (Reference 2):

Maximum slope length for the 3.5:1 cover slope (east sideslope across from the leachate evaporation pond) based upon longest change in elevation

$$(\text{El. 114} - \text{El. 52}) \left( \sqrt{3.5^2 + 1^2} \right) = 225.7 \text{ feet} \Rightarrow 230 \text{ feet or } 70.1 \text{ m}$$

### *Infinite Slope Stability*

The infinite slope stability is determined by force summation along the sideslope angle resulting in a factor of safety (Reference 6) without a buttress effect at the toe of slope or:

$$FS = \frac{\text{resisting forces}}{\text{driving forces}} = \frac{F}{W \sin \beta} = \frac{N \tan \delta}{W \sin \beta} = \frac{W \cos \beta \tan \delta}{W \sin \beta}$$
$$FS = \frac{\tan \delta}{\tan \beta}$$

where:

FS = Factor of Safety  
 $\delta$  = critical interface friction angle  
 $\beta$  = sideslope angle

Solving for 3.5:1 slope (15.9 degrees) and Factor of Safety of 1.5, the minimum critical interface friction angle is:

$$FS = \frac{\tan \delta}{\tan \beta} \Rightarrow 1.5 = \frac{\tan \delta_{3.5:1}}{\tan 15.9} \Rightarrow \delta_{3.5:1} = \tan^{-1}(1.5 * \tan 15.9)$$
$$\delta_{3.5:1} = 23.1 \text{ degrees}$$

The infinite slope stability is not dependent upon cover soil thickness, slope length, or cover soil permeability.

# CALCULATION SHEET



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## Methodology for Drainage Layer Capacity Analysis

The degree of submergence of the final cover under the design precipitation should be determined prior to conducting the final cover stability analysis. In order to quantify the degree of submergence, the drainage layer capacity (DLC) of the design option will be determined first. The procedure is based upon those presented by Soong and Koerner, 1997 (Reference 3).

The procedure is:

$$DLC = \frac{FLUX_{allow}}{FLUX_{req'd}}$$

For geocomposite drainage layer:

$$\begin{aligned} FLUX_{allow} &= \text{Allowable flux (flow rate per unit width of final cover)} \\ &= k_d i A \\ &= k_d \sin\beta (t \cdot 1) \\ &= (k_d \cdot t) \sin\beta \\ &= \theta \sin\beta \end{aligned}$$

where:

$k_d$  = permeability of drainage material  
 $i$  = hydraulic gradient =  $\sin\beta$   
 $\beta$  = slope angle  
 $A$  = cross-sectional area of the drainage layer per unit width of final cover  
 $t$  = thickness of drainage layer  
 $\theta$  = transmissivity of geocomposite

$$\begin{aligned} FLUX_{req'd} &= \text{Required flux per unit width of sideslope} \\ &= (PERC)L \cdot \cos\beta (1.0) \end{aligned}$$

where:

$$PERC = \text{percolation} = \begin{cases} I & (k_{cover\ soil} \geq I) \\ k_{cover\ soils} & (k_{cover\ soils} < I) \end{cases}$$

$I$  = design rainfall intensity  
 $k_{cover\ soils}$  = permeability of vegetative/protective cover  
 $L$  = slope length  
 $\beta$  = slope angle

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## Methodology for Seepage Slope Stability Analysis

The final cover stability analysis is conducted using procedures developed specifically for veneer cover situations; see Koerner and Soong, 1998 (Reference 4). A spreadsheet program, based on the procedures recommended in the above referenced literature for seepage conditions was constructed, calibrated, and used in this analysis. Note that the input values were previously converted as needed into SI units for ease of spreadsheet input and analysis.

## Results

The following conditions have been considered in the final cover stability analyses:

1. Static condition: Determine the minimum interface friction angle based upon infinite slope stability analysis (see "infinite slope stability" section above) to achieve a factor of safety of 1.5; and,
2. Seepage condition: Determine the correlations between the maximum length of continuous geocomposite drainage layer, permeability of protective soils and the critical interface friction angle. A minimum factor of safety of 1.2 is targeted for the seepage (short term) condition.

The typical permeability of the imported final cover soil was varied between  $1 \times 10^{-4}$  cm/sec and  $1.0 \times 10^{-5}$  cm/sec for the seepage analysis to assess the maximum allowable uninterrupted slope installation length for the proposed geocomposite while soil thickness, design slope, precipitation, soil parameters, and liner shear strength were held constant.

The results of the static final cover stability have been completed (see "infinite slope stability" section above) and on spreadsheets with the results attached and summarized below in Table 1.

**Table 1  
Summary of Slope Stability Results For Static and Seepage Conditions**

Condition	Slope (H:V)	Rain Event	Maximum Protective Cover Permeability (cm/sec)	Slope Length Feet, (meters)	Cover Soil Thickness Feet, (mm)	Critical Friction Angle	Factor of Safety	DLC	Figure
Static	3.5:1	Infinite slope stability analysis, these parameters are not applied.				23.1	1.50 = 1.50	NA	NA
Seepage	3.5:1	100-year	$*1 \times 10^{-4}$	77.1 (23.5)	1.5 (457.2)	23.1	1.55 > 1.20	1.0 = 1.0	2
			$3.35 \times 10^{-5}$	230 (70.1)			1.51 > 1.20	1.0 = 1.0	3
			$1 \times 10^{-5}$	770.8 (234.9)			1.49 > 1.20	1.0 = 1.0	4
* Equals maximum allowable permeability per the final cover/base liner equivalency calculation.									

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### Conclusions and Discussion

Based upon the above static infinite slope analysis, the weakest peak shear strength as represented by the friction angle  $\phi$  ( $\Phi$ ) for any interface within the final cover system should be a minimum of 23.1 degrees. Based on the seepage analysis, the maximum 3.5:1 slope length (230 feet or 70.1 meters) can be covered with a continuous layer of geocomposite if the protective cover soil layer immediately overlying the geocomposite has a maximum permeability of  $3.35 \times 10^{-5}$  cm/sec. If the permeability of the cover soils is greater than  $3.35 \times 10^{-5}$  cm/sec, then the specific geocomposite proposed for this project will need to be day lighted along the slope length at the maximum slope length intervals listed.

If the transmissivity and correlating permeability of a site specific geocomposite is greater than the design requirement, this calculation should be revisited and slope lengths may potentially increase for a continuous layer of geocomposite with higher permeability protective cover soils. Please note continuous geocomposite slope lengths cannot be increased by increasing the critical friction angle since the DLC factor governs the suitability of the geocomposite. The overall factor of safety would increase, but the performance of the geocomposite still governs maximum continuous geocomposite slope length.

Interface friction angle testing should be completed prior to final acceptance of final cover liner system materials. Transmissivity testing should also be performed at 100 hour seat time at 1,000 psf load with actual site soil and geosynthetic materials to further substantiate the design assumptions.

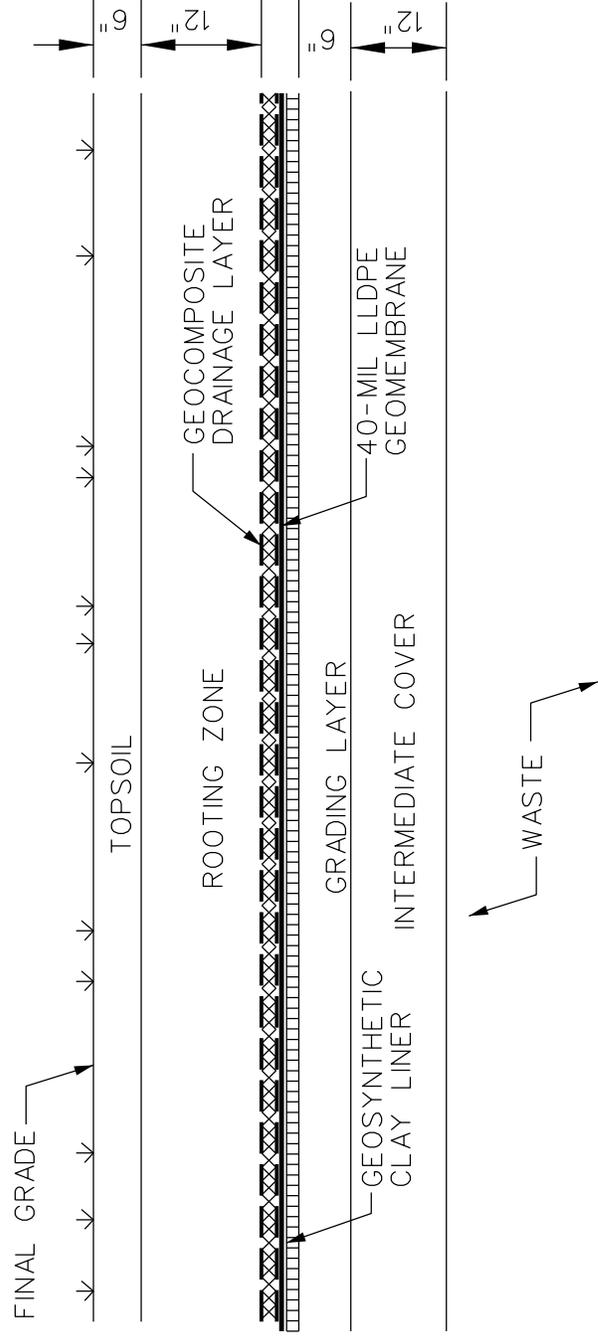
This calculation should be revisited if a geocomposite other than GSE FabriNet geocomposite is selected for final cover installation.

### References

1. "Addendum Operations Manual For Kekaha Sanitary Landfill – Phase II," prepared by EMCON, May 1998.
2. Drawings titled, "Engineering Report, Kekaha Landfill Phase II Vertical Expansion, Kekaha Sanitary Landfill", prepared by AECOM, dated August 2013.
3. Soong, T.-Y. and Koerner, R.M. (1997) "The Design of Drainage Systems Over Geosynthetically Lined Slopes", Report #19, Geosynthetic Research Institute, Philadelphia, PA 19104, 88 pgs.
4. Koerner, R. M. and Soong, T.-Y. (1998), "Analysis and Design of Veneer Cover Soils" *Proc. 6th Int. Conf. on Geosynthetics, Atlanta, USA, IFAI*, pp. 1-23.
5. Daniel, David E., "Geotechnical Practice for Waste Disposal", page 216.
6. Koerner, R. M., "Designing with Geosynthetics," Fourth Edition, pps. 478 and 480.
7. Department of Engineering, County of Kauai. 2001. Stormwater Runoff System Manual. July. Lihue, Kauai, Hawaii
8. Standard Guide for "Determination of the Allowable Flow Rate of a Drainage Geocomposite", Geosynthetic Research Institute, GRI Standard GC8, Revision 1: January 9, 2013.
9. "The GSE Drainage Design Manual", Second Edition, GSE Environmental.

**FIGURE 1**

**TYPICAL FINAL COVER LINER CROSS SECTION**



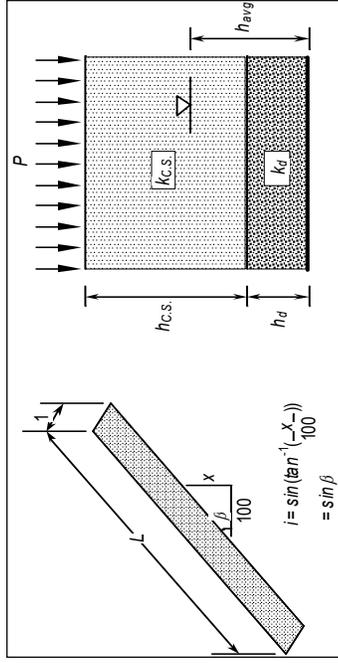
**FINAL COVER SYSTEM** 1  
 NTS

**FIGURES 2 THROUGH 4**

**SLOPE STABILITY UNDER SEEPAGE CONDITIONS FIGURES  
3.5:1 SLOPE, VARIOUS SLOPE LENGTHS, 18-INCH PROTECTIVE COVER THICKNESS**

## Calculation of stability under seepage condition

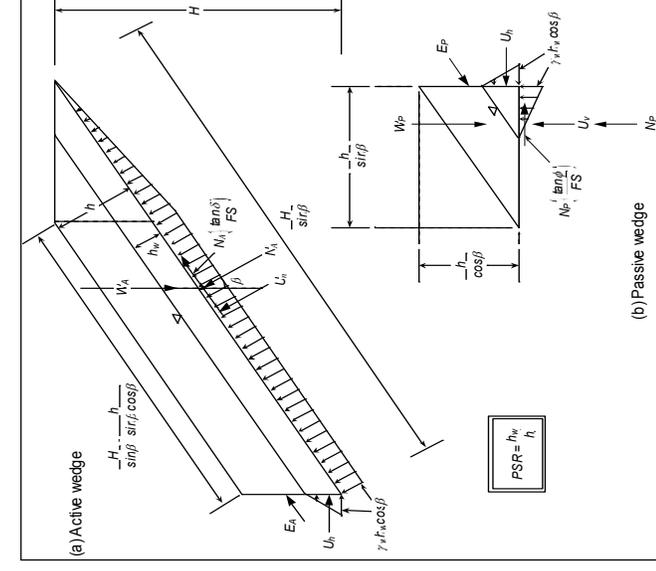
### Calculation of DLC and PSR



$i = \frac{\sin(\tan^{-1}(X_v))}{100} = \sin \beta$   
 $L = 77.1$  ft  
 $L = 23.5$  m  
 $\beta = 15.9$  °  
 $h_{c.s.} = 457.2$  mm  
 $h_d \text{ or } t_{GS} = 5.0$  mm  
 $k_{c.s.} = 1.00E-04$  cm/s  
 $k_d \text{ or } k_{GS} = 1.65E+00$  cm/s  
 $P = 12.70$  mm/hr  
 $RC = 0.15$  mm/hr  
 $i = 0.2740$   
 $L(\cos \beta) = 22.60$  m  
 $x = 6.44$  m  
 $h_{c.s.} = 0.5$  m  
 $h_d \text{ or } t_{GS} = 0.01$  m  
 $h_{c.s.} + h_d = 0.46$  m  
 $k_{c.s.} = 1.0E-06$  m/s  
 $k_d \text{ or } k_{GS} = 1.7E-02$  m/s  
 $P(RC) = 1.9$  mm/hr  
 $Actual\ runoff = 9.10$  mm/hr  
 $PERC = 3.60$  mm/h  
 $FLUX_{actual} = 0.081$  m<sup>3</sup>/hr  
 $FLUX_{allow} = 0.081$  m<sup>3</sup>/hr  
 $q = 2.3E-05$  m<sup>3</sup>/sec  
 $h_{avg} = 0.01$  m

### Results:

<b>DLC</b>	<b>1.000</b>
<b>PSR</b>	<b>0.020</b>
<b>FS</b>	<b>1.550</b>



thickness of cover soil =  $h = 0.46$  m  
 length of slope measured along the top of clay layer =  $L = 24$  m  
 soil slope angle along top of clay =  $\beta = 15.9$  ° =  $0.28$  (rad.)  
 vertical height of the slope measured from the toe =  $H = 6.4$  m  
 parallel submergence ratio =  $PSR = 0.02$   
 depth of the water surface measured from the top of clay layer =  $h_w = 0.01$  m  
 dry unit weight of the cover soil =  $\gamma_{moist} = 17.3$  kN/m<sup>3</sup>  
 saturated unit weight of the cover soil =  $\gamma_{saturated} = 18.9$  kN/m<sup>3</sup>  
 unit weight of water =  $\gamma_w = 9.81$  kN/m<sup>3</sup>  
 friction angle of the cover soil =  $\phi = 30.0$  ° =  $0.52$  (rad.)  
 critical interface =  $\delta = 23.1$  ° =  $0.40$  (rad.)

### Calculation of FS

#### Active Wedge:

$W_A = 181.262$  kN  
 $U_n = 2.07626$  kN  
 $U_h = 0.00043$  kN  
 $N_A = 172.251$  kN

#### Passive Wedge:

$W_P = 7.01372$  kN  
 $U_v = 0.00151$  kN

$$FS = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

where  $a = 47.8$   
 $b = -81.5$   
 $c = 11.6$

**FS = 1.550**

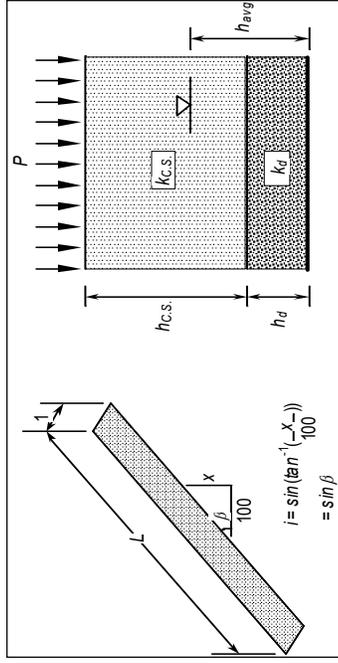
Note: numbers in boxes are input values

numbers in italics are calculated values

Constructed by Te-Yang Soong

## Calculation of stability under seepage condition

### Calculation of DLC and PSR



ft	230.0
L =	70.1
$\beta =$	15.9

$i = 0.2740$   
 $L(\cos \beta) = 67.42$  m  
 $x = 19.21$  m  
 $h_{c.s.} = 0.5$  m  
 $h_d$  or  $t_{GS} = 0.01$  m  
 $h_{c.s.} + h_d = 0.46$  m

#### Results:

<b>DLC</b>	<b>1.000</b>
<b>PSR</b>	<b>0.011</b>
<b>FS</b>	<b>1.511</b>

$h_{c.s.} =$	457.2
$h_d$ or $t_{GS} =$	5.0

$k_{c.s.} =$	3.35E-05
$k_d$ or $k_{GS} =$	1.65E+00

P =	12.70
RC =	0.15

$k_{c.s.} = 3.4E-07$  m/s  
 $k_d$  or  $k_{GS} = 1.7E-02$  m/s

$P(RC) = 1.9$  mm/hr  
 Actual runoff = 11.49 mm/hr  
 PERC = 1.21 mm/h  
 $FLUX_{actual} = 0.081$  m<sup>3</sup>/hr  
 $FLUX_{allow} = 0.081$  m<sup>3</sup>/hr

$q = 2.3E-05$  m<sup>3</sup>/sec

$h_{avg} = 0.00$  m

**PSR = 0.011**

Note: numbers in boxes are input values

*numbers in italics are calculated values*

### Calculation of FS

#### Active Wedge:

$W_A = 554.103$  kN  
 $U_n = 3.30568$  kN  
 $U_h = 0.00012$  kN  
 $N_A = 529.598$  kN

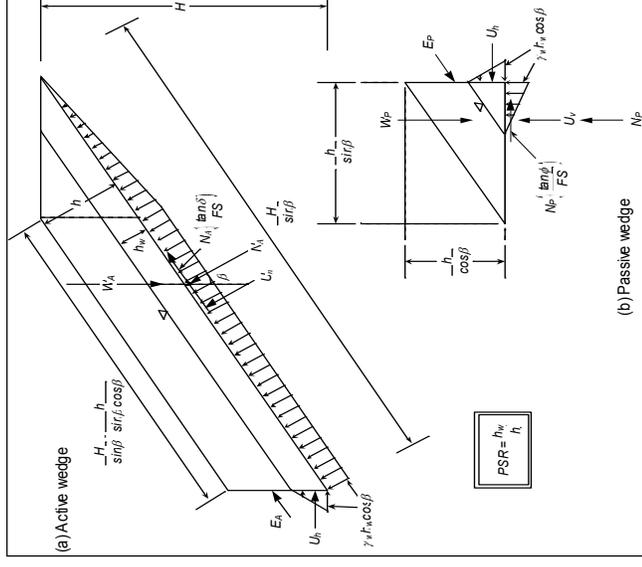
#### Passive Wedge:

$W_P = 7.01353$  kN  
 $U_V = 0.00043$  kN

$FS = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$

where  $a = 146.0$   
 $b = -244.3$   
 $c = 35.7$

**FS = 1.511**

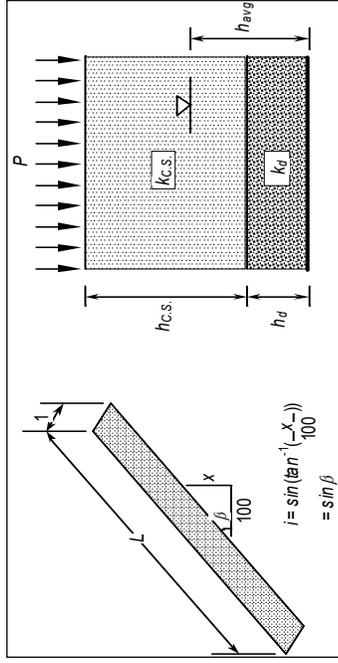


thickness of cover soil =  $h = 0.46$  m  
 length of slope measured along the top of clay layer =  $L = 70$  m  
 soil slope angle along top of clay =  $\beta = 15.9^\circ = 0.28$  (rad.)  
 vertical height of the slope measured from the toe =  $H = 19.2$  m  
 parallel submergence ratio =  $PSR = 0.01$   
 depth of the water surface measured from the top of clay layer =  $h_w = 0.00$  m

dry unit weight of the cover soil =  $\gamma_{moist} = 17.3$  kN/m<sup>3</sup>  
 saturated unit weight of the cover soil =  $\gamma_{saturated} = 18.9$  kN/m<sup>3</sup>  
 unit weight of water =  $\gamma_w = 9.81$  kN/m<sup>3</sup>  
 friction angle of the cover soil =  $\phi = 30.0^\circ = 0.52$  (rad.)  
 critical interface =  $\delta = 23.1^\circ = 0.40$  (rad.)

## Calculation of stability under seepage condition

### Calculation of DLC and PSR



$i$	$= 0.2740$
$L (\cos \beta)$	$= 225.95 \text{ m}$
$x$	$= 64.36 \text{ m}$
$h_{c.s.}$	$= 0.5 \text{ m}$
$h_d \text{ or } t_{GS}$	$= 0.01 \text{ m}$
$h_{c.s.} + h_d$	$= 0.46 \text{ m}$

#### Results:

<b>DLC</b>	<b>1.000</b>
<b>PSR</b>	<b>0.011</b>
<b>FS</b>	<b>1.495</b>

$k_{c.s.}$	$= 1.00E-05 \text{ cm/s}$
$k_d \text{ or } k_{GS}$	$= 1.65E+00 \text{ cm/s}$
$P$	$= 12.70 \text{ mm/hr}$
$RC$	$= 0.15$

$P (RC)$	$= 1.9 \text{ mm/hr}$
Actual runoff	$= 12.34 \text{ mm/hr}$
PERC	$= 0.36 \text{ mm/h}$
$FLUX_{actual}$	$= 0.081 \text{ m}^3/\text{hr}$
$FLUX_{allow}$	$= 0.081 \text{ m}^3/\text{hr}$

$q$	$= 2.3E-05 \text{ m}^3/\text{sec}$
$h_{avg}$	$= 0.00 \text{ m}$

**PSR = 0.011**

Note: numbers in boxes are input values  
*numbers in italics are calculated values*

### Calculation of FS

#### Active Wedge:

$W_A$	$= 1873.47 \text{ kN}$
$U_n$	$= 11.0795 \text{ kN}$
$U_h$	$= 0.00012 \text{ kN}$
$N_A$	$= 1790.72 \text{ kN}$

#### Passive Wedge:

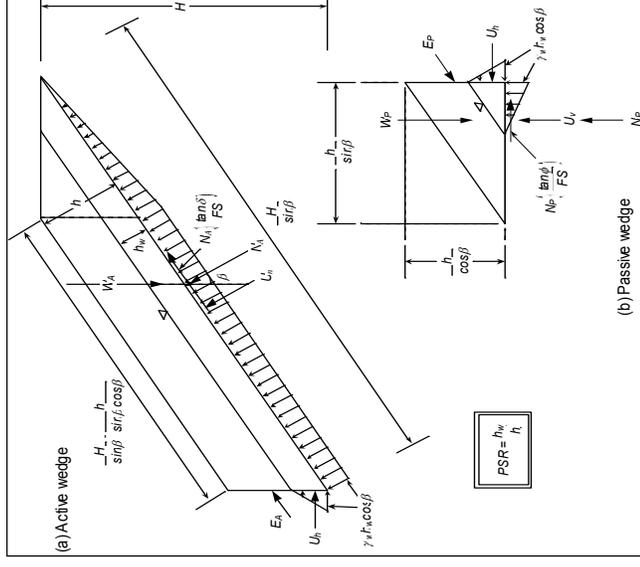
$W_P$	$= 7.01353 \text{ kN}$
$U_V$	$= 0.00043 \text{ kN}$

$$FS = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

where

$a$	$= 493.6$
$b$	$= -818.8$
$c$	$= 120.8$

**FS = 1.495**



thickness of cover soil = $h$	$= 0.46 \text{ m}$
length of slope measured along the top of clay layer = $L$	$= 235 \text{ m}$
soil slope angle along top of clay = $\beta$	$= 15.9^\circ = 0.28 \text{ (rad.)}$
vertical height of the slope measured from the toe = $H$	$= 64.4 \text{ m}$
parallel submergence ratio = $PSR$	$= 0.01$
depth of the water surface measured from the top of clay layer = $h_w$	$= 0.00 \text{ m}$
dry unit weight of the cover soil = $\gamma_{moist}$	$= 17.3 \text{ kN/m}^3$
saturated unit weight of the cover soil = $\gamma_{saturated}$	$= 18.9 \text{ kN/m}^3$
unit weight of water = $\gamma_w$	$= 9.81 \text{ kN/m}^3$
friction angle of the cover soil = $\phi$	$= 30.0^\circ = 0.52 \text{ (rad.)}$
critical interface = $\delta$	$= 23.1^\circ = 0.40 \text{ (rad.)}$

Constructed by Te-Yang Soong

**ATTACHMENT 1**

**RUNOFF COEFFICIENT REFERENCE**

## 10.2.1 Thornthwaite method

The earliest, comprehensive method for water balance analysis was developed by Thornthwaite and Mather (1957). Fenn *et al.* (1975) developed for the US Environmental Protection Agency (EPA) a water balance method for predicting leachate generation for solid waste disposal sites based on the Thornthwaite method, proposing runoff coefficients for landfills and moisture storage values for municipal waste. The water balance method employs average monthly values of precipitation and other climatic parameters. To determine monthly infiltration ( $IN$ ) into the cover, one subtracts monthly runoff ( $R$ ) from monthly precipitation ( $P$ ).

$$IN = P - R \quad (10.1)$$

Runoff can be calculated from precipitation, as follows

$$R = CP \quad (10.2)$$

where  $C$  is a runoff coefficient that can be estimated from the guidance provided by Fenn *et al.* (1975):

description of the grass-covered soil	slope of ground surface	runoff coefficient ( $C$ )
sandy soil	flat (<2%)	0.05-0.10
	mild (2-7%)	0.10-0.15
	steep (>7%)	0.15-0.20
clayey soil	flat (<2%)	0.13-0.17
	mild (2-7%)	0.18-0.22
	steep (>7%)	0.25-0.35

Potential evapotranspiration ( $PET$ ), which depends on mean temperature, heat index, and hours of sunlight, can be calculated from tables provided by Thornthwaite and Mather (1957). The cumulative monthly infiltration minus potential evapotranspiration ( $IN - PET$ ) is calculated. A negative number for  $IN - PET$  indicates that the cover has a tendency to dry out; a positive value indicates that there is a tendency for the cover soil to become wetter. If  $IN - PET$  is negative, water may evapotranspire from the cover soil, but if the soil is already dry, no further drying will occur. The amount of drying depends not only on  $IN - PET$  but also on the water content of the soil.

If  $IN - PET$  is positive, water may be stored in the cover soil (which would produce an increase in water content). However, if the water content is already very high, the soil can store no additional water and water will percolate downward through the cover soil. The field capacity of the soil is the maximum water content that a soil can attain without draining water by gravity. Field capacity can be determined by

REFERENCES: "GEOTECHNICAL PRACTICE FOR WASTE DISPOSAL", DANIEL, DAVID E., PG 216.

**ATTACHMENT 2**

**TYPICAL GEOCOMPOSITE PROPERTIES**

# GSE FabriNet Geocomposite

GSE FabriNet geocomposite consists of a 200 mil thick GSE HyperNet geonet heat-laminated on one or both sides with a GSE nonwoven needle-punched geotextile. The geotextile is available in mass per unit area range of 6 oz/yd<sup>2</sup> to 16 oz/yd<sup>2</sup>. The geocomposite is designed and formulated to perform drainage function under a range of anticipated site loads, gradients and boundary conditions.



**AT THE CORE:**  
A 200 mil thick HyperNet geonet heat-laminated on one or both sides with a nonwoven needlepunched geotextile.

## Product Specifications

Tested Property	Test Method	Frequency	Minimum Average Roll Value		
<b>Geocomposite</b>			<b>6 oz/yd<sup>2</sup></b>	<b>8 oz/yd<sup>2</sup></b>	<b>10 oz/yd<sup>2</sup></b>
Transmissivity <sup>(2)</sup> , gal/min/ft, (m <sup>2</sup> /sec) Double-Sided Composite Single-Sided Composite	ASTM D 4716	1/540,000 ft <sup>2</sup>	0.5 (1x10 <sup>-4</sup> ) 4.8 (1x10 <sup>-3</sup> )	0.5 (1x10 <sup>-4</sup> ) 4.8 (1x10 <sup>-3</sup> )	0.4 (9x10 <sup>-5</sup> ) 4.3 (9x10 <sup>-4</sup> )
Ply Adhesion, lb/in	ASTM D 7005	1/50,000 ft <sup>2</sup>	1.0	1.0	1.0
<b>Geonet Core<sup>(3)</sup> - GSE HyperNet</b>					
Transmissivity <sup>(2)</sup> , gal/min/ft (m <sup>2</sup> /sec)	ASTM D 4716		9.6 (2 x 10 <sup>-3</sup> )	9.6 (2 x 10 <sup>-3</sup> )	9.6 (2 x 10 <sup>-3</sup> )
Density, g/cm <sup>3</sup>	ASTM D 1505	1/50,000 ft <sup>2</sup>	0.94	0.94	0.94
Tensile Strength (MD), lb/in	ASTM D 5035/7179	1/50,000 ft <sup>2</sup>	45	45	45
Carbon Black Content, %	ASTM D 1603 <sup>(6)</sup> /4218	1/50,000 ft <sup>2</sup>	2.0	2.0	2.0
<b>Geotextile<sup>(3,4)</sup></b>					
Mass per Unit Area, oz/yd <sup>2</sup>	ASTM D 5261	1/90,000 ft <sup>2</sup>	6	8	10
Grab Tensile, lb	ASTM D 4632	1/90,000 ft <sup>2</sup>	160	220	260
Puncture Strength, lb	ASTM D 4833	1/90,000 ft <sup>2</sup>	90	120	165
AOS, US sieve <sup>(5)</sup> , (mm)	ASTM D 4751	1/540,000 ft <sup>2</sup>	70 (0.212)	80 (0.180)	100 (0.150)
Permittivity, sec <sup>-1</sup>	ASTM D 4491	1/540,000 ft <sup>2</sup>	1.5	1.3	1.0
Flow Rate, gpm/ft <sup>2</sup>	ASTM D 4491	1/540,000 ft <sup>2</sup>	110	95	75
UV Resistance, % retained	ASTM D 4355 (after 500 hours)	per formulation	70	70	70
<b>NOMINAL ROLL DIMENSIONS</b>					
Geonet Core Thickness, mil	ASTM D 5199	1/50,000 ft <sup>2</sup>	200	200	200
Roll Width <sup>(5)</sup> , ft			14.5	14.5	14.5
Roll Length <sup>(5)</sup> , ft	Double-Sided Composite Single-Sided Composite		270 300	260 300	230 290
Roll Area, ft <sup>2</sup>	Double-Sided Composite Single-Sided Composite		3,915 4,350	3,770 4,350	3,335 4,205

[Product specifications continued on back]



**AT THE CORE:**  
 A 200 mil thick GSE  
 HyperNet geonet heat-  
 laminated on one or both  
 sides with a nonwoven  
 needlepunched geotextile.

**Product Specifications [continued]**

NOTES:

- <sup>(1)</sup>AOS in mm is a maximum average roll value.
- <sup>(2)</sup>Gradient of 0.1, normal load of 10,000 psf, water at 70°F between steel plates for 15 minutes. Contact GSE for performance transmissivity value for use in design.
- <sup>(3)</sup>Component properties prior to lamination.
- <sup>(4)</sup>Refer to geotextile product data sheet for additional specifications.
- <sup>(5)</sup>Roll widths and lengths have a tolerance of ±1%.
- <sup>(6)</sup>Modified.

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution.



**[ DURABILITY RUNS DEEP ]** For more information on this product and others, please visit us at [GSEworld.com](http://GSEworld.com), call 800.435.2008 or contact your local sales office.

### **ATTACHMENT 3**

**Figure A-3, Performance Transmissivity of a 200 mil FabriNet Geocomposite under Soil**

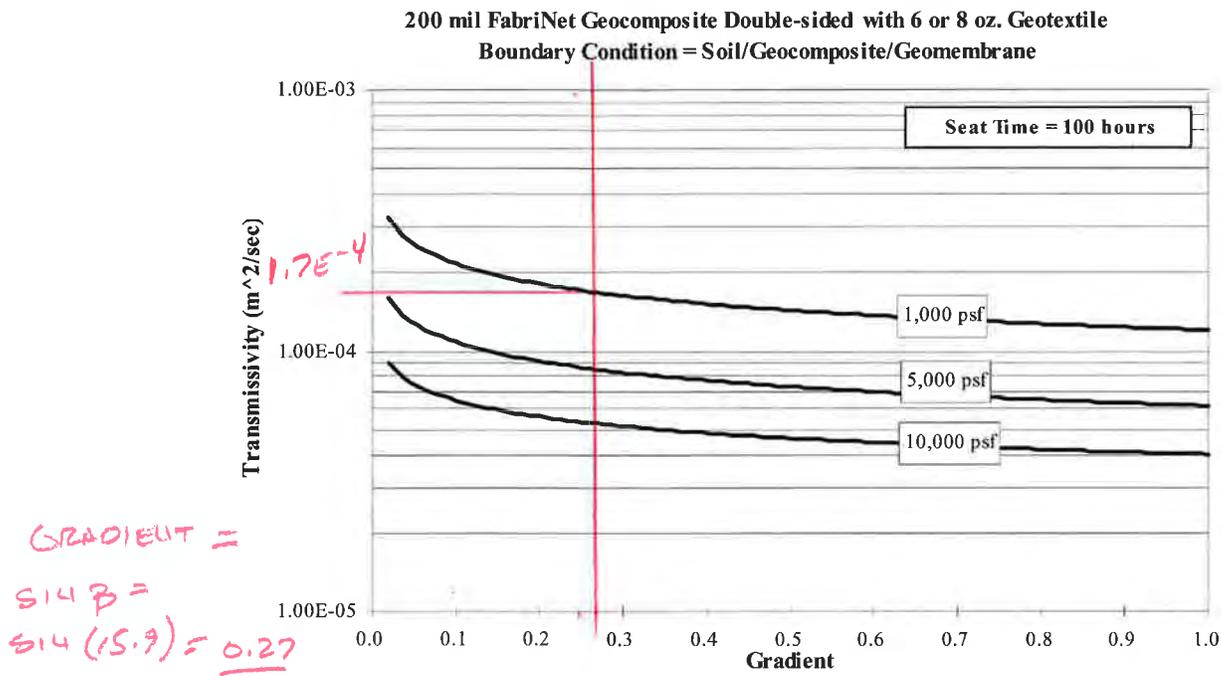


Figure A-3. Performance Transmissivity of a 200 mil FabriNet Geocomposite under Soil.

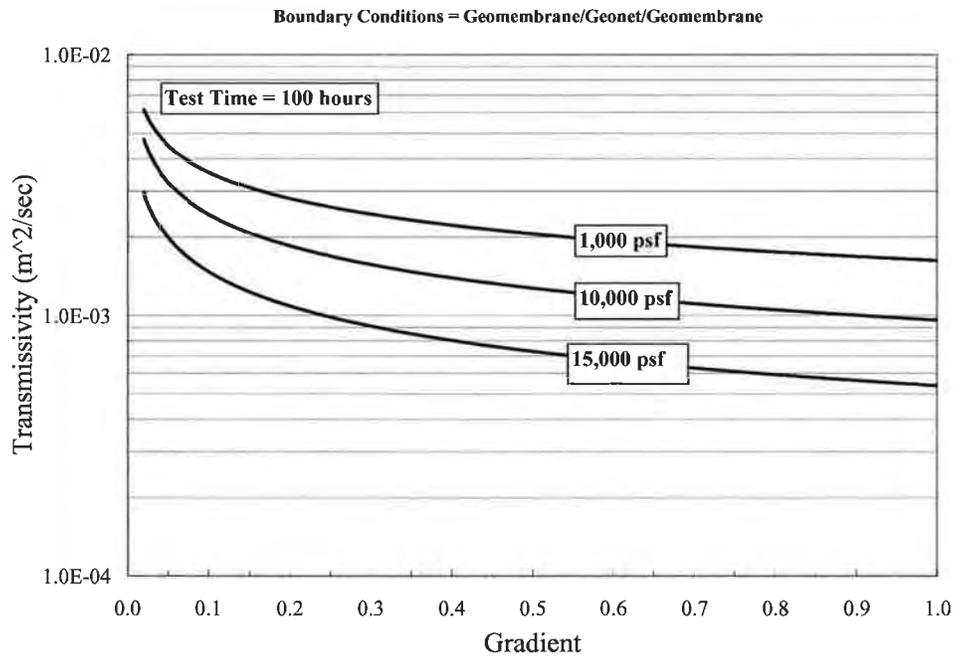


Figure A-4. Performance Transmissivity of a 250 mil GSE HyperNet HF geonet.

**Appendix D**  
**Landfill Inspection Form**



# Landfill Inspection Form

## Kekaha Landfill Phase II, Kekaha, Hawaii

Date Landfill Closed: \_\_\_\_\_

Current Date: \_\_\_\_\_

Date of Last Inspection: \_\_\_\_\_

Inspection By: \_\_\_\_\_

Type of Inspection: QUARTERLY ANNUAL OTHER \_\_\_\_\_

	Good	Adequate	Needs Attention	Not Applicable
<b>A. Final Cover and Erosion Control Vegetation:</b>				
1. Top Deck (Good Drainage, No Erosion/Settlement/ /Other Deterioration)				
2. Side Slopes (Good Drainage, No Erosion/Settlement/Other Deterioration)				
3. Vegetation Quality and Density				
4. Surveyed benchmarks				
5. Monitoring well accessibility/visibility/condition				
6. Landfill Gas or Leachate Collection System				
7. No Waste Exposed				
8. Perimeter Cover Termination				
<b>B. Surface Water Drainage:</b>				
1. Are Run-on and Runoff Controls Appropriate				
2. Swales				
3. Swale Crossings				
4. Diversion Berms				
5. Cover Drainage Layer Outlet Pipes				
6. Infiltration Ditch				
<b>C. Leachate Control Systems:</b>				
1. Collection Manholes				
2. Evaporation Lagoon & Aerating Equipment				
3. Following Leachate Management Plan				
4. Wet wells				
5. Leachate Holding Tanks and Containment Areas				
<b>D. Gas Control System:</b>				
1. Gas flares, vents, pipes				
2. Odor/Gas migration off-site				
3. Probes/detection system				

	Good	Adequate	Needs Attention	Not Applicable
E. Monitoring Wells:				
1. Well Condition				
2. Well visible				
E. Security and Access:				
1. Perimeter Fencing				
2. Signs Posted				
3. Access Roads				
4. Undesirable Uses Prevented				

Comments (Reference Item No.): \_\_\_\_\_

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Items That Need Immediate Attention: \_\_\_\_\_

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**SECTION X**

**PERMITS**



The following permits are included in this section:

- NPDES Permit
- Historic Preservation Review
- Conservation District Use Application
- SMA Permit
- Initial Covered Source Air Permit





STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P. O. BOX 3378  
HONOLULU, HI 96801-3378

In reply, please refer to:  
EMD/CWB

04050PJF.13

April 19, 2013

Mr. Larry Dill  
County Engineer  
Solid Waste Division  
Department of Public Works  
County of Kauai  
4444 Rice Street, Suite 275  
Lihue, Hawaii 96766

Dear Mr. <sup>LARRY</sup>Dill:

In accordance with the provisions of the Clean Water Act, Hawaii Revised Statutes, Chapter 342D; and Hawaii Administrative Rules, Chapters 11-54 and 11-55, the Department of Health (DOH), has reviewed the following application for a National Pollutant Discharge Elimination System (NPDES) permit to discharge storm water run-off associated with construction activity:

<u>Facility</u>	<u>Permit No.</u>
<b>Kekaha Sanitary Landfill Cell 2 Expansion Kekaha, Island of Kauai</b>	<b>HI S000235</b>

The public notice of our proposed action was published in *The Garden Island* on **Thursday, February 28, 2013**, regarding the above application.

After consideration of the expressed views of all interested persons and agencies, pertinent Federal and State statutes and rules regarding the discharge, the DOH hereby issues the enclosed NPDES permit for the discharge referred to above. This action does not constitute a significant change from the tentative determination set forth in the public notice.

This permit will take effect on **April 19, 2013**.

Mr. Larry Dill  
April 19, 2013  
Page 2

04050PJF.13

Should you have any questions, please contact Ms. Jamie Tanimoto of the Enforcement Section or Ms. Jiaping Fouse of the Engineering Section, CWB, at (808) 586-4309.

Sincerely,



STUART YAMADA, P.E., CHIEF  
Environmental Management Division

JF:np

Enclosures: 1. NPDES Permit  
2. Hawaii DOH Customer Satisfaction Survey

c: Water Division (WTR-5), CWA Standards and Permits Office, EPA, Region 9  
(w/encl. 1) [via e-mail [sablad.elizabeth@epa.gov](mailto:sablad.elizabeth@epa.gov) only]  
Mr. Larry Dill, County of Kauai (w/encl. 1) [via e-mail [LDill@kauai.gov](mailto:LDill@kauai.gov)]  
Mr. Troy Tanigawa, County of Kauai  
(w/encl. 1) [via e-mail [ttanigawa@kauai.gov](mailto:ttanigawa@kauai.gov) only]  
Mr. Julie Zimmerman, AECOM Technical Services  
(w/encl. 1) [via e-mail [Julie.zimmerman@aecom.com](mailto:Julie.zimmerman@aecom.com) only]  
Mr. Gary Ueunten, CWB, Kauai District Health Office  
(w/encl. 1) [via e-mail only]

**AUTHORIZATION TO DISCHARGE UNDER THE  
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM**

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. §1251 et seq.; the "Act"); Hawaii Revised Statutes, Chapter 342D; and Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55, Department of Health (DOH), State of Hawaii;

**COUNTY OF KAUAI  
DEPARTMENT OF PUBLIC WORKS**

(hereinafter PERMITTEE),

is authorized to discharge storm water associated with construction activities from the Kekaha Sanitary Landfill Cell 2 Expansion Project site located at 6900D Kaunualii Highway, Kekaha, Island of Kauai, TMK: (4) 1-2-002:001 and 009, to the receiving waters named Pacific Ocean, a Class A, Marine Waters, at the discharge point coordinates: Latitude 21°59'01"N and Longitude 159°44'52"W.

in accordance with the general requirements, discharge monitoring requirements and other conditions set forth herein, and in the attached DOH "Standard NPDES Permit Conditions," that is available on the DOH, Clean Water Branch (CWB) website at: <http://www.hawaii.gov/health/environmental/water/cleanwater/index.html>.

All references to Title 40 of the Code of Federal Regulations (CFR) are to regulations that are in effect on July 1, 2011, except as otherwise specified. Unless otherwise specified herein, all terms are defined as provided in the applicable regulations in Title 40 of the CFR.

This permit will become effective on **April 19, 2013**.

This permit and the authorization to discharge will expire at midnight, **April 18, 2018**.

Signed this 19th day of April, 2013.

  
\_\_\_\_\_  
(For) Director of Health

**FINAL PERMIT  
April 19, 2013**

**TABLE OF CONTENTS**

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**ATTACHMENT:  
STANDARD NPDES PERMIT CONDITIONS (VERSION 14)**

**A. GENERAL REQUIREMENTS**

The Permittee shall:

1. Comply with all materials submitted in and with the Application, dated January 9, 2013.
2. Retain a copy of the Application, including other related materials, and this permit at the job site or at a nearby field office.
3. Design, operate, implement, and maintain the project Site-Specific Best Management Practices (BMPs) Plan to ensure that storm water discharges associated with construction activities will not cause or contribute to a violation of applicable State Water Quality Standards.
4. Implement the project Site-Specific BMPs Plan as often as needed to improve the quality of storm water discharges or when instructed by the Director of Health (Director).
5. Not cause or contribute to a violation of the basic water quality criteria as specified in HAR, Chapter 11-54, Section 11-54-4.
6. Inspect, at a minimum of once per week, the receiving state waters, storm water runoff and control measures and BMPs to detect violations of and conditions which may cause or contribute to a violation of the basic water quality criteria as specified in HAR, Chapter 11-54, Section 11-54-4 (e.g., the Permittee shall look at storm water discharges and receiving state waters for turbidity, color, floating oil and grease, floating debris and scum, materials that will settle, substances that will produce taste in the water or detectable off-flavor in fish, and inspect for items that may be toxic or harmful to human or other life).
7. Immediately stop, reduce, or modify construction, or implement new or revised BMPs as needed to stop or prevent a violation of the basic water quality criteria as specified in HAR, Chapter 11-54, Section 11-54-4.

**PART A**  
**PERMIT NO. HI S000235**  
**Page 4**

8. Review the effectiveness and adequacy of the implemented Site-Specific BMPs Plan(s) and Erosion and Sediment Control (ESC) Plan(s) at a minimum of once per week, and update the plan as often as necessary. Any change(s) to the Site-Specific BMPs Plans and/or ESC Plans or correction(s) to information already on file with the CWB shall be maintained onsite and be available upon request.
9. Know that as of the date of this NPDES, Mr. Larry Dill shall submit all information/documents for compliance with the NPDES conditions. An authorized representative may be appointed in accordance with Part B.7.

**B. REPORTING REQUIREMENTS**

The Permittee shall:

1. Submit the General Contractor information in accordance with Part B.7. for review and comment **at least 30 calendar days prior to the start of construction activities.**

**All questions/concerns that the DOH may have must be answered to the satisfaction of the CWB.**

2. Notify the Director of the construction start date in accordance with Part B.7. within seven (7) calendar days before the start of construction.
3. Complete and submit the Solid Waste Disclosure Form for Construction Sites to the DOH, Solid and Hazardous Waste Branch, Solid Waste Section, as specified on the form, unless already submitted under the previously issued NPDES permit. The form can be downloaded at:  
<http://www.hawaii.gov/health/environmental/waste/sw/pdf/swdiscformnov2008.pdf>.
4. Submit any changes to information on Item Nos. 1, 3, 4, 5, or 16 of the CWB-Individual NPDES Form C to the CWB as soon as changes arise. The changes shall be submitted in accordance with Part B.7. The Permittee shall properly address all related concerns and/or comments to the CWB's satisfaction.
5. Immediately notify the Director of all incidences of non-compliance and identify the pollutant(s) source(s) and the proposed and implemented control or mitigative measures as required in Section 16 of the "Standard NPDES Permit Conditions".
6. Complete and submit the Notice of Cessation (NOC) in accordance with Part B.7. within 14 calendar days of completion of the subject project.

7. All reports, notifications, and updates to information on file shall be submitted through the CWB Compliance Submittal Form for Individual NPDES Permits and Notice of General Permit Coverages (NGPCs). This form is accessible through the e-Permitting Portal website at: <https://eha-cloud.doh.hawaii.gov/epermit/View/home.aspx>. If not already registered, you will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool to locate the form. Follow the instructions to complete and submit this form. All submissions shall include a CD or DVD containing the downloaded e-Permitting submission and a completed Transmittal Requirements and Certification Statement for e-Permitting NPDES/NGPC Compliance Submissions Form, with original signature and date.
8. Include the following certification statement, NPDES permit number, and original signature on each submittal in accordance with HAR, Chapter 11-55, Section 11-55-07(b). Failure to provide this information on future correspondence or submittals may be a basis for delay of the processing of the document(s).

**"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations."**

9. The Permittee shall develop and submit a facility-specific waste load allocation (WLA) implementation and monitoring plan to the Director when a Total Maximum Daily Load (TMDL), which specifies WLAs applicable to the Permittee's discharge, is approved by the EPA within one (1) year of notification of the approval date.

**C. BEST MANAGEMENT PRACTICES (BMPs)**

1. The Permittee shall:
  - a. Refrain from performing any work during heavy rainstorms.
  - b. Prevent loose particles, sand, soil, silt, and other construction debris at the project site from being washed away by storm water runoff to drainage systems and to State waters.
  - c. Remove excavated/waste materials as soon as possible or at the end of each work day. The materials shall be disposed of to a State and/or County-approved landfill site.
  - d. Not discharge water used for dust control to State waters.
  - e. Not discharge water used for irrigation to State waters.
  - f. Not discharge hydrotesting effluent to State waters without an appropriate NPDES permit.
  - g. Not discharge dewatering effluent to State waters without an appropriate NPDES permit.
  - h. Not stockpile unprotected materials on-site without implementing the appropriate BMPs for the stockpile(s).
  - i. Wash-down vehicles and/or equipment and concrete truck drums only at designated areas and not discharge the wash waters to State waters. The concrete wash water shall not be allowed to infiltrate into the ground.
  - j. Assure that the implemented BMPs are effective and the discharge effluent is in compliance with the basic State Water Quality Standards.
2. The following special conditions apply to all land disturbance work conducted under this permit:
  - a. Construction Management Techniques
    - (1) Clearing and grubbing shall be held to the minimum necessary for grading and equipment operation.

- (2) Construction shall be sequenced to minimize the exposure time of the cleared surface area.
- (3) Construction shall be staged or phased for large projects. Areas of one (1) phase shall be stabilized before another phase is initiated. Stabilization shall be accomplished by temporarily or permanently protecting the disturbed soil surface from rainfall impacts and runoff.
- (4) Erosion and Sediment Control Measures shall be in place and functional before earth moving operations begin. These measures shall be properly constructed and maintained throughout the construction period.
- (5) All control measures shall be checked and repaired as necessary, for example, weekly in dry periods and within 24 hours after any rainfall of 0.5 inches or greater within a 24-hour period. During prolonged rainfall, daily checking is necessary. The Permittee shall maintain records of checks and repairs.
- (6) The Permittee shall maintain records of the duration and estimated volume of storm water discharge(s).
- (7) A specific individual shall be designated to be responsible for erosion and sediment controls on each project site.

**b. Vegetation Controls**

- (1) Pre-construction vegetative ground cover shall not be destroyed, removed, or disturbed more than 20 calendar days prior to land disturbance.
- (2) Temporary soil stabilization with appropriate vegetation shall be applied on areas that will remain unfinished for more than 30 calendar days.
- (3) Permanent soil stabilization with perennial vegetation or pavement shall be applied as soon as practical after final grading. Irrigation and maintenance of the perennial vegetation shall be provided for 30 calendar days or until the vegetation takes root, whichever is shorter.

**c. Structural Controls**

- (1) Storm water flowing toward the construction area shall be diverted by using appropriate control measures, as practical.**
- (2) Erosion Control Measures shall be designed according to the size of disturbed or drainage areas to detain runoff and trap sediment.**
- (3) Water must be discharged in a manner that the discharge shall not cause or contribute to a violation of the basic water quality criteria as specified in HAR, Chapter 11-54, Section 11-54-4.**

S000235.FNL.13

D. MAP

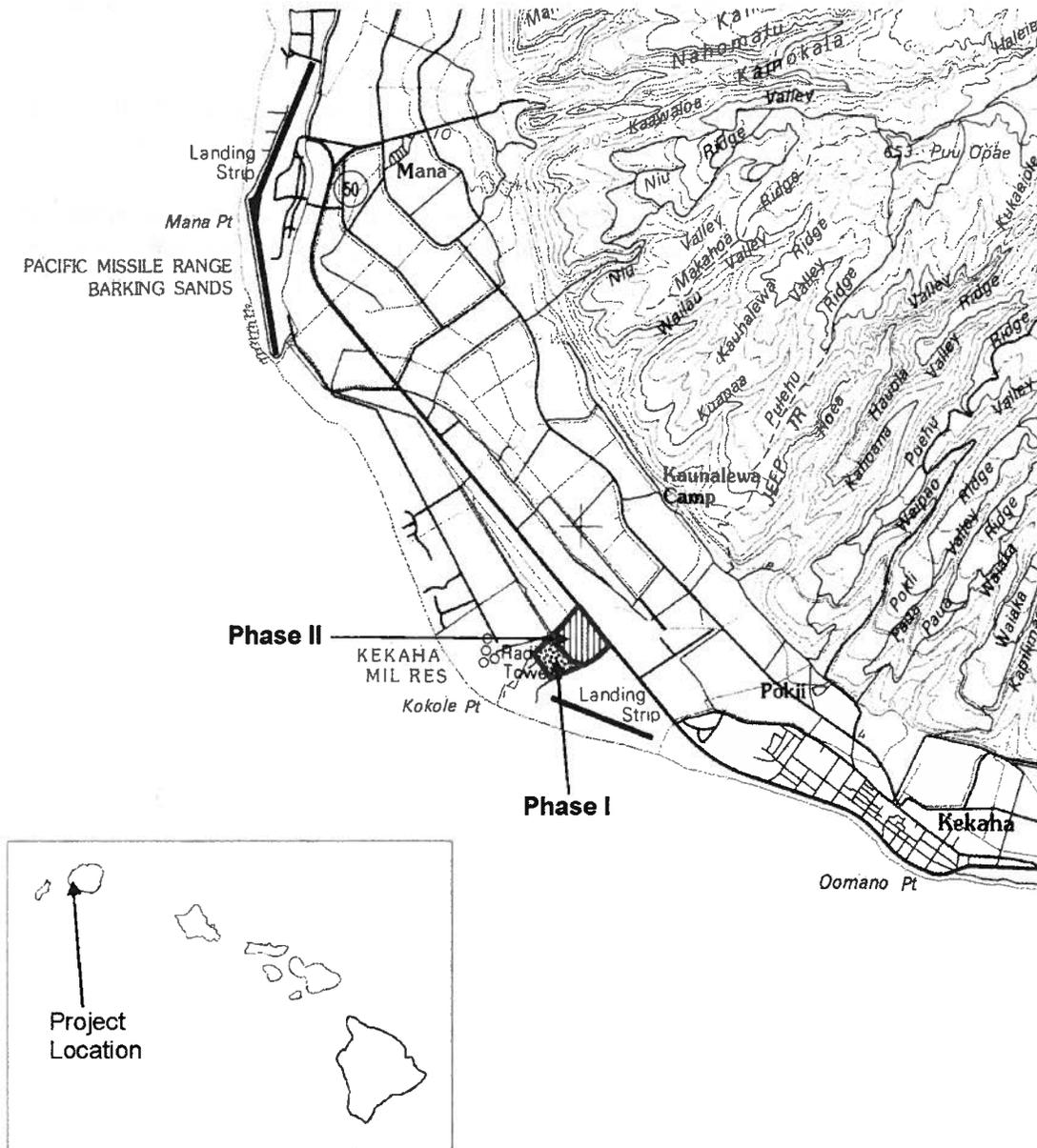


Figure 1  
Site Location Map

County of Kauai  
Kekaha Landfill Phase II Cell 2 Lateral Expansion

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



WILLIAM J. AILA, JR.  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA  
FIRST DEPUTY

WILLIAM M. TAM  
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES  
BOATING AND OCEAN RECREATION  
BUREAU OF CONVEYANCES  
COMMISSION ON WATER RESOURCE MANAGEMENT  
CONSERVATION AND COASTAL LANDS  
CONSERVATION AND RESOURCES ENFORCEMENT  
ENGINEERING  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
KAHOOLAWE ISLAND RESERVE COMMISSION  
LAND  
STATE PARKS

**HISTORIC PRESERVATION DIVISION  
DEPARTMENT OF LAND AND NATURAL RESOURCES**

601 Kamokila Boulevard, Suite 555  
Kapolei, HI 96806

October 11, 2013

Ms. Julie Zimmerman  
AECOM  
1001 Bishop Street, Suite 1600  
Honolulu, Hawaii 96813-3698  
[Julie.Zimmerman@aecom.com](mailto:Julie.Zimmerman@aecom.com)

LOG NO: 2013.5499  
DOC NO: 1310SL09  
Archaeology

Dear Ms. Zimmerman:

**SUBJECT: Chapter 6E-8 Historic Preservation Review –  
Environmental Assessment, Kekaha Landfill Phase II Vertical Expansion  
Waimea Ahupua'a, Kona District, Island of Kaua'i  
TMK: (4) 1-2-002:001 and 009**

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Thank you for conducting the archaeological field inspection and assessment we requested to determine the status, condition, and significance of two previously-identified historic properties within the 63.2-acre Kekaha Landfill Phase II project area, and to make project effect and mitigation recommendations (September 9, 2013; Log No. 2013.3334 and 2013.4258, Doc. No. 1309SL06). These two 1950s historic properties were identified as an irrigation canal of mounded sand and a low linear sand mound for irrigation control. They were recorded (but not assigned site numbers) by Cultural Surveys Hawai'i, Inc. (CSH) during their 1993 *Archaeological Inventory Survey and Subsurface Testing at Kekaha Phase II Landfill Site*.

According to the earlier submittal documents (Log No. 2013.3334 and 2013.4258), the County of Kaua'i, Department of Public Works, Solid Waste Division (County) proposes a vertical expansion of the Kekaha Landfill (KLF). The KLF is located 1.3 miles northwest of the town of Kekaha and is situated on about 98 acres of land adjacent to the Kaumuali'i Highway about 1,700 from the shoreline. KLF consists of two distinct refuse fill areas designated as Phase I and Phase II. Phase I operated from 1953 until October 1993. Phase II has operated since October 1993 and has been expanded in height several times from 37 feet above mean sea level (amsl) in 1993, to 60 feet amsl in 1998, and to 85 feet amsl in 2005. The proposed vertical expansion would raise the current height limit to 120 feet amsl. The draft Environmental Assessment (Draft EA) states that Section 5.5 of the Kauai General Plan designates Kaumuali'i Highway as a scenic roadway corridor, but that the corridor along the KLF boundary meets none of the requirements set forth in Section 3.2.1 of plan. In addition, KLF occurs in an area that does not exhibit a high degree of intactness and vividness, and does not block any scenic landforms, scenic view planes, or shoreline views. The DEA concludes that no historic properties will be affected by this project. The Final Environmental Assessment (Final EA) presents a determination of No Significant Impact.

In response to SHPD's request (September 9, 2013; Log No. 2013.3334 and 2013.4258, Doc. No. 1309SL06), AECOM conducted a documents review and field inspection which confirmed the two historic properties are no longer present. Specifically, "By 2013, the entire site was completely re-graded, and the two former feature locations are both below the current landfilled waste mass, scale house, access road, stormwater control systems, and the leachate evaporation pond. All of the features required excavation, re-grading, and/or backfilling for structural support, which removed the two former features." Also in response to SHPD's request, AECOM's documentation and findings are included in the Final EA (October 2013).

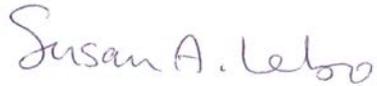
On August 24, 2012, the Board of Land and Natural Resources (BLNR) approved Conservation District Use Permit (CDUP) KA-3625 for the Kekaha Landfill Phase II Expansion (Log No. 2012.1262). This permit includes a provision requiring SHPD be notified if any historic properties (non-burial and/or burial) are encountered.

Ms. Zimmerman  
October 11, 2013  
Page 2

Based on the aforementioned AECOM documents review and field inspection, the two previously-identified 1950s historic properties no longer exist. Therefore, we determine that **no historic properties will be affected** because no historic properties exist within the Kekaha Landfill Phase II project area.

Please contact me at (808) 692-8019 or at [Susan.A.Lebo@hawaii.gov](mailto:Susan.A.Lebo@hawaii.gov) if you have any questions regarding this letter.

Aloha,

A handwritten signature in cursive script that reads "Susan A. Lebo".

Susan A. Lebo, PhD  
Oahu Lead Archaeologist

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



**STATE OF HAWAII**  
**DEPARTMENT OF LAND AND NATURAL RESOURCES**

OFFICE OF CONSERVATION AND COASTAL LANDS  
POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

WILLIAM J. AILA, JR.  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

PAUL J. CONRY  
INTERIM FIRST DEPUTY

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CONSERVATION AND RESOURCES ENFORCEMENT  
ENGINEERING  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
KAHOOLAWE ISLAND RESERVE COMMISSION  
LAND  
STATE PARKS

REF: OCCL: AJR

CDUP: KA-3625

Julie Zimmerman  
c/o AECOM  
1001 Bishop St., Ste. 1600  
Honolulu, HI 96813

AUG 28 2012

**SUBJECT: CONSERVATION DISTRICT USE PERMIT (CDUP) NO. KA-3625**  
*County of Kaua'i Kekaha Landfill (KLF) Phase II Expansion*  
Kaumuali'i Highway, Waimea, Kekaha, Island of Kaua'i  
(4) 1-2-002:009 and (4) 1-2-002:001

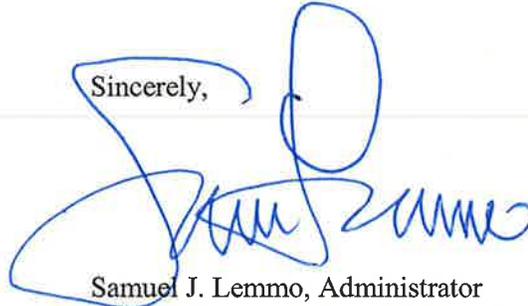
This is to inform you that on **August 24, 2012** the Board of Land and Natural Resources (BLNR) approved Conservation District Use Permit (CDUP) **KA-3625** for the Kekaha Landfill Phase II Expansion located in Waimea, Kekaha, Island of Kaua'i, Hawaii on TMKs: (4) 1-2-002:009 and (4) 1-2-002:001, subject to the following conditions:

1. The permittee shall comply with all applicable statutes, ordinances, rules, and regulations of the federal, State and county governments, and the applicable parts of HAR §13-5-42;
2. The permittee, its successors and assigns, shall indemnify and hold the State of Hawai'i harmless from and against any loss, liability, claim or demand for property damage, personal injury or death arising out of any act or omission of the permittee, its successors, assigns, officers, employees, contractors and agents under this permit or relating to or connected with the granting of this permit;
3. The permittee shall comply with all applicable Department of Health administrative rules. Particular attention should be paid to HAR §11-60.1-33, "Fugitive Dust" and to Chapter 11-46, "Community Noise Control," and Chapter 11-54 "National Pollutant Discharge Elimination System";
4. Before proceeding with any work authorized by the Department of the board, the permittee shall submit three (3) copies of the construction plans and specifications to the chairperson or an authorized representative for approval for consistency with the conditions of the permit and the declarations set forth in the permit application. Two (2) of the copies will be returned to the permittee. Plan approval by the chairperson does not constitute approval required from other agencies;
5. Unless otherwise authorized, any work or construction to be done on the land shall be initiated within two (2) years of the approval of such use, in accordance with construction plans that have been approved by the Department; further, all work and construction of the infrastructure must be completed within six (6) years of the approval. The permittee shall notify the department in writing when construction activity is initiated and when it is completed;

6. Where any interference, nuisance, or harm may be caused, or hazard established by the use, the permittee shall be required to take measures to minimize or eliminate the interference, nuisance, harm, or hazard;
7. All representations relative to mitigation set forth in the accepted environmental assessment or impact statement for the proposed use are incorporated as conditions of the permit;
8. The permittee understands and agrees that this permit does not convey any vested rights or exclusive privilege;
9. In issuing this permit, the Department and Board have relied on the information and data that the permittee has provided in connection with this permit application. If, subsequent to the issuance of this permit, such information and data prove to be false, incomplete or inaccurate, this permit may be modified, suspended or revoked, in whole or in part, and/or the Department may, in addition, institute appropriate legal proceedings;
10. Where any interference, nuisance or harm may be caused, or hazard established by use, the permittee shall be required to take measures to minimize or eliminate the interference, nuisance, harm or hazard;
11. Obstruction of public roads, trails, lateral shoreline access, and pathways shall be avoided and minimized. If obstruction is unavoidable, the permittee shall provide alternative roads, trails, lateral shoreline access, or pathways acceptable to the department;
12. The permittee acknowledges that the approved work shall not hamper, impede, or otherwise limit the exercise of traditional, customary, or religious practices of native Hawaiians in the immediate area, to the extent the practices are provided for by the Constitution of the State of Hawaii, and by Hawaii statutory and case law;
13. In the event that unrecorded historic remains (i.e., artifacts, or human skeletal remains) are inadvertently uncovered during construction or operations, all work shall cease in the vicinity and the permittee shall immediately contact the State Historic Preservation Division;
14. Use of the area shall conform with the program of the appropriate soil and water conservation district or plan approved by and on file with the department, where applicable;
15. The permittee shall obtain any necessary County of Kaua'i permits, prior to final construction plan approval by the department;
16. Artificial light from exterior lighting fixtures, including but not limited to floodlights, uplights, or spotlights used for decorative purposes, shall be prohibited if the light directly illuminates or is directed to project across property boundaries towards the shoreline and ocean waters, except as may be permitted pursuant to section 205A-71, HRS. All exterior lighting shall be shielded to protect the night sky;
17. The permittee acknowledges that the approved work shall not hamper, impede, or otherwise limit the exercise of traditional, customary, or religious practices of native Hawaiians in the immediate area, to the extent the practices are provided for by the Constitution of the State of Hawaii, and by Hawaii statutory and case law;
18. Other terms and conditions as prescribed by the chairperson; and
19. Failure to comply with any of these conditions may render this Conservation District Use Permit (CDUP) null and void.

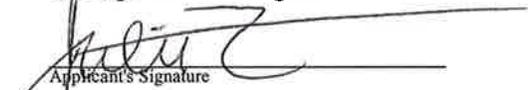
Please acknowledge receipt of this approval, with the above noted conditions, in the space provided below. **Please sign two copies. Retain one and return the other within thirty (30) days.** Should you have any questions on any of these conditions, please feel free to contact Alex J. Roy at 808-587-0316 or via email at [alex.j.roy@hawaii.gov](mailto:alex.j.roy@hawaii.gov)

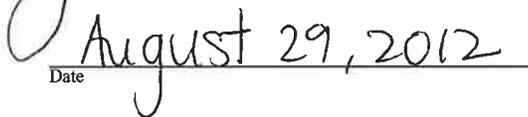
Sincerely,



Samuel J. Lemmo, Administrator  
Office of Conservation and Coastal Lands

Receipt acknowledged:

  
Applicant's Signature

  
Date

CC: *BLNR- Chairperson*  
*KDLO*  
*Kaua'i County Department of Planning*  
*Kaua'i County Department of Public Works*



**Jan Kimura**  
Chair

**Hartwell Blake**  
Vice-Chair

**Caven Raco**  
**Wayne Katayama**  
**Camilla Matsumoto**  
**Herman Texeira**  
Members



**Michael A. Dahilig**  
Clerk of the Commission

**PLANNING COMMISSION**  
**County of Kaua'i, State of Hawai'i**  
4444 Rice Street  
Kapule Building, Suite A-473  
Līhu'e, Hawai'i 96766-1326  
TEL (808) 241-4050 FAX (808) 241-6699

**JUL 12 2012**

Larry Dill, County Engineer  
COK DEPT. OF PUBLIC WORKS  
4444 Rice Street, Suite 275  
Līhu'e, Hawai'i 96766

Subject: Special Management Area Use Permit SMA(U)-2012-4  
Applicant – COK DEPT. OF PUBLIC WORKS  
Tax Map Key: (4) 1-2-002:001, 009  
Kekaha, Kaua'i

Dear Mr. Dill,

This letter memorializes the action taken by the Kaua'i Planning Commission effective June 26, 2012 concerning approval of the above subject permits. Approval, per your consent, is subject to the following conditions:

1. The proposed lateral expansion of the existing landfill site shall be constructed as represented. Any changes to said structures and/or facilities shall be reviewed by the Planning Department to determine whether Planning Commission review and approval is warranted.
2. The Applicant shall resolve and comply with the applicable standards and requirements set forth by the State Health Department, State DBEDT Office of Planning, and the County Departments of Public Works, Fire & Water.
3. The Applicant shall develop and utilize Best Management Practices (BMP's) during all phases of development in order to minimize erosion, dust, and sedimentation impacts of the project to abutting properties.

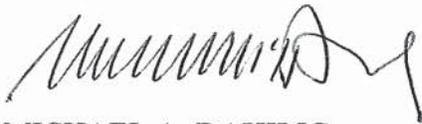
*An Equal Opportunity Employer*

Larry Dill, County Engineer  
County of Kaua'i, Dept. of Public Works  
Page | 2

4. The Applicant is advised that should any archaeological or historical resources be discovered during ground disturbing/construction work, all work in the area of the archaeological/historical findings shall immediately cease and the Applicant shall contact the State Department of Land and Natural Resources – Historic Preservation Division at (808) 692-8015 and the Planning Department at (808) 241-4050.

The Applicant is advised that additional government agency conditions may be imposed. It shall be the Applicant's responsibility to resolve those conditions with the respective agency(ies).

Sincerely Yours,



MICHAEL A. DAHILIG  
Clerk, Kaua'i Planning Commission

xc: County – Public Works, Fire, Water, Finance-Real Property Division  
State – Health, Historic Preservation Division-DLNR.

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



LINDA ROSEN, M.D., M.P.H.  
DIRECTOR OF HEALTH

STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P. O. BOX 3378  
HONOLULU, HI 96801-3378

In reply, please refer to:  
File:

September 10, 2014

14-725E CAB  
File No. 0802

**CERTIFIED MAIL**  
**RETURN RECEIPT REQUESTED**  
(7010 3090 0002 5271 6926)

Mr. Larry Dill  
County Engineer  
County of Kauai  
Department of Public Works  
Moikena Building  
4444 Rice Street, Suite 275  
Lihue, Hawaii 96766

Dear Mr. Dill:

**Subject: Covered Source Permit (CSP) No. 0802-01-C**  
**Initial Application No. 0802-01**  
**Kekaha Landfill**  
**Landfill Gas Collection and Control System**  
**Located At: 6900D Kaunualii Highway, Kekaha, Kauai**  
**Date of Expiration: September 9, 2019**

The subject Covered Source Permit is issued in accordance with Hawaii Administrative Rules, Title 11, Chapter 60.1. The issuance of this permit is based on the plans, specifications and information submitted on January 14, 2014. This Covered Source Permit is issued subject to the conditions/requirements set forth in the following Attachments:

Attachment I:	Standard Conditions
Attachment II:	Special Conditions
Attachment II-INSIG:	Special Conditions - Insignificant Activities
Attachment III:	Annual Fee Requirements
Attachment IV:	Annual Emissions Reporting Requirements

The following forms are enclosed for your use and submittal as required:

Compliance Certification Form	
Monitoring Report Form:	Collection and Control System
Monitoring Report Form:	Opacity Exceedances
Annual Emissions Report Form:	Municipal Solid Waste Landfills

Mr. Larry Dill  
September 10, 2014  
Page 2

Supplemental Report Form:	Modification/Reconstruction of MSW Landfill
Supplemental Report Form:	Notification of Landfill Closure
Supplemental Report Form:	Annual Report
Supplemental Report Form:	Notification of Collection and Control Equipment Removal

The following are enclosed for your use in monitoring visible emissions:

Visible Emissions Form Requirements, State of Hawaii  
Visible Emissions Form

This permit, (a) shall not in any manner affect the title of the premises upon which the equipment is to be located, (b) does not release the permittee from any liability for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment, and (c) in no manner implies or suggests that the Hawaii Department of Health (herein after referred to as Department), or its officers, agents, or employees, assumes any liability, directly or indirectly, for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment.

If you have any questions regarding this matter, please call Mr. Kevin Kihara of the Clean Air Branch at (808) 586-4200.

Sincerely,



STUART YAMADA, P.E., CHIEF  
Environmental Management Division

KK:nn  
Enclosures

c: Solid and Hazardous Waste Branch  
Logan Kastner, EHS – Kauai  
CAB Monitoring Section

**ATTACHMENT I: STANDARD CONDITIONS  
COVERED SOURCE PERMIT NO. 0802-01-C**

**Issuance Date: September 10, 2014**

**Expiration Date: September 9, 2019**

This permit is granted in accordance with the Hawaii Administrative Rules (HAR), Title 11, Chapter 60.1, Air Pollution Control, and is subject to the following standard conditions:

1. Unless specifically identified, the terms and conditions contained in this permit are consistent with the applicable requirement, including form, on which each term or condition is based.  
  
(Auth.: HAR §11-60.1-90)
2. This permit, or a copy thereof, shall be maintained at or near the source and shall be made available for inspection upon request. The permit shall not be willfully defaced, altered, forged, counterfeited, or falsified.  
  
(Auth.: HAR §11-60.1-6; SIP §11-60-11)<sup>2</sup>
3. This permit is not transferable whether by operation of law or otherwise, from person to person, from place to place, or from one piece of equipment to another without the approval of the Department, except as provided in HAR, Section 11-60.1-91.  
  
(Auth.: HAR §11-60.1-7; SIP §11-60-9)<sup>2</sup>
4. A request for transfer from person to person shall be made on forms furnished by the Department.  
  
(Auth.: HAR §11-60.1-7)
5. In the event of any changes in control or ownership of the facilities to be constructed or modified, this permit shall be binding on all subsequent owners and operators. The permittee shall notify the succeeding owner and operator of the existence of this permit and its conditions by letter, copies of which will be forwarded to the Department and the U.S. Environmental Protection Agency (EPA), Region 9.  
  
(Auth.: HAR §11-60.1-5, §11-60.1-7, §11-60.1-94)
6. The facility covered by this permit shall be constructed and operated in accordance with the application, and any information submitted as part of the application, for the Covered Source Permit. There shall be no deviation unless additional or revised plans are submitted to and approved by the Department, and the permit is amended to allow such deviation.  
  
(Auth.: HAR §11-60.1-2, §11-60.1-4, §11-60.1-82, §11-60.1-84, §11-60.1-90)
7. This permit (a) does not release the permittee from compliance with other applicable statutes of the State of Hawaii, or with applicable local laws, regulations, or ordinances, and

(b) shall not constitute, nor be construed to be an approval of the design of the covered source.

(Auth.: HAR §11-60.1-5, §11-60.1-82)

8. The permittee shall comply with all the terms and conditions of this permit. Any permit noncompliance constitutes a violation of HAR, Chapter 11-60.1 and the Clean Air Act and is grounds for enforcement action; for permit termination, suspension, reopening, or amendment; or for denial of a permit renewal application.

(Auth.: HAR §11-60.1-3, §11-60.1-10, §11-60.1-19, §11-60.1-90)

9. If any term or condition of this permit becomes invalid as a result of a challenge to a portion of this permit, the other terms and conditions of this permit shall not be affected and shall remain valid.

(Auth.: HAR §11-60.1-90)

10. The permittee shall not use as a defense in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the terms and conditions of this permit.

(Auth.: HAR §11-60.1-90)

11. This permit may be terminated, suspended, reopened, or amended for cause pursuant to HAR, Sections, 11-60.1-10 and 11-60.1-98, and Hawaii Revised Statutes (HRS), Chapter 342B-27, after affording the permittee an opportunity for a hearing in accordance with HRS, Chapter 91.

(Auth.: HAR §11-60.1-3, §11-60.1-10, §11-60.1-90, §11-60.1-98)

12. The filing of a request by the permittee for the termination, suspension, reopening, or amendment of this permit, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

(Auth.: HAR §11-60.1-90)

13. This permit does not convey any property rights of any sort, or any exclusive privilege.

(Auth.: HAR §11-60.1-90)

14. The permittee shall notify the Department and U.S. EPA, Region 9, in writing of the following dates:

- a. The **anticipated date of initial start-up** for each emission unit of a new source or significant modification not more than sixty (60) days or less than thirty (30) days prior to such date;
- b. The **actual date of construction commencement** within fifteen (15) days after such date; and
- c. The **actual date of start-up** within fifteen (15) days after such date.

(Auth.: HAR §11-60.1-90)

15. The permittee shall furnish, in a timely manner, any information or records requested in writing by the Department to determine whether cause exists for terminating, suspending, reopening, or amending this permit, or to determine compliance with this permit. Upon request, the permittee shall also furnish to the Department copies of records required to be kept by the permittee. For information claimed to be confidential, the Director of Health may require the permittee to furnish such records not only to the Department but also directly to the U.S. EPA, Region 9, along with a claim of confidentiality.

(Auth.: HAR §11-60.1-14, §11-60.1-90)

16. The permittee shall notify the Department in writing, of the **intent to shut down air pollution control equipment for necessary scheduled maintenance** at least twenty-four (24) hours prior to the planned shutdown. The submittal of this notice shall not be a defense to an enforcement action. The notice shall include the following:
  - a. Identification of the specific equipment to be taken out of service, as well as its location and permit number;
  - b. The expected length of time that the air pollution control equipment will be out of service;
  - c. The nature and quantity of emissions of air pollutants likely to be emitted during the shutdown period;
  - d. Measures such as the use of off-shift labor and equipment that will be taken to minimize the length of the shutdown period; and
  - e. The reasons why it would be impossible or impractical to shut down the source operation during the maintenance period.

(Auth.: HAR §11-60.1-15; SIP §11-60-16)<sup>2</sup>

17. **Except for emergencies which result in noncompliance with any technology-based emission limitation in accordance with HAR, Section 11-60.1-16.5, in the event any emission unit, air pollution control equipment, or related equipment malfunctions or breaks down in such a manner as to cause the emission of air pollutants in violation of HAR, Chapter 11-60.1 or this permit**, the permittee shall immediately notify the Department of the malfunction or breakdown, unless the protection of personnel or public health or safety demands immediate attention to the malfunction or breakdown and makes such notification infeasible. In the latter case, the notice shall be provided as soon as

practicable. Within five (5) working days of this initial notification, the permittee shall also submit, in writing, the following information:

- a. Identification of each affected emission point and each emission limit exceeded;
- b. Magnitude of each excess emission;
- c. Time and duration of each excess emission;
- d. Identity of the process or control equipment causing the excess emission;
- e. Cause and nature of each excess emission;
- f. Description of the steps taken to remedy the situation, prevent a recurrence, limit the excessive emissions, and assure that the malfunction or breakdown does not interfere with the attainment and maintenance of the National Ambient Air Quality Standards and state ambient air quality standards;
- g. Documentation that the equipment or process was at all times maintained and operated in a manner consistent with good practice for minimizing emissions; and
- h. A statement that the excess emissions are not part of a recurring pattern indicative of inadequate design, operation, or maintenance.

The submittal of these notices shall not be a defense to an enforcement action.

(Auth.: HAR §11-60.1-16; SIP §11-60-16)<sup>2</sup>

18. The permittee may request confidential treatment of any records in accordance with HAR, Section 11-60.1-14.

(Auth.: HAR §11-60.1-14, §11-60.1-90)

19. This permit shall become invalid with respect to the authorized construction if construction is not commenced as follows:

- a. Within eighteen (18) months after the permit takes effect, is discontinued for a period of eighteen (18) months or more, or is not completed within a reasonable time.
- b. For phased construction projects, each phase shall commence construction within eighteen (18) months of the projected and approved commencement dates in the permit. This provision shall be applicable only if the projected and approved commencement dates of each construction phase are defined in Attachment II, Special Conditions, of this permit.

(Auth.: HAR §11-60.1-9, §11-60.1-90)

20. The Department may extend the time periods specified in Standard Condition No. 19 upon a satisfactory showing that an extension is justified. Requests for an extension shall be submitted in writing to the Department.

(Auth.: HAR §11-60.1-9, §11-60.1-90)

21. The permittee shall submit fees in accordance with HAR, Chapter 11-60.1, Subchapter 6.  
(Auth.: HAR §11-60.1-90)
22. All certifications shall be in accordance with HAR, Section 11-60.1-4.  
(Auth.: HAR §11-60.1-4, HAR §11-60.1-90)
23. The permittee shall allow the Director of Health, the Regional Administrator for the U.S. EPA and/or an authorized representative, upon presentation of credentials or other documents required by law:
- a. To enter the premises where a source is located or emission-related activity is conducted, or where records must be kept under the conditions of this permit and inspect at reasonable times all facilities, equipment, including monitoring and air pollution control equipment, practices, operations, or records covered under the terms and conditions of this permit and request copies of records or copy records required by this permit; and
  - b. To sample or monitor at reasonable times substances or parameters to ensure compliance with this permit or applicable requirements of HAR, Chapter 11-60.1.
- (Auth.: HAR §11-60.1-11, §11-60.1-90)
24. Within thirty (30) days of **permanent discontinuance of the construction, modification, relocation, or operation of the facility covered by this permit**, the discontinuance shall be reported in writing to the Department by a responsible official of the source.  
(Auth.: HAR §11-60.1-8; SIP §11-60-10)<sup>2</sup>
25. Each permit renewal application shall be submitted to the Department and the U.S. EPA, Region 9, no less than twelve (12) months and no more than eighteen (18) months prior to the permit expiration date. The director may allow a permit renewal application to be submitted no less than six months prior to the permit expiration date, if the director determines that there is reasonable justification.  
(Auth.: HAR §11-60.1-101, 40 CFR §70.5(a)(1)(iii))<sup>1</sup>
26. The terms and conditions included in this permit, including any provision designed to limit a source's potential to emit, are federally enforceable unless such terms, conditions, or requirements are specifically designated as not federally enforceable.  
(Auth.: HAR §11-60.1-93)
27. The compliance plan and compliance certification submittal requirements shall be in accordance with HAR, Sections 11-60.1-85 and 11-60.1-86. As specified in HAR,

Section 11-60.1-86, the compliance certification shall be submitted to the Department and the U.S. EPA, Region 9, once per year, or more frequently as set by any applicable requirement.

(Auth.: HAR §11-60.1-90)

28. **Any document (including reports) required to be submitted by this permit shall be certified as being true, accurate, and complete by a responsible official in accordance with HAR, Sections 11-60.1-1 and 11-60.1-4, and shall be mailed to the following address:**

**Clean Air Branch  
Environmental Management Division  
Hawaii Department of Health  
P.O. Box 3378  
Honolulu, HI 96801-3378**

**Upon request and as required by this permit, all correspondence to the State of Hawaii Department associated with this Covered Source Permit shall have duplicate copies forwarded to:**

**Chief  
Permits Office, (Attention: Air-3)  
Air Division  
U.S. Environmental Protection Agency  
Region 9  
75 Hawthorne Street  
San Francisco, CA 94105**

(Auth.: HAR §11-60.1-4, §11-60.1-90)

29. To determine compliance with submittal deadlines for time-sensitive documents, the postmark date of the document shall be used. If the document was hand-delivered, the date received ("stamped") at the Clean Air Branch shall be used to determine the submittal date.

(Auth.: HAR §11-60.1-5, §11-60.1-90)

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<sup>1</sup>The citations to the Code of Federal Regulations (CFR) identified under a particular condition, indicate that the permit condition complies with the specified provision(s) of the CFR. Due to the integration of the preconstruction and operating permit requirements, permit conditions may incorporate more stringent requirements than those set forth in the CFR.

<sup>2</sup>The citations to the State Implementation Plan (SIP) identified under a particular condition, indicate that the permit condition complies with the specified provision(s) of the SIP.

**ATTACHMENT II: SPECIAL CONDITIONS  
COVERED SOURCE PERMIT NO. 0802-01-C**

**Issuance Date:** September 10, 2014

**Expiration Date:** September 9, 2019

In addition to the standard conditions of the Covered Source Permit, the following special conditions shall apply to the permitted facility:

**Section A. Equipment Description**

1. This permit encompasses the following equipment and associated appurtenances:
  - a. Kekaha Sanitary Landfill; and
  - b. Active Landfill Gas Collection and Control system for landfill consisting of enclosed flare, extraction wells, landfill gas piping, and associated equipment.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.1, §60.752)<sup>1</sup>

**Section B. Definitions**

For the purposes of this permit, the following definitions shall be used:

1. Active Collection System means a gas collection system that uses gas mover equipment.
2. Active Landfill means a landfill in which solid waste is being placed or a landfill that is planned to accept waste in the future.
3. Bioreactor means a Municipal Solid Waste (MSW) landfill or portion of a MSW landfill where any liquid other than leachate (leachate includes landfill gas condensate) is added in a controlled fashion into the waste mass (often in combination with recirculating leachate) to reach a minimum average moisture content of at least 40 percent by weight to accelerate or enhance the anaerobic (without oxygen) biodegradation of the waste.
4. Closed Landfill means a landfill in which solid waste is no longer being placed, and in which no additional solid wastes will be placed without first filing a notification of modification as prescribed under 40 Code of Federal Regulations (CFR) §60.7(a)(4). Once a notification of modification has been filed, and additional solid waste is placed in the landfill, the landfill is no longer closed.
5. Closure means that point in time when a landfill becomes a closed landfill.
6. Commercial Solid Waste means all types of solid waste generated by stores, offices, restaurants, warehouses, and other non-manufacturing activities, excluding residential and industrial wastes.
7. Controlled Landfill means any landfill at which collection and control systems are required under 40 CFR Part 60, Subpart WWW, as a result of the non-methane organic compounds emission rate. The landfill is considered controlled at the time a collection and control system design plan is submitted in compliance with 40 CFR §60.752(b)(2)(I).

8. Design Capacity means the maximum amount of solid waste a landfill can accept, as indicated in terms of volume or mass in the most recent permit issued by the State, local, or Tribal agency responsible for regulating the landfill, plus any in-place waste not accounted for in the most recent permit. If the owner or operator chooses to convert the design capacity from volume to mass or from mass to volume to demonstrate its design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, the calculation must include a site specific density, which must be recalculated annually.
9. Deviation means any instance in which an affected source subject to 40 CFR Part 60, Subpart WWW, or an owner or operator of such a source:
  - a. Fails to meet any requirement or obligation established by this subpart, including, but not limited to, any emissions limitation (including any operating limit) or work practice standard;
  - b. Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit; or
  - c. Fails to meet any emission limitation (including any operating limit) or work practice standard in this subpart during Startup, Shutdown, or Malfunction, regardless of whether or not such failure is permitted by this subpart.
10. Disposal Facility means all contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.
11. Emission Rate Cutoff means the threshold annual emission rate to which a landfill compares its estimated emission rate to determine if control under the regulation is required.
12. Emissions Limitation means any emission limit, opacity limit, operating limit, or visible emissions limit.
13. Enclosed Combustor means an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an enclosed combustor.
14. EPA Approved State Plan means a State plan that EPA has approved based on the requirements in 40 CFR Part 60, Subpart B to implement and enforce 40 CFR Part 60, Subpart Cc. An approved State plan becomes effective on the date specified in the notice published in the Federal Register announcing EPA's approval.
15. Federal Plan means the EPA plan to implement 40 CFR Part 60, Subpart Cc for existing MSW landfills located in States and Indian country where State plans or tribal plans are not currently in effect. On the effective date of an EPA approved State or tribal plan, the Federal plan no longer applies. The Federal plan is found at 40 CFR Part 62, Subpart GGG.
16. Flare means an open combustor without enclosure or shroud.

17. Gas Mover Equipment means the equipment (i.e., fan, blower, compressor) used to transport landfill gas through the header system.
18. Household Waste means any solid waste (including garbage, trash, and sanitary waste in septic tanks) derived from households (including, but not limited to, single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas).
19. Industrial Solid Waste means solid waste generated by manufacturing or industrial processes that is not a hazardous waste regulated under Subtitle C of the Resource Conservation and Recovery Act, Parts 264 and 265 of the CFR, Title 40. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste, or oil, and gas waste.
20. Interior Well means any well or similar collection component located inside the perimeter of the landfill waste. A perimeter well located outside the landfilled waste is not an interior well.
21. Landfill means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile as those terms are defined under 40 CFR §257.2.
22. Lateral Expansion means a horizontal expansion of the waste boundaries of an existing MSW landfill. A lateral expansion is not a modification unless it results in an increase in the design capacity of the landfill.
23. Modification means an increase in the permitted volume design capacity of the landfill by either horizontal or vertical expansion based on its permitted design capacity as of May 30, 1991. Modification does not occur until the owner or operator commences construction on the horizontal or vertical expansion.
24. Municipal Solid Waste Landfill or MSW Landfill means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. A MSW landfill may also receive other types of Resource Conservation and Recovery Act, Subtitle D wastes (40 CFR §257.2) such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of a MSW landfill may be separated by access roads. A MSW landfill may be publicly or privately owned. A MSW landfill may be a new MSW landfill, an existing MSW landfill, or a lateral expansion.

25. Municipal solid waste landfill emissions or MSW landfill emissions means gas generated by the decomposition of organic waste deposited in a MSW landfill or derived from the evolution of organic compounds in the waste.
26. NMOC means non-methane organic compounds, as measured according to the provisions of 40 CFR §60.754.
27. Nondegradable waste means any waste that does not decompose through chemical breakdown or microbiological activity. Examples are, but are not limited to, concrete, municipal waste combustor ash, and metals.
28. Passive collection system means a gas collection system that solely uses positive pressure within the landfill to move the gas rather than using gas mover equipment.
29. Sludge means any solid, semisolid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility, exclusive of the treated effluent from a wastewater treatment plant.
30. Solid waste means any garbage, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges that are point sources subject to permits under 33 U.S.C. 1342, or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (42 U.S.C 2011 et seq.).
31. Sufficient density means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance set forth in 40 CFR 60, Subpart WWW.
32. Sufficient extraction rate means a rate sufficient to maintain a negative pressure at all wellheads in the collection system without causing air infiltration, including any wellheads connected to the system as a result of expansion or excess surface emissions, for the life of the blower.
33. Tribal plan means a plan submitted by a tribal authority pursuant to 40 CFR Parts 9, 35, 49, 50, and 81 to implement and enforce 40 CFR Part 60, Subpart Cc.
34. Work practice standard means any design, equipment, work practice, or operational standard, or combination thereof that is promulgated pursuant to Section 112(h) of the Clean Air Act.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-161; 40 CFR §60.751, 40 CFR §63.1990 )<sup>1</sup>

**Section C. Applicable Federal Regulations**

1. The Kekaha Landfill is subject to the provisions of the following federal regulations:
  - a. 40 CFR Part 60, Standards of Performance for New Stationary Sources, Subpart A - General Provisions;
  - b. 40 CFR Part 60, Standards of Performance for New Stationary Sources, Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills;
  - c. 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants for Source Categories, Subpart A - General Provisions; and
  - d. 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants for Source Categories, Subpart AAAA - Municipal Solid Waste Landfills.

(Auth: HAR §11-60.1-3, §60.1-90, §60.1-174; 40 CFR §60.1, §60.750, 40 CFR §63.1930)<sup>1</sup>

2. The permittee shall comply with all applicable provisions of these standards including all emission limits, notification, testing, monitoring, and reporting requirements.

In addition to the requirements of Hawaii Revised Statutes, Chapter 342B and Hawaii Administrative Rules, Chapters 11-59 and 60.1, the conditions specified in this Attachment are incorporated pursuant to Federal regulations 40 CFR Part 60, Subparts A and WWW and 40 CFR Part 63, Subparts A and AAAA. Except as may be required by the aforementioned state law and rules, should there be a conflict between the conditions of this attachment and the aforementioned Federal regulations, the Federal regulations shall take precedence.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.1, §60.750, 40 CFR §63.1930)<sup>1</sup>

**Section D. Operational Standards for the Collection and Control System**

1. Landfill Air Emission Standards
  - a. The landfill shall comply with the following:
    - i. Submit a collection and control system design plan prepared by a professional engineer to the Department and U.S. EPA, Region 9, by June 2, 2015, unless Tier 2 or Tier 3 sampling demonstrates that the emission rate is less than fifty (50) megagrams per year, as specified in 40 CFR §60.757(c)(1) or (2).
      - 1) The collection and control system as described in the plan shall meet the design requirements of this attachment, Special Condition D.1.a.ii.
      - 2) The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions of 40 CFR §§60.753 through 60.758 proposed by the owner or operator.

- 3) The collection and control system design plan shall either conform with specifications for active collection systems in 40 CFR §60.759 or include a demonstration which satisfies to the Department and/or U.S. EPA, Region 9, as applicable, the sufficiency of the alternative provisions to 40 CFR §60.759.
  - 4) The Department and/or U.S. EPA, Region 9, as applicable, shall review the information submitted under this attachment, Special Conditions D.1.a.i.1 thru D.1.a.i.3, and either approve it, disapprove it, or request that additional information be submitted. Because of the many site-specific factors involved with landfill gas system design, alternative systems may be necessary. A wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, or horizontal trenches only, leachate collection components, and passive systems.
- ii. Install a collection and control system that captures the gas generated within the landfill as required by this attachment, Special Conditions D.1.a.ii and D.1.a.iii by December 1, 2016, unless Tier 2 or Tier 3 sampling, demonstrates that the emission rate is less than fifty (50) megagrams per year, as specified in 40 CFR §60.757(c)(1) or (2).
- 1) The Active collection system shall:
    - a) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment;
    - b) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of:
      - i) Five (5) years or more if active; or
      - ii) Two (2) years or more if closed or at final grade.
    - c) Collect gas at a sufficient extraction rate; and
    - d) Be designed to minimize off-site migration of subsurface gas.
- iii. Route all the collected gas to a control system that complies with the requirements in either paragraph 1), 2), or 3) of this section.
- 1) An open flare designed and operated in accordance with 40 CFR §60.18 except as noted in 40 CFR §60.754(e);
  - 2) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than twenty (20) parts per million (ppm) by volume, dry basis as hexane at three (3) percent oxygen. The reduction efficiency or ppm by volume shall be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in 40 CFR §60.754(d).

- a) If a boiler or process heater is used as the control device, the landfill gas stream shall be introduced into the flame zone.
  - b) The control device shall be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in 40 CFR §60.756;
- 3) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be subject to the requirements of this attachment, Special Conditions D.1.a.iii.1) or D.1.a.iii.2).
- iv. Operate the collection and control device installed to comply with this subpart in accordance with the provisions of 40 CFR §§60.753, 60.755, and 60.756.
- v. The collection and control system may be capped or removed provided that all the conditions of paragraphs 1), 2), and 3) of this section are met:
- 1) The landfill shall be a closed landfill as defined in this attachment, Special Condition B.4. A closure report shall be submitted to the Department and U.S. EPA, Region 9, as provided in this attachment, Special Condition G.8;
  - 2) The collection and control system shall have been in operation a minimum of fifteen (15) years; and
  - 3) Following the procedures specified in 40 CFR §60.754(b), the calculated NMOC gas produced by the landfill shall be less than fifty (50) megagrams per year on three (3) successive test dates. The test dates shall be no less than 90 days apart, and no more than 180 days apart.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.752)<sup>1</sup>

## 2. Gas Collection System Standards

Each owner or operator of a MSW landfill gas collection and control system used to comply with the provisions of 40 CFR §60.752(b)(2)(ii) shall:

- a. Operate the collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for:
  - i. Five (5) years or more if active; or
  - ii. Two (2) years or more if closed or at final grade.
- b. Operate the collection system with negative pressure at each wellhead except under the following conditions:
  - i. A fire or increased well temperature. The owner or operator shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the monitoring reports as provided in this attachment, Special Condition G.2;

- ii. Use of a geomembrane or synthetic cover. The owner or operator shall develop acceptable pressure limits in the design plan; and
  - iii. A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes shall be approved by the Department and/or U.S. EPA, Region 9, as applicable.
- c. Operate each interior wellhead in the collection system with a landfill gas temperature less than 55 °C and with either a nitrogen level less than twenty (20) percent or an oxygen level less than five (5) percent. The permittee may establish a higher operating temperature, nitrogen, or oxygen value at a particular well. A higher operating value demonstration shall show supporting data that the elevated parameter does not cause fires or significantly inhibit anaerobic decomposition by killing methanogens.
- i. The nitrogen level shall be determined using 40 CFR Part 60, Appendix A, Method 3C, unless an alternative test method is established as allowed by 40 CFR §60.752(b)(2)(i).
  - ii. Unless an alternate test method is established as allowed by 40 CFR §60.752(b)(2)(i), the oxygen shall be determined by an oxygen meter using 40 CFR Part 60, Appendix A, Method 3A or 3C except that:
    - 1) The span shall be set so that the regulatory limit is between twenty (20) and fifty (50) percent of the span;
    - 2) A data recorder is not required;
    - 3) Only two (2) calibration gases are required, a zero and span, and ambient air may be used as the span;
    - 4) A calibration error check is not required; and
    - 5) The allowable sample bias, zero drift, and calibration drift are ±10 percent.
- d. Operate the collection system so that the methane concentration is less than 500 ppm above background at the surface of the landfill. To determine if this level is exceeded, the permittee shall conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at thirty (30) meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The permittee may establish an alternate traversing pattern that ensures equivalent coverage. A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the thirty (30) meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing;
- e. Operate the system such that all collected gases are vented to the gas collection and control system designed and operated in compliance with 40 CFR §60.752(b)(2)(iii). In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within one (1) hour;
- f. Operate the control or treatment system at all times when the collected gas is routed to the system; and

- g. If monitoring demonstrates that the operational requirements of this attachment, Special Conditions D.2.b, D.2.c, or D.2.d are not met, the permittee shall take corrective action as specified in Section E of this attachment. If corrective actions are taken as specified, the monitored exceedance is not a violation of the operational requirements in this section.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.753)<sup>1</sup>

### 3. Visible Emissions

- a. The permittee shall take measures to control fugitive dust at all material transfer points and throughout the workyard. The Department may at any time require the permittee to further abate fugitive dust emissions if an inspection indicates poor or insufficient control.
- b. The permittee shall not cause or permit fugitive dust to become airborne without taking reasonable precautions and shall not cause or permit the discharge of visible emissions of fugitive dust beyond the lot line of the property on which the emissions originate.
- c. For any six (6) minute averaging period, the enclosed flare shall not exhibit visible emissions of twenty (20) percent or greater, except as follows: during start-up, shutdown, or equipment breakdown, the enclosed flare may exhibit visible emissions not greater than twenty (20), but not exceeding sixty (60) percent opacity for a period aggregating not more than six (6) minutes in any sixty (60) minute period.

(Auth: HAR §11-60.1-3, §11-60.1-33, §11-60.1-90)

## **Section E. Compliance Provisions**

1. Except as provided in the collection and control system design plan submitted pursuant to this attachment, Special Condition D.1.a.i, the permittee shall use the following methods to determine whether the gas collection system is in compliance with this attachment, Special Conditions D.1.a.ii.1 and D.1.a.iii.

- a. Calculation of Maximum Expected Gas Generation Flow Rate

For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with 40 CFR §60.752(b)(2)(ii)(A)(1), one of the following equations shall be used. The  $k$  and  $L_0$  kinetic factors should be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42) or other site specific values demonstrated to be appropriate and approved by the Department. If  $k$  has been determined as specified in this attachment, Section H, the value of  $k$  determined from the test shall be used. A value of no more than fifteen (15) years shall be used for the intended use period of the gas mover equipment. The active life of the landfill is the age of the landfill plus the estimated number of years until closure.

- i. For sites with unknown year-to-year solid waste acceptance rate:

$$Q_m = 2L_oR (e^{-kc} - e^{-kt}) \text{ where,}$$

- $Q_m$  = maximum expected gas generation flow rate ( $m^3/yr$ )  
 $L_o$  = methane generation potential, ( $m^3/Mg$  solid waste)  
 $R$  = average annual acceptance rate ( $Mg/yr$ )  
 $k$  = methane generation rate constant ( $year^{-1}$ )  
 $t$  = age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or active life of the landfill, whichever is less. If the equipment is installed after closure,  $t$  is the age of the landfill at installation (years)  
 $c$  = time since closure (years) (for an active landfill  $c = 0$  and  $e^{-kc} = 1$ )

- ii. For sites with known year-to-year solid waste acceptance rate:

$$Q_M = \sum_{i=1}^n 2kL_oM_i (e^{-kt_i})$$

- $Q_M$  = maximum expected gas generation flow rate ( $m^3/year$ )  
 $k$  = methane generation rate constant ( $year^{-1}$ )  
 $L_o$  = methane generation potential, ( $m^3/Mg$  solid waste)  
 $M_i$  = mass of solid waste in the  $i^{th}$  section ( $Mg$ )  
 $t_i$  = age of the  $i^{th}$  section (years)

- iii. If a collection and control system has been installed, actual flow data may be used to project the maximum expected gas generation flow rate instead of, or in conjunction with, the equations in this attachment, Special Conditions E.1.a.i and E.1.a.ii. If the landfill is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using the equations in this attachment, Special Conditions E.1.a.i and E.1.a.ii, or other methods shall be used to predict the maximum expected gas generation rate over the intended period of use of the gas control system equipment.

b. Gas Collector Density

For the purposes of determining sufficient density of gas collectors for compliance with 40 CFR §60.752(b)(2)(ii)(A)(2), the permittee shall design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the Department and/or U.S. EPA, Region 9, as applicable, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards.

c. Gas Collection System Flow Rate

For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with 40 CFR §60.752(b)(2)(ii)(A)(3), the owner or

operator shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within five (5) calendar days, except for the three (3) conditions allowed under this attachment, Special Condition D.2.b. If negative pressure cannot be achieved without excess air infiltration within fifteen (15) calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Department and/or U.S. EPA, Region 9, as applicable, for approval.

- d. Owners or operators are not required to install additional wells as required in this attachment, Special Condition E.1.c during the first 180 days after gas collection system startup.
- e. Identification of Excess Air Infiltration

For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen as provided in 40 CFR §60.753(c). If a well exceeds one of these operating parameters, action shall be initiated to correct the exceedance within five (5) calendar days. If correction of the exceedance cannot be achieved within fifteen (15) calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Department and/or U.S. EPA, Region 9, as applicable.

- f. An owner or operator seeking to demonstrate compliance with §60.752(b)(2)(ii)(A)(4) through the use of a collection system not conforming to the specifications provided in 40 CFR §60.759, shall provide information as specified in §60.752(b)(2)(i)(C) satisfactory to the Department and/or U.S. EPA, Region 9, as applicable, demonstrating that off-site migration is being controlled.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.755)<sup>1</sup>

- 2. For purposes of compliance with 40 CFR §60.753(a), the permittee of a controlled landfill shall place each well or design component as specified in the approved design plan. Each well shall be installed no later than sixty (60) days after the date on which the initial solid waste has been in place for a period of:
  - a. Five (5) years or more if active; or
  - b. Two (2) years or more if closed or at final grade.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.755)<sup>1</sup>

3. The following procedures shall be used for compliance with the surface methane operational standard as provided in this attachment, Special Condition D.2.d.
  - a. After installation of the collection system, the permittee shall monitor surface concentrations of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at thirty (30) meter intervals (or a site-specific established spacing) for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in this attachment, Special Condition E.4.
  - b. The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least thirty (30) meters from the perimeter wells.
  - c. Surface emission monitoring shall be performed in accordance with §4.3.1 of Method 21 of 40 CFR Part 60, Appendix A, except that the probe inlet shall be placed within five (5) to ten (10) centimeters of the ground. Monitoring shall be performed during typical meteorological conditions.
  - d. Any reading of 500 ppm or more above background at any location shall be recorded as a monitored exceedance and the following actions shall be taken. As long as the specified actions are taken, the exceedance is not a violation of this attachment, Special Condition D.2.d.
    - i. The location of each monitored exceedance shall be marked and the location recorded.
    - ii. Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within ten (10) calendar days of detecting the exceedance.
    - iii. If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again within ten (10) days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in this attachment, Special Condition E.3.d.v shall be taken, and no further monitoring of that location is required until the action specified in this attachment, Special Condition E.3.d.v has been taken.
    - iv. Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the ten-day (10-day) re-monitoring specified in this attachment, Special Conditions E.3.d.ii or E.3.d.iii shall be re-monitored one-month (1-month) from the initial exceedance. If the one-month (1-month) re-monitoring shows a concentration less than 500 ppm above background, no further monitoring of that location is required until the next quarterly monitoring period. If the one-month (1-month) re-monitoring shows an exceedance, the actions specified in this attachment, Special Conditions E.3.d.ii or E.3.d.iii shall be taken.
    - v. For any location where monitored methane concentration equals or exceeds 500 ppm above background three (3) times within a quarterly period, a new well or other collection device shall be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation

may be submitted to the Department and/or U.S. EPA, Region 9, as applicable, for approval.

- e. The permittee shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.755)<sup>1</sup>

4. The permittee shall comply with the following instrumentation specifications and procedures for surface emission monitoring devices:
  - a. The portable analyzer shall meet the instrument specifications provided in Section 3 of Method 21 of 40 CFR 60, Appendix A, except that "methane" shall replace all references to VOC;
  - b. The calibration gas shall be methane, diluted to a nominal concentration of 500 ppm in air;
  - c. To meet the performance evaluation requirements in Section 3.1.3 of Method 21 of 40 CFR Part 60, Appendix A, the instrument evaluation procedures of Section 4.4 of Method 21 of 40 CFR Part 60, Appendix A shall be used; and
  - d. The calibration procedures provided in Section 4.2 of Method 21 of 40 CFR Part 60, Appendix A shall be followed immediately before commencing a surface monitoring survey.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.755)<sup>1</sup>

5. The provisions of this attachment, Section E apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction, shall not exceed five (5) days for collection systems and shall not exceed one (1) hour for treatment or control devices.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.755)<sup>1</sup>

6. If you are required by 40 CFR §60.752(b)(2) of Subpart WWW, the Federal plan, or an EPA approved and effective State or tribal plan to install a collection and control system, you must comply with the requirements in 40 CFR §§63.1960 through 63.1985 and with the general provisions of this part specified in Table 1 of 40 CFR Part 63, Subpart AAAA.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174, 40 CFR §63.1955)<sup>1</sup>

7. All affected sources must comply with the Startup, Shutdown, and Malfunction (SSM) requirements, in Subpart A of 40 CFR Part 63, Subpart AAAA, as specified in Table 1 of this subpart and all affected sources must submit compliance reports every six (6) months as specified in §63.1980(a) and (b), including information on all deviations that occurred during the six-month (6-month) reporting period. Deviations for continuous emission

monitors or numerical continuous parameter monitors must be determined using a three-hour (3 hour) monitoring block average.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174, 40 CFR §63.1955)<sup>1</sup>

8. Compliance with 40 CFR Part 63, Subpart AAAA, is determined in the same way it is determined for 40 CFR Part 60, Subpart WWW, including performance testing, monitoring of the collection system, continuous parameter monitoring, and other credible evidence. In addition, continuous parameter monitoring data, collected under 40 CFR §60.756(b)(1), (c)(1), and (d) of Subpart WWW, are used to demonstrate compliance with the operating conditions for control systems. If a deviation occurs, you have failed to meet the control device operating conditions described in 40 CFR Part 63, Subpart AAAA, and have deviated from the requirements of 40 CFR Part 63, Subpart AAAA. Finally, you must develop a written SSM plan according to the provisions in 40 CFR §63.6(e)(3). A copy of the SSM plan must be maintained on site. Failure to write or maintain a copy of the SSM plan is a deviation from the requirements of 40 CFR Part 63, Subpart AAAA.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174, 40 CFR §63.1960)<sup>1</sup>

9. A deviation is defined in 40 CFR §63.1990. For the purposes of the landfill monitoring and SSM plan requirements, deviations include the following:
  - a. A deviation occurs when the control device operating parameter boundaries described in 40 CFR §60.758(c)(1) of Subpart WWW are exceeded;
  - b. A deviation occurs when one-hour (1-hour) or more of the hours during the three-hour (3-hour) block averaging period does not constitute a valid hour of data. A valid hour of data must have measured values for at least three (3) fifteen-minute (15-minute) monitoring periods within the hour; and
  - c. A deviation occurs when a SSM plan is not developed or maintained on site.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174, 40 CFR §63.1960, 63.1965)<sup>1</sup>

## **Section F. Monitoring and Recordkeeping Requirements**

### **Monitoring Requirements**

#### **1. Active Gas Collection System**

Except as provided in the collection and control system design plan submitted pursuant to this attachment, Special Condition D.1.a.i, the permittee with an active gas collection system shall install a sampling port and a thermometer, other temperature measuring device, or an access port for temperature measurements at each wellhead and:

- a. Measure the gauge pressure in the gas collection header on a monthly basis as provided for in this attachment, Special Condition E.1.c;

- b. Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis; as provided for in this attachment, Special Condition E.1.e; and
- c. Monitor temperature of the landfill gas on a monthly basis as provided in this attachment, Special Condition E.1.e.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.756)<sup>1</sup>

## 2. Enclosed Flare

The permittee shall calibrate, maintain, and operate the following equipment according to the manufacturer's specifications:

- a. A temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of  $\pm 1$  percent of the temperature being measured expressed in degrees Celsius or  $\pm 0.5$  degrees Celsius, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity equal to or greater than forty-four (44) megawatts.
- b. A device that records flow to or bypass of the control device. The permittee shall either:
  - i. Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every fifteen (15) minutes; or
  - ii. Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.756)<sup>1</sup>

## 3. Surface Concentrations of Methane

The permittee shall monitor surface concentrations of methane according to the instrument specifications and procedures provided in this attachment, Special Condition No. E.4. Any closed landfill that has no monitored exceedances of the operational standard in three (3) consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.756)<sup>1</sup>

## 4. Alternatives

All of the specified alternatives in the collection and control design plan shall comply with any additional monitoring requirements set forth in the plan as approved by the Department and/or U.S. EPA, Region 9, as applicable.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.756)<sup>1</sup>

5. Performance Tests

Initial and annual source performance tests shall be conducted on the collection and control system pursuant to this attachment, Section H. Test summaries and results shall be maintained in accordance with the requirements of this section.

(Auth: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90)<sup>1</sup>

6. In the event that the collection and control system is not in operation and in compliance with this attachment, Sections D and E:

- a. Annual NMOC emission rates shall be calculated in accordance with this attachment, Section G; and
- b. NMOC emission rate reports shall be submitted in accordance with this attachment, Special Condition G.4.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.757)<sup>1</sup>

7. Visible Emissions (VE)

The permittee shall conduct **monthly** (*calendar month*) VE observations for the enclosed flare in accordance with 40 CFR Part 60, Appendix A, Method 9, or U.S. EPA approved equivalent methods, or alternate methods with prior written approval from the Department. For each month, two (2) consecutive six (6) minute observations shall be taken at fifteen (15) second intervals for each equipment. Records shall be completed and maintained in accordance with the *Visible Emissions Form Requirements*.

(Auth: HAR §11-60.1-8, §11-60.1-15, §11-60.1-16, §11-60.1-90)

Recordkeeping Requirements

8. All records, including support information, shall be maintained for at least five (5) years from the date of the monitoring sample, measurement, test, report, or application. Support information includes all maintenance, inspection, and repair records, and copies of all reports required by this permit. These records shall be true, accurate, and maintained in a permanent form suitable for inspection, and made available to the Department or its representative upon request.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.758)<sup>1</sup>

9. Each permittee that specified alternatives in the collection and control design plan shall comply with any additional recordkeeping requirements set forth in the plan as approved by the Department.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.758)<sup>1</sup>

10. Except as provided in the collection and control system design plan approved by the Department, the permittee shall maintain the following records:
  - a. Equipment operating parameters specified to be monitored in this attachment, Special Conditions F.1 thru F.4, including:
    - i. Gauge pressure in each extraction well;
    - ii. Nitrogen or oxygen concentration in extracted landfill gas;
    - iii. Temperature of extracted landfill gas;
    - iv. Methane concentrations along landfill surface;
    - v. Gas flow from collection system to the control device; and
    - vi. Combustion temperature of an enclosed combustion device or the continuous presence of a pilot flame for an open flare.
  - b. The following data, as measured during the initial performance test or compliance determination shall be maintained for the life of the control equipment. Records of subsequent tests or monitoring shall be maintained for a minimum of five (5) years.
    - i. The maximum expected gas generation flow rate as calculated in this attachment, Special Condition E.1.a. The owner or operator may use another method to determine the maximum gas generation flow rate, if the method is included in the collection and control system design plan approved by the Department and/or U.S. EPA, Region 9, as applicable.
    - ii. The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in this attachment, Special Condition E.1.
  - c. Instances in which positive pressure occurs in efforts to avoid a fire, including the date, time, and duration of positive pressure.
  - d. Periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.
  - e. Continuous records of the indication of flow to the control device or the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines.
  - f. Plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector for the life of the collection system, including:
    - i. Installation date and location of all newly installed collectors; and
    - ii. Documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as well as any nonproductive areas excluded from collection.
  - g. All collection and control system exceedances of the operational standards in this attachment, Section D, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance. Records

shall also include the dates, times, duration, reasons, sampler's name, and any corrective actions, as applicable.

- h. Source performance test plans, summaries, and results for the collection and control system.
- i. Equipment inspection, maintenance, and repair work. A log shall be maintained for the equipment covered under this permit. Replacement of parts and repairs to the facility shall be well documented. As a minimum, the log shall include:
  - i. Date of the inspection/maintenance/repair;
  - ii. Description of the findings and any maintenance/repair work performed; and
  - iii. The name and title of the personnel performing the inspection/work.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.753, §60.758)<sup>1</sup>

8. Records of the control device vendor specifications shall be maintained until removal.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.753, §60.758)<sup>1</sup>

### **Section G. Notification and Reporting Requirements**

1. Notification and reporting pertaining to the following events for each landfill shall be done in accordance with Attachment I, Standard Conditions 14, 16, 17, and 25, respectively.
  - a. *Anticipated date of initial start-up, actual date of construction commencement, and actual date of start-up;*
  - b. *Intent to shut down air pollution control equipment for necessary scheduled maintenance;*
  - c. *Emissions of air pollutants in violation of HAR, Chapter 11-60.1 or this permit (excluding technology-based emission exceedances due to emergencies); and*
  - d. *Permanent discontinuance of construction, modification, relocation, or operation of the facility covered by this permit.*

(Auth: HAR §11-60.1-8, §11-60.1-15, §11-60.1-16, §11-60.1-90; SIP §11-60-10, §11-60-16)<sup>2</sup>

2. Monitoring Reports

The permittee shall submit **semi-annually** the following written report to the Department. The report shall be submitted **within sixty (60) days after the end of each semi-annual calendar period (January 1 - June 30 and July 1 - December 31)**, and shall include:

- a. Information as required by the Annual Report in this attachment, Special Condition G.3; and
- b. Additional information, including:

- i. Average and maximum gauge pressure within each gas extraction well measured over six-month (6-month) period;
- ii. Average and maximum nitrogen concentration or average and maximum oxygen concentration measured over six-month (6-month) period;
- iii. Average and maximum landfill gas temperature in extraction well measured over six-month (6-month) period;
- iv. Average and maximum methane concentration at landfill surface measured over quarterly period. If annual monitoring is allowed, the average and maximum methane concentration at landfill surface during the most recent monitoring event;
- v. Identification of any instances when the gas flow has been diverted from the control device, enclosed combustor, or open flare;
- vi. Average, maximum, and minimum combustion temperature of an enclosed combustion device, as applicable;
- vii. Identification of any instances in which the pilot flame or flare flame for an open flare was not present;
- viii. For all maximum values, include the date and time that the value was identified;
- ix. For all instances of non-compliance, indicate the dates, times, duration, and reason;
- x. Any opacity exceedances as determined by the required monthly visible emissions monitoring. Each exceedance reported shall include the date, six (6) minute average opacity reading, possible reasons for exceedance, duration of exceedance, and corrective actions taken. If there were no exceedances, the permittee shall submit in writing a statement indicating that for each equipment there were no exceedances for that semi-annual period; and
- xi. All deviations from the requirements of 40 CFR Part 63, Subpart AAAA, including the actions taken during a startup, shutdown, or malfunction, were consistent with the procedures in the SSM plan, that occurred during the six-month (6-month) reporting period

The Monitoring Report Form(s): **Collection and Control System**, and **Visible Emissions** shall be used.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.756)<sup>1</sup>

### 3. Annual Reports

The permittee with an active collection system shall submit to the Department and U.S. EPA, Region 9, annual reports of the recorded information in Conditions G.3.a through G.3.f of this paragraph. The initial report shall be submitted **within 180 days of installation and start-up of the collection and control system**, and shall include the initial performance test report required under 40 CFR §60.8. For enclosed combustion devices and flares, reportable exceedances are defined under 40 CFR §60.758(c).

- a. Value, date, time, and duration of each exceedance of applicable parameters for:
  - i. Gauge pressure in the gas collection header;
  - ii. Nitrogen or oxygen concentration in the landfill gas;

- iii. Temperature of landfill gas; and
  - iv. Surface concentrations of methane.
- 
- b. Description, reason, dates, start and end times, and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow as specified in Attachment II, Section E.
  - c. Description, reason, dates, start and end times, and duration of all periods when the control device was not operating for a period exceeding one (1) hour and length of time the control device was not operating.
  - d. All periods when the collection system was not operating in excess of five (5) days, including dates and times that operation ceased, reason for not operating, actions taken, dates and times that operation resumed, and future operational protocol that will prevent a reoccurrence of the situation.
  - e. The location of each exceedance of the 500 ppm surface methane concentration as provided in 40 CFR §60.753(d), concentration at each location for which an exceedance was recorded in the previous month. Also identify the dates of sampling, sampler's name, and actions taken to address the exceedance.
  - f. The date of installation and the location of each well or collection system expansion added.

The Supplemental Report Form: **Annual Report** shall be used.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.758)<sup>1</sup>

#### 4. Annual Report Submission

Pursuant to 40 CFR §63.1980, the annual report described in this attachment, Special Condition G.3, shall be updated and submitted every six (6) months.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.758, 40 CFR §63.1980)<sup>1</sup>

#### 5. Annual Emissions Reporting

As required by Attachment IV, the permittee shall report annually the NMOC emission rate and total tons per year emitted of each regulated air pollutant from the municipal solid waste landfill facility, including hazardous air pollutants. The reporting of annual emissions is due **within sixty (60) days following the end of each calendar year.**

The enclosed Annual Emissions Report Form: **Municipal Solid Waste Landfills** shall be used for reporting.

Upon written request of the facility, the deadline for reporting of annual emissions may be extended, if the Department determines that reasonable justification exists for the extension.

(Auth: HAR §11-60.1-3, §11-60.1-90)

6. Performance Test Reports

- a. At least **thirty (30) days prior** to conducting a source performance test, the permittee shall submit to the Department a test plan in accordance with this attachment, Special Condition H.4.
- b. Written reports of the results of all source performance tests conducted pursuant to this permit shall be submitted to the Department **within sixty (60) days after the completion of the performance test** in accordance with this attachment, Special Condition H.6.

(Auth: HAR §11-60.1-3, §11-60.1-90)

7. Design Capacity Increase

The permittee shall submit information regarding landfill modifications (as defined in Special Condition B.23) to the Department at least **thirty (30) days prior** to commencement of construction. The information submitted shall include the following:

- a. Name, address, and phone number of the facility, and the plant site manager or other contact;
- b. Current design capacity of the landfill ( $m^3$  and Mg);
- c. Current site-specific density ( $Mg/m^3$ );
- d. Description of the reconstruction or modification;
- e. Site map of the landfill containing the following information:
  - i. Location of the landfill and area of proposed modification or reconstruction;
  - ii. Current lateral boundaries of the existing landfill;
  - iii. Proposed lateral boundaries of the expansion;
  - iv. Current and proposed vertical dimensions of the landfill;
  - v. Projected date of construction commencement;
  - vi. Projected waste acceptance rate for the proposed modification;
  - vii. Certification that no air pollution equipment will be added to the facility and operational methods will remain similar as permitted under this Covered Source Permit;
  - viii. Certification that the permittee shall comply with each applicable requirement of this Covered Source Permit;
  - ix. Other information as may be required by the Department; and
  - x. A **certified statement by a responsible official** that all information contained in the notification is accurate and true.

The enclosed Supplemental Report Form: **Modification/Reconstruction of MSW Landfill** shall be used.

(Auth: HAR §11-60.1-3, §11-60.1-90)

8. Landfill Closure

The permittee shall submit a **closure report** to the Department **within 30 days** of waste acceptance cessation. If a closure report is submitted, no additional wastes may be placed into the landfill without filing a notification of modification as in 40 CFR §60.7(a)(4). The closure report shall contain the following information:

- a. Last day of waste acceptance (month, day, year);
- b. Date of closure (month, day, year);
- c. Design capacity (Mg and m<sup>3</sup>);
- d. Quantity of refuse-in-place (Mg and m<sup>3</sup>);
- e. Identification and quantity of additional capacity, if any;
- f. Certification that no additional waste will be placed in the landfill; and
- g. Name, address, and phone number of the facility, and the plant site manager or other contact.

The enclosed Supplemental Report Form: **Notification of Landfill Closure** shall be used.

The Department may request additional information as may be necessary to verify that permanent closure has taken place in accordance with 40 CFR §258.60.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.757)<sup>1</sup>

9. Equipment Removal Notification

The permittee shall submit an equipment removal report to the Department **thirty (30) days prior** to removal or cessation of operation of the control equipment.

- a. The equipment removal report shall contain the following items:
  - i. A copy of the closure report submitted in accordance with Special Condition G.7;
  - ii. A copy of the initial performance test report demonstrating that the fifteen (15) year minimum control period has expired; and
  - iii. Dated copies of three (3) successive NMOC emission rate reports demonstrating that the landfill is no longer producing fifty (50) megagrams or greater of NMOC per year.
- b. The Department may request such additional information as may be necessary to verify that all of the conditions for removal in Special Condition G.11 have been met.

The enclosed Supplemental Report Form: **Notification of Collection and Control Equipment Removal** shall be used.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.757)<sup>1</sup>

#### 10. Compliance Certification

During the permit term, the permittee shall submit at least **annually** to the Department and U.S. EPA, Region 9, a compliance certification pursuant to HAR, Subsection 11-60.1-86. The permittee shall indicate whether or not compliance is being met with each term or condition of this permit. The compliance certification shall include at a minimum the following information:

- a. The identification of each term or condition of the permit that is the basis of the certification;
- b. The compliance status;
- c. Whether compliance was continuous or intermittent;
- d. The methods used for determining the compliance status of the source currently and over the reporting period;
- e. Any additional information indicating the source's compliance status with any applicable enhanced monitoring and compliance certification including the requirements of Section 114(a)(3) of the Clean Air Act or any applicable monitoring and analysis provisions of Section 504(b) of the Clean Air Act;
- f. A brief description of any deviations including identifying as possible exceptions to compliance any periods during which compliance is required and in which the excursion or exceedances as defined in 40 CFR Part 64 occurred; and
- g. Any additional information as required by the Department including information to determine compliance.

*The compliance certification shall be submitted within **sixty (60) days after the end of each calendar year, and shall be signed and dated by a responsible official.***

*Upon written request of the permittee, the deadline for submitting the compliance certification may be extended, if the Department determines that reasonable justification exists for the extension.*

(Auth.: HAR §11-60.1-4, §11-60.1-86, §11-60.1-90)

#### 11. Discontinuance of the Collection and Control System

The permittee shall calculate the NMOC emission rate for purposes of determining when a collection and control system can be removed, using the following equation:

$$M_{\text{NMOC}} = 1.89 \times 10^{-3} Q_{\text{LFG}} C_{\text{NMOC}}, \text{ where}$$

$M_{\text{NMOC}}$  = mass emission rate of NMOC (Mg/yr)  
 $Q_{\text{LFG}}$  = flow rate of landfill gas ( $\text{m}^3/\text{min}$ )  
 $C_{\text{NMOC}}$  = NMOC concentration (ppm by volume as hexane)

- a. The flow rate of landfill gas,  $Q_{\text{LFG}}$ , shall be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control device using a gas flow measuring device calibrated according to the provisions of Section 4 of Method 2E of 40 CFR Part 60, Appendix A.

- b. The average NMOC concentration,  $C_{\text{NMOC}}$ , shall be determined by collecting and analyzing landfill gas sampled from the common header pipe before the gas moving or condensate removal equipment using the procedures in Method 25C or Method 18 of 40 CFR Part 60, Appendix A. If using Method 18 of Appendix A, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). The sample location on the common header pipe shall be before any condensate removal or other gas refining units. The permittee shall divide the NMOC concentration from Method 25C of 40 CFR Part 60, Appendix A, by six (6) to convert from  $C_{\text{NMOC}}$  as carbon to  $C_{\text{NMOC}}$  as hexane.
- c. The owner or operator may use another method to determine landfill gas flow rate and NMOC concentration if the method has been approved by the Department and/or U.S. EPA, Region 9, as applicable.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.754)<sup>1</sup>

#### **Section H. Testing Requirements**

1. **Within sixty (60) days after achieving the maximum production rate** of the collection and control system but not later than one hundred eighty (180) days after initial start-up, and annually thereafter, the permittee shall conduct or cause to be conducted performance tests on the collection and control system for the following purposes:
  - a. To establish the reduction efficiency or parts per million volume (ppmv) of a control system designed and operated to reduce NMOC by ninety-eight (98) weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by ninety-eight (98) weight percent or reduce the outlet NMOC concentration to less than twenty (20) ppm by volume, dry basis as hexane at three (3) percent oxygen.

The Department may require testing at other points in the facility or more frequent testing if an inspection indicates poor or insufficient controls.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.754)<sup>1</sup>

2. The performance tests for the emissions of NMOC shall be conducted and results reported in accordance with the test methods set forth in 40 CFR Part 60, Appendix A, and 40 CFR Part 60.8. The following test methods or U.S. EPA approved equivalent methods with written consent from the Department shall be used:
  - a. The permittee shall use Method 25, 25C, or Method 18 of 40 CFR Part 60, Appendix A, to determine compliance with the ninety-eight (98) weight-percent efficiency or the twenty (20) ppmv outlet concentration level, unless another method to demonstrate compliance is included in the collection and control system design plan approved by the Department;
  - b. The permittee shall use Method 3 or 3A, to determine the oxygen for correcting the NMOC concentration as hexane to three (3) percent;

- c. The permittee shall use Method 25A in place of Method 25 in cases where the outlet concentration is less than fifty (50) ppm NMOC as carbon (eight (8) ppm NMOC as hexane);
- d. If using Method 18 of Appendix A, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42); and
- e. The permittee shall use the following equation to calculate efficiency:

$$\text{Control Efficiency} = (\text{NMOC}_{\text{in}} - \text{NMOC}_{\text{out}}) / \text{NMOC}_{\text{in}}$$

Where,  $\text{NMOC}_{\text{in}}$  = mass of NMOC entering control device and  
 $\text{NMOC}_{\text{out}}$  = mass of NMOC exiting control device.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.754)<sup>1</sup>

3. The initial performance test report shall include the following information:
  - a. A diagram of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of any areas excluded from collection and the proposed sites for the future collection system expansion;
  - b. The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;
  - c. The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material;
  - d. The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on nonproductivity and the calculations of gas generation flow rate for each excluded area;
  - e. The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and
  - f. The provisions for the control of off-site migration.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.754, 60.757)<sup>1</sup>

4. The performance tests shall be made at the expense of the permittee and shall be conducted at the maximum expected operating capacity of the collection and control system. All performance tests may be monitored by the Department.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90, SIP §11-60-15)<sup>2</sup>

5. Unless otherwise specified in the applicable subpart, each performance test shall consist of three separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions specified in the applicable standard. For the purpose of

determining compliance with an applicable standard, the arithmetic means of results of the three (3) runs shall apply.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90 40 CFR §60.8)<sup>2</sup>

6. At least **thirty (30) calendar days prior to conducting a performance test**, the owner or operator shall submit a written performance test plan to the Department that includes date(s) of the test, test duration, test locations, test methods, source operation, location of visible emissions, and other parameters that may affect performance test results. Such a plan shall conform to U.S. EPA guidelines including quality assurance procedures. A test plan or quality assurance plan that does not have the approval of the Department may be grounds to invalidate any test and require a retest.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90, 40 CFR §60.8, SIP §11-60-15)<sup>1,2</sup>

7. Any deviations from these conditions, test methods, or procedures may be cause for rejection of the test results unless such deviations are approved by the Department before the tests.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

8. **Within sixty (60) days after completion of the performance test**, the permittee shall submit to the Department the test report which shall include the operating conditions of the landfill gas collection and control system, the summarized test results, comparative results with the permit emissions limits, and other pertinent field data, laboratory data, and support calculations.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

9. Upon written request and justification, the Department may waive the requirement for, or a portion of, a specific performance test. The waiver request is to be submitted prior to the required test and must include documentation justifying such action. Documentation should include, but is not limited to, the results of the prior performance test indicating compliance by a wide margin, documentation of continuing compliance, and further that operations of the source have not changed since the previous test.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

**CSP No. 0802-01-C**  
**Attachment II**  
**Page 27 of 27**  
**Issuance Date: September 10, 2014**  
**Expiration Date: September 9, 2019**

**Section I. Agency Notification**

Any document, including reports, required to be submitted by this Covered Source Permit shall be done in accordance with Attachment I, Standard Condition No. 28.

(Auth: HAR §11-60.1-4, §11-60.1-90)

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<sup>1</sup>The citations to the Code of Federal Regulations (CFR) identified under a particular condition, indicate that the permit condition complies with the specified provision(s) of the CFR. Due to the integration of the preconstruction and operating permit requirements, permit conditions may incorporate more stringent requirements than those set forth in the CFR.

<sup>2</sup>The citations to the State Implementation Plan (SIP) identified under a particular condition, indicate that the permit condition complies with the specified provision(s) of the SIP.

**ATTACHMENT II - INSIG  
SPECIAL CONDITIONS – INSIGNIFICANT ACTIVITIES  
COVERED SOURCE PERMIT NO. 0802-01-C**

**Issuance Date:** September 10, 2014

**Expiration Date:** September 9, 2019

In addition to the Standard Conditions of the Covered Source Permit, the following Special Conditions shall apply to the permitted facility:

**Section A. Equipment Description**

This attachment encompasses insignificant activities listed in HAR, §11-60.1-82(f) and (g) for which provisions of this permit and HAR, Subchapter 2, General Prohibitions apply.

(Auth: HAR §11-60.1-3)

**Section B. Operational Limitations**

1. The permittee shall take measures to operate applicable insignificant activities in accordance with the provisions of HAR, Subchapter 2 for visible emissions, fugitive dust, incineration, process industries, sulfur oxides from fuel combustion, storage of volatile organic compounds, volatile organic compound water separation, pump and compressor requirements, and waste gas disposal.

(Auth: HAR §11-60.1-3, §11-60.1-82, §11-60.1-90)

2. The Department may at any time require the permittee to further abate emissions if an inspection indicates poor or insufficient controls.

(Auth: HAR §11-60.1-3, §11-60.1-5, §11-60.1-82, §11-60.1-90)

**Section C. Monitoring and Recordkeeping Requirements**

1. The Department reserves the right to require monitoring, recordkeeping, or testing of any insignificant activity to determine compliance with the applicable requirements.

(Auth: HAR §11-60.1-3, §11-60.1-90)

2. All records shall be maintained for at least five (5) years from the date of any required monitoring, recordkeeping, testing, or reporting. These records shall be in a permanent form suitable for inspection and made available to the Department or their authorized representative upon request.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

**Section D. Notification and Reporting**

**Compliance Certification**

During the permit term, the permittee shall submit at least **annually** to the Department and U.S. EPA, Region 9, the attached *Compliance Certification Form* pursuant to HAR,

Subsection 11-60.1-86. The permittee shall indicate whether or not compliance is being met with each term or condition of this permit. The compliance certification shall include at a minimum the following information:

1. The identification of each term or condition of the permit that is the basis of the certification;
2. The compliance status;
3. Whether compliance was continuous or intermittent;
4. The methods used for determining the compliance status of the source currently and over the reporting period;
5. Any additional information indicating the source's compliance status with any applicable enhanced monitoring and compliance certification, including the requirements of Section 114(a)(3) of the Clean Air Act or any applicable monitoring and analysis provisions of Section 504(b) of the Clean Air Act; and
6. A brief description of any deviations including identifying as possible exceptions to compliance any periods during which compliance is required and in which the excursion or exceedances as defined in 40 CFR Part 64 occurred; and
7. Any additional information as required by the Department including information to determine compliance.

The compliance certification shall be submitted **within sixty (60) days after** the end of each calendar year, and shall be signed and dated by a responsible official or authorized representative.

Upon written request of the permittee, the deadline for submitting the compliance certification may be extended, if the Department determines that reasonable justification exists for the extension.

In lieu of addressing each emission unit as specified in Attachment V, the permittee may address insignificant activities as a single unit provided compliance is met with all applicable requirements. If compliance is not totally attained, the permittee shall identify the specific insignificant activity and provide the details associated with the noncompliance.

(Auth: HAR §11-60.1-4, §11-60.1-86, §11-60.1-90)

#### **Section E. Agency Notification**

Any document (including reports) required to be submitted by this Covered Source Permit shall be done in accordance with Attachment 1, Standard Condition No. 28.

(Auth: HAR §11-60.1-4, §11-60.1-90)

**ATTACHMENT III: ANNUAL FEE REQUIREMENTS  
COVERED SOURCE PERMIT NO. 0802-01-C**

**Issuance Date: September 10, 2014**

**Expiration Date: September 9, 2019**

The following requirements for the submittal of annual fees are established pursuant to HAR, Title 11, Chapter 60.1, Air Pollution Control. Should HAR, Chapter 60.1 be revised such that the following requirements are in conflict with the provisions of HAR, Chapter 60.1, the permittee shall comply with the provisions of HAR, Chapter 60.1.

1. Annual fees shall be paid in full:
  - a. **Within sixty (60) days after** the end of each calendar year; and
  - b. **Within thirty (30) days after** the permanent discontinuance of the covered source.
2. The annual fees shall be determined and submitted in accordance with HAR, Chapter 11-60.1, Subchapter 6.
3. The annual emissions data for which the annual fees are based shall accompany the submittal of any annual fees and be submitted on forms furnished by the Department.
4. The annual fees and the emission data shall be mailed to:

**Clean Air Branch  
Environmental Management Division  
Hawaii Department of Health  
P.O. Box 3378  
Honolulu, HI 96801-3378**

**ATTACHMENT IV: ANNUAL EMISSIONS REPORTING REQUIREMENTS  
COVERED SOURCE PERMIT NO. 0802-01-C**

**Issuance Date: September 10, 2014**

**Expiration Date: September 9, 2019**

In accordance with the HAR, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the nature and amounts of emissions.

1. Complete the attached Annual Emissions Report Form: **Municipal Solid Waste Landfills.**
2. The reporting period shall be from January 1 to December 31 of each year. All reports shall be submitted to the Department of Health **within sixty (60) days after the end of each calendar year** and shall be mailed to the following address:

**Clean Air Branch  
Environmental Management Division  
Hawaii Department of Health  
P.O. Box 3378  
Honolulu, HI 96801-3378**

3. The permittee shall retain the information submitted, including all emission calculations. These records shall be in a permanent form suitable for inspection, retained for a minimum of five (5) years, and made available to the Department of Health upon request.
4. Any information submitted to the Department of Health without a request for confidentiality shall be considered public record.
5. In accordance with HAR, Section 11-60.1-14, the permittee may request confidential treatment of specific information, including information concerning secret processes or methods of manufacture, by submitting a written request to the Department of Health and clearly identifying the specific information that is to be accorded confidential treatment.

**COMPLIANCE CERTIFICATION FORM**  
**COVERED SOURCE PERMIT NO. 0802-01-C**  
PAGE 1 OF \_\_\_\_\_

**Issuance Date:** September 10, 2014

**Expiration Date:** September 9, 2019

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the following certification at least annually, or more frequently as requested by the Department.

(Make Copies of the Compliance Certification Form for Future Use)

For Period: \_\_\_\_\_ Date: \_\_\_\_\_

Company/Facility Name: \_\_\_\_\_

Responsible Official (Print): \_\_\_\_\_

Title: \_\_\_\_\_

Responsible Official (Signature): \_\_\_\_\_

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by Department of Health as public record. I further state that I will assume responsibility for the construction, modification, or operation of the source in accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, and any permit issued thereof.

**COMPLIANCE CERTIFICATION FORM  
COVERED SOURCE PERMIT NO. 0802-01-C  
(CONTINUED, PAGE 2 OF \_\_\_)**

**Issuance Date:** September 10, 2014

**Expiration Date:** September 9, 2019

The purpose of this form is to evaluate whether or not the facility was in compliance with the permit terms and conditions during the covered period. If there were any deviations to the permit terms and conditions during the covered period, the deviation(s) shall be certified as *intermittent compliance* for the particular permit term(s) or condition(s). Deviations include failure to monitor, record, report, or collect the minimum data required by the permit to show compliance. In the absence of any deviation, the particular permit term(s) or condition(s) may be certified as *continuous compliance*.

**Instructions:**

Please certify Sections A, B, and C below for continuous or intermittent compliance. Sections A and B are to be certified as a group of permit conditions. Section C shall be certified individually for each operational and emissions limit condition as listed in the Special Conditions section of the permit (list all applicable equipment for each condition). Any deviations shall also be listed individually and described in Section D. The facility may substitute its own generated form in verbatim for Sections C and D.

**A. Attachment I, Standard Conditions**

<u>Permit term/condition</u>	<u>Equipment(s)</u>	<u>Compliance</u>
All standard conditions	All Equipment(s) listed in the permit	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent

**B. Special Conditions - Monitoring, Recordkeeping, Reporting, Testing, and INSIG**

<u>Permit term/condition</u>	<u>Equipment(s)</u>	<u>Compliance</u>
All monitoring conditions	All Equipment(s) listed in the permit	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
All recordkeeping conditions	All Equipment(s) listed in the permit	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
All reporting conditions	All Equipment(s) listed in the permit	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
All testing conditions	All Equipment(s) listed in the permit	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
All INSIG conditions	All Equipment(s) listed in the permit	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent

**COMPLIANCE CERTIFICATION FORM  
COVERED SOURCE PERMIT NO. 0802-01-C  
(CONTINUED, PAGE \_\_\_\_ OF \_\_\_\_)**

**Issuance Date:** September 10, 2014

**Expiration Date:** September 9, 2019

**C. Special Conditions - Operational and Emissions Limitations**

Each permit term/condition shall be identified in chronological order using attachment and section numbers (e.g., Attachment II, B.1, Attachment IIA, Special Condition No. B.1.f, etc.). Each equipment shall be identified using the description stated in Section A of the Special Conditions (e.g., unit no., model no., serial no., etc.). Check all methods (as required by permit) used to determine the compliance status of the respective permit term/condition.

Permit term/condition	Equipment(s)	Method	Compliance
		<input type="checkbox"/> monitoring <input type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
		<input type="checkbox"/> monitoring <input type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
		<input type="checkbox"/> monitoring <input type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
		<input type="checkbox"/> monitoring <input type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
		<input type="checkbox"/> monitoring <input type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
		<input type="checkbox"/> monitoring <input type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
		<input type="checkbox"/> monitoring <input type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent

**(Make Additional Copies if Needed)**

**COMPLIANCE CERTIFICATION FORM  
COVERED SOURCE PERMIT NO. 0802-01-C  
(CONTINUED, PAGE \_\_\_ OF \_\_\_)**

**Issuance Date: September 10, 2014**

**Expiration Date: September 9, 2019**

**D. Deviations**

<u>Permit Term/ Condition</u>	<u>Equipment(s) / Brief Summary of Deviation</u>	<u>Deviation Period time (am/pm) &amp; date (mo/day/yr)</u>	<u>Date of Written Deviation Report to DOH (mo/day/yr)</u>
		Beginning:  Ending:	

\*Identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion or exceedance as defined under 40 CFR 64 occurred.

**(Make Additional Copies if Needed)**

**MONITORING REPORT FORM  
COLLECTION AND CONTROL SYSTEM  
COVERED SOURCE PERMIT 0802-01-C  
(PAGE 1 OF 3)**

**Issuance Date:** September 10, 2014

**Expiration Date:** September 9, 2019

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the following information **semi-annually**:

(Make copies for Future Use)

For Period: \_\_\_\_\_ Date: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Facility Location: \_\_\_\_\_

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Responsible Official (Print): \_\_\_\_\_

Title: \_\_\_\_\_

Responsible Official (Signature): \_\_\_\_\_ Date: \_\_\_\_\_

1. Value and length of time for exceedance of applicable parameters. If there were no exceedances identified, then write "no exceedances" in the comment column.

Parameter	Value	Date	Start Time	End Time	Duration	Comments
Gauge pressure in gas collection header						
Nitrogen Conc.(%), or Oxygen Conc. (%)						
Temp. (EC) of landfill gas						
Surface Conc. of Methane (ppmv as hexane)						

2. Average and maximum values for the following:

Parameter	Average Value	Maximum Value	Date of Max. Value	Comments
Gauge pressure in gas collection header				
Nitrogen Conc. (%)				
Oxygen Conc. (%)				
Temp. (°C) of landfill gas				
Surface Concentrations of Methane*				

\* If annual monitoring is allowed, the average and maximum methane concentration at landfill surface during the most recent monitoring event;

**MONITORING REPORT FORM  
COLLECTION AND CONTROL SYSTEM  
COVERED SOURCE PERMIT 0802-01-C  
(PAGE 2 of 3)**

**Issuance Date:** September 10, 2014

**Expiration Date:** September 9, 2019

3. Identify the dates, times, duration, reason, and description of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow. If there were no occurrences, then write "no occurrences" in the comment column.

Description and Reason	Date	Start - End Time	Duration	Comments

4. Identify the dates, times, duration, reason, and description of all periods when the control device was not operating for a period exceeding one (1) hour and length of time the control device was not operating. If there were no occurrences, then write "no occurrences" in the comment column.

Description and Reason	Dates	Start/End Times	Duration	Comments

5. Identify all periods when the collection system was not operating in excess of five (5) days, including the dates and times that operation ceased, reason for not operating, actions taken, dates and times that operation resumed, and future operational protocol that will prevent a reoccurrence of the situation. If there were no occurrences, then write "no occurrences" in the comment column.

Reason, Actions Taken	Start/End Dates	Start/End Times	Duration	Future Protocol, Comments

6. Identify the location of each exceedance of the 500 ppm surface methane concentration and the concentration at each location for which an exceedance was recorded in the previous month. Also identify the dates of sampling, sampler's name, and actions taken to address the exceedance. If there were no exceedances, then write "no occurrences" in the table.

Sampling Date	Location	Conc. (ppm)	Previous Conc. (ppm)	Actions Taken	Sampler's Name



**ANNUAL EMISSIONS REPORT FORM  
MUNICIPAL SOLID WASTE LANDFILLS  
COVERED SOURCE PERMIT 0802-01-C**

**Issuance Date:** September 10, 2014

**Expiration Date:** September 9, 2019

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the nature and amounts of emissions, annually.

(Make copies for Future Use)

For Period: \_\_\_\_\_ Date: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Facility Location: \_\_\_\_\_

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Responsible Official (Print): \_\_\_\_\_

Title: \_\_\_\_\_

Responsible Official (Signature) \_\_\_\_\_ Date: \_\_\_\_\_

**1. Landfill Emissions**

Landfill type (circle one):      Area              Trench              Ramp

Average annual refuse acceptance rate during active life (Mg/yr): \_\_\_\_\_

Parameter	Site-Specific Value, if available	Calculation Method
Methane generation potential, $L_0$ ( $m^3 CH_4/Mg$ refuse)		
Methane generation rate constant, $k$ ( $yr^{-1}$ )		
Concentration of $CH_4$ in landfill gas (ppmv)		
Concentration of $CO_2$ in landfill gas (ppmv)		
Concentration of $N_2$ in landfill gas (ppmv)		
Concentration of $O_2$ in landfill gas (ppmv)		
Temperature of landfill gas ( $^{\circ}C$ )		

**Note:**

If the permittee intends to use the site-specific values to compute annual emissions from the municipal solid waste landfill, all data, background information, and calculations shall be provided with the submittal of this form. If the requested information is not provided, default values will be assumed.

**2. For MSW Landfills with a Collection and Control System:**

Indicate the control efficiency of the collection and control system: \_\_\_\_\_

$$\text{Control Efficiency} = (NMOC_{in} - NMOC_{out})/NMOC_{in}$$

Where,  $NMOC_{in}$  = mass of NMOC entering control device and

$NMOC_{out}$  = mass of NMOC exiting control device.

**SUPPLEMENTAL REPORT FORM  
MODIFICATION/RECONSTRUCTION OF MSW LANDFILL  
COVERED SOURCE PERMIT NO. 0802-01-C**

**Issuance Date:** September 10, 2014

**Expiration Date:** September 9, 2019

*This form fulfills the requirements of the Amended Design Capacity Report.*

(Make copies for Future Use)

For Period: \_\_\_\_\_ Date: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Facility Location: \_\_\_\_\_

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

I certify that no air pollution equipment will be added to the facility and operational methods will remain similar as permitted under this Covered Source Permit.

I certify to comply with each applicable requirement of this Covered Source Permit.

Responsible Official (Print): \_\_\_\_\_

Title: \_\_\_\_\_

Responsible Official (Signature): \_\_\_\_\_ Date: \_\_\_\_\_

1. Current design capacity of the landfill ( $m^3$  and Mg) \_\_\_\_\_

2. Current site-specific density ( $Mg/m^3$ ): \_\_\_\_\_

3. Description of the reconstruction or modification: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Current lateral dimensions of the landfill (meters): \_\_\_\_\_

Proposed lateral dimensions of the landfill (meters): \_\_\_\_\_

Current vertical limit of the landfill (meters): \_\_\_\_\_

Proposed vertical limit of the landfill (meters): \_\_\_\_\_

5. Projected date of construction commencement: \_\_\_\_\_

6. Projected waste acceptance rate ( $Mg/yr$ ): \_\_\_\_\_

7. Include a site map of the landfill containing the following information:

a) Location of the landfill and area of proposed modification or reconstruction;

b) Current lateral boundaries of the existing landfill;

c) Proposed lateral boundaries of the expansion; and

d) Current and proposed vertical dimensions of the landfill.

**SUPPLEMENTAL REPORT FORM  
NOTIFICATION OF LANDFILL CLOSURE  
COVERED SOURCE PERMIT NO. 0802-01-C**

Issuance Date: September 10, 2014

Expiration Date: September 9, 2019

For Period: \_\_\_\_\_ Date: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Facility Location: \_\_\_\_\_

**I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.**

**I certify that the landfill closure is intended to be permanent.**

Responsible Official (Print): \_\_\_\_\_

Title: \_\_\_\_\_

Responsible Official (Signature): \_\_\_\_\_ Date: \_\_\_\_\_

Last day of waste acceptance (month, day, year): \_\_\_\_\_

Date of landfill closure (month, day, year): \_\_\_\_\_

Final design capacity of landfill (Mg or m<sup>3</sup>): \_\_\_\_\_

Final quantity of refuse-in-place (Mg **and** m<sup>3</sup>): \_\_\_\_\_

Anticipated additional capacity, if any (Mg or m<sup>3</sup>): \_\_\_\_\_

**SUPPLEMENTAL REPORT FORM  
ANNUAL REPORT  
COVERED SOURCE PERMIT NO. 0802-01-C  
(PAGE 1 OF 2)**

**Issuance Date:** September 10, 2014

**Expiration Date:** September 9, 2019

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report the following to the Department of Health.

This report shall be submitted to the Department of Health *within 180 days of installation and start-up* of the collection and control system. Attach additional sheets if necessary. The initial performance test report shall also be included with this submittal.

Facility Name: \_\_\_\_\_ Date: \_\_\_\_\_

Facility Location: \_\_\_\_\_

**I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.**

Responsible Official (Print): \_\_\_\_\_

Title: \_\_\_\_\_

Responsible Official (Signature): \_\_\_\_\_ Date: \_\_\_\_\_

Start-up date of collection and control system: \_\_\_\_\_

1. Value and length of time for exceedance of applicable parameters. If there were no exceedances identified, then write "no exceedances" in the comment column.

Parameter	Value	Date	Start Time	End Time	Duration	Comments
Gauge pressure in gas collection header						
Nitrogen Concentration or						
Oxygen Concentration						
Temperature of landfill gas						
Surface Concentrations of Methane						

2. Identify the dates, times, duration, reason, and description of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow. If there were no occurrences, then write "no occurrences" in the comment column.

Description and Reason	Date	Start - End Time	Duration	Comments

**SUPPLEMENTAL REPORT FORM  
ANNUAL REPORT  
COVERED SOURCE PERMIT NO. 0802-01-C  
(PAGE 2 OF 2)**

**Issuance Date:** September 10, 2014

**Expiration Date:** September 9, 2019

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report the following to the Department of Health.

3. Identify the dates, times, duration, reason, and description of all periods when the control device was not operating for a period exceeding one (1) hour and length of time the control device was not operating. If there were no occurrences, then write "no occurrences" in the comment column.

Description and Reason	Dates	Start/End Times	Duration	Comments

4. Identify all periods when the collection system was not operating in excess of five (5) days, including the dates and times that operation ceased, reason for not operating, actions taken, dates and times that operation resumed, and future operational protocol that will prevent a reoccurrence of the situation. If there were no occurrences, then write "no occurrences" in the comment column.

Reason, Actions Taken	Start/End Dates	Start/End Times	Duration	Future Protocol, Comments

5. Identify the location of each exceedance of the 500 ppm surface methane concentration and the concentration at each location for which an exceedance was recorded in the previous month. Also identify the dates of sampling, sampler's name, and actions taken to address the exceedance. If there were no exceedances, then write "no occurrences" in the table.

Sampling Date	Location	Conc. (ppm)	Previous Conc. (ppm)	Actions Taken	Sampler's Name

6. Identify the date of installation and the location of each well or collection system expansion added. If no additions were made, then write "no additions" in the table.

Installation Date	Description of Addition	Location

**SUPPLEMENTAL REPORT FORM  
NOTIFICATION OF COLLECTION AND CONTROL EQUIPMENT REMOVAL  
COVERED SOURCE PERMIT NO. 0802-01-C**

Issuance Date: September 10, 2014

Expiration Date: September 9, 2019

For Period: \_\_\_\_\_ Date: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Facility Location: \_\_\_\_\_

**I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.**

**I certify that the landfill closure is intended to be permanent.**

Responsible Official (Print): \_\_\_\_\_

Title: \_\_\_\_\_

Responsible Official (Signature): \_\_\_\_\_ Date: \_\_\_\_\_

Last day of waste acceptance (month, day, year): \_\_\_\_\_

Date of landfill closure (month, day, year): \_\_\_\_\_

Final design capacity of landfill (Mg or m<sup>3</sup>): \_\_\_\_\_

Date of closure report (month, day, year), including a copy of the closure report: \_\_\_\_\_

Has the collection and control system been in operation for a minimum of fifteen (15) years (based on the date of the most recent addition to the system?)                      Yes    No

Include dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing fifty (50) megagrams or greater of NMOC per year. (Use equations for landfills without a collection and control system to make this determination.)



**VISIBLE EMISSIONS FORM REQUIREMENTS  
STATE OF HAWAII  
COVERED SOURCE PERMIT NO. 0802-01-C**

**Issuance Date: September 10, 2014**

**Expiration Date: September 9, 2019**

The following Visible Emissions (VE) Form shall be completed **monthly** (*each calendar month*) for each equipment subject to opacity limits in accordance with Method 9. At least **annually** (*calendar year*), VE observations shall be conducted for each equipment subject to opacity limits by a certified reader in accordance with Method 9. The VE Form shall be completed as follows:

1. Visible emissions observations shall take place during the day only. The opacity shall be noted in five (5) percent increments (i.e., 25%).
2. Orient the sun within a 140 degree sector to your back. Provide a source layout sketch on the VE Form using the symbols as shown.
3. Stand at least three (3) stack heights, but not more than a quarter mile from the stack.
4. Two (2) observations shall be taken at fifteen (15) second intervals for six (6) consecutive minutes for each equipment.
5. The six (6) minute average opacity reading shall be calculated for each observation.
6. If possible, the observations shall be performed as follows:
  - a. Read from where the line of sight is at right angles to the wind direction.
  - b. The line of sight shall not include more than one (1) plume at a time.
  - c. Read at the point in the plume with the greatest opacity (without condensed water vapor), ideally while the plume is no wider than the stack diameter.
  - d. Read the plume at fifteen (15) second intervals only. Do not read continuously.
  - e. The equipment shall be operating at maximum permitted capacity.
7. If the equipment was shut-down for that period, briefly explain the reason for shut-down in the comment column.

The permittee shall retain the completed VE Forms for recordkeeping. These records shall be in a permanent form suitable for inspection, retained for a minimum of five (5) years, and made available to the Department of Health, or their representative upon request.

**VISIBLE EMISSIONS FORM  
STATE OF HAWAII  
COVERED SOURCE PERMIT NO. 0802-01-C**

**Issuance Date:** September 10, 2014

**Expiration Date:** September 9, 2019

(Make Copies for Future Use For Each Equipment)

**Permit No.:** 0802-01-C

**Company Name:** \_\_\_\_\_

**Equipment and Fuel:** \_\_\_\_\_

**Site Conditions:**

Stack height above ground (ft): \_\_\_\_\_

Stack distance from observer (ft): \_\_\_\_\_

Emission color (black or white): \_\_\_\_\_

Sky conditions (% cloud cover): \_\_\_\_\_

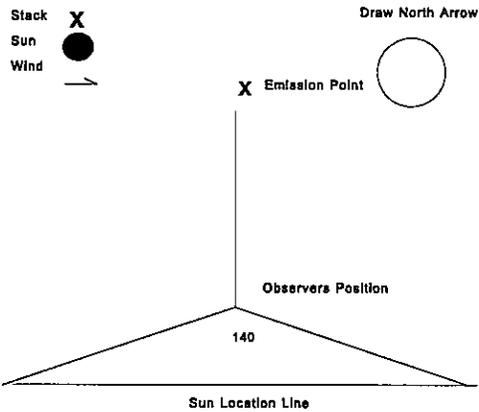
Wind speed (mph): \_\_\_\_\_

Temperature (EF): \_\_\_\_\_

Observer Name: \_\_\_\_\_

Certified? (Yes/No): \_\_\_\_\_

Observation Date and Start Time: \_\_\_\_\_



SECONDS	0	15	30	45	COMMENTS
MINUTES					
1					
2					
3					
4					
5					
6					
Six (6) Minute Average Opacity Reading (%):					

Observation Date and Start Time: \_\_\_\_\_

SECONDS	0	15	30	45	COMMENTS
MINUTES					
1					
2					
3					
4					
5					
6					
Six (6) Minute Average Opacity Reading (%):					

