

MICHAEL P. VICTORINO  
Mayor

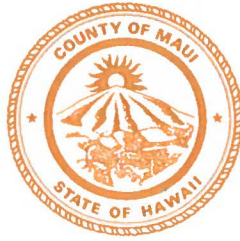
ERIC A. NAKAGAWA, P.E.  
Director

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Wastewater Reclamation Division

TAMARA L. FARNSWORTH  
Environmental Protection &  
Sustainability Division



**COUNTY OF MAUI  
DEPARTMENT OF  
ENVIRONMENTAL MANAGEMENT**  
2050 MAIN STREET, SUITE 2B  
WAILUKU, MAUI, HAWAII 96793

February 26, 2020

Ms. Lene Ichinotsubo, Acting Chief  
Solid and Hazardous Waste Branch  
State of Hawaii Department of Health  
2827 Waimano Home Road  
Pearl City, Hawaii 96782

Dear Ms. Ichinotsubo:

**SUBJECT: CENTRAL MAUI LANDFILL (PERMIT NO. LF-0074-13)  
PHASE III APPLICATION - CLARIFICATIONS**

The County of Maui (County) submits herewith its response to clarification requests received via email on January 22, 2020 from the State Department of Health, Solid and Hazardous Waste Branch regarding the Central Maui Landfill Phase III Solid Waste Facility Permit Application.

Should you have any questions, please contact Sage Kiyonaga, Solid Waste Division Engineer, at (808) 270-7941.

Sincerely,

ERIC A. NAKAGAWA, Director  
Department of Environmental Management

attachment

## A-Mehr Inc.

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### Professional Engineers and Scientists Specializing in Landfills

23016 Mill Creek Drive  
Laguna Hills, CA 92653

Phone (949) 206-0157  
Fax (949) 206-9157

February 12, 2020

Mr. Sage Kiyonaga, P.E.  
Department of Environmental Management  
Solid Waste Division  
County of Maui  
2200 Main Street, Suite 225  
Wailuku, Hawaii 96793

**SUBJECT:** RESPONSE TO COMMENTS, PHASE III SWFP APPLICATION, CENTRAL MAUI LANDFILL (CML)  
SOLID WASTE MANAGEMENT PERMIT LF-0074-13

Dear Mr. Kiyonaga:

A-Mehr, Inc., at the request of the County of Maui, has reviewed comments received via emails on January 22, 2020 and February 1, 2020 from Mr. Glenn Haae of the Department of Health (DOH), Solid Waste Section. The comments pertained to the Phase III SWFP Application and were a compilation of comments from DOH and their consultant Tetra Tech.

This letter and attachments are submitted in response to these comments. The itemized responses 1 through 23 reflect and follow the order of the comments as they were received in the January 22, 2020 DOH email.

Response number 24 addresses the comment received in the February 1, 2020 DOH email.

1. 18-inch to 2 feet cover soil above scrim (rain cap) – need details (sections?)

**Response:**

*As noted in the Design Report (Section 4.2, page 6, third paragraph), we have proposed a 2-foot thick lateral drainage layer/protective soil layer consisting of crushed rock over the existing Phase II final cover. The 2-foot thick layer will function as an LCRS drainage layer and will be protected by the rain cap. The rain cap will not be removed (Design Report, Section 7, page 12, first paragraph) and will be protected through placement of a select waste layer over the rain cap.*

*Protective soil cover is proposed on the Phase III composite lined slopes as illustrated in Design Report, Appendix A, Sheet 8, Detail 1 and addressed in the Design Report, Section 4.1.1, page 5. Protective soil specification and placement are addressed in Section 2250, Parts I and III of the Project Specifications (Design Report, Appendix B).*

2. Need detail for terminations on outside slope to prevent leachate seeps.

Response:

*The project design will prevent conditions that would result in leachate seeps on the outside slopes of the Phase II improvements. The Phase II area slopes to the Phase III lined area and the limits of the Phase II slope improvements follow the underlying Phase II slope and pitch inwards towards the Phase III lined area.*

*Leachate seeps are typically associated with precipitation and are prevented through operational controls of maintaining positive drainage off the landfill (except the active disposal area which are graded and bermed to prevent discharge of impacted stormwater), diverting stormwater runoff away from and/or around the active disposal area, and application and maintenance of daily and intermediate cover to prevent infiltration of stormwater. These practices are addressed in the Operations Plan, Section 7 and Section 10.*

3. Minimum 12-in. thick leachate collection granular drainage layer, with hydraulic conductivity of >1.0 cm/s, with perforated pipe along low points to collect/convey liquids to leachate sump. Crushing calculations will need to be provided for the LCRS pipe.

Response:

*The HELP model analysis for the CML, provided in Attachment A, indicates peak leachate head levels on the liner will be less than 1 inch. The LCRS trench where we have specified a LCRS pipe is designed at slopes of 1.3% and the LCRS gravel alone is sufficient to convey the design leachate quantities to the LCRS sump. The Phase III floor liner is designed with a minimum slope of 2% and is consistent with the minimum State and Federal requirements. Hydraulic conductivity of the typical drainage rock used for LCRS drainage media is approximately 5 to 8 cm/s (five to eight times better than 1 cm/sec required in the project specification), and with specified hydraulic conductivity of 1 cm/sec the LCRS design for this project meets the prescriptive standard with no LCRS pipe. The combination of low leachate volumes, the sloped floor and trench, and the drainage media hydraulic conductivity, the LCRS pipe is a redundant LCRS component and is provided to facilitate the leachate removal flow during operation. The pipe is 8-inch diameter SDR 11HDPE pipe that will be protected in the LCRS trench by 1-foot of drainage rock and 2-feet of protective soil over the pipe in the LCRS trench as shown in Detail 3, Sheet 9, Appendix A, Design Report. This pipe under the design loads is not subject to collapse and will carry the maximum design load conditions. The maximum design load for this pipe is 80 psi. The crushing load for a typical 8-inch diameter SDR 11 HDPE pipe is approximately 300 psi. The pipe can carry approximately 3.74 times the design load.*

4. Minimum 24-inch thick protective (operations) soil layer. A gradation and permeability specification are required for this material. In addition, a specification should be provided for placement and material type supported by puncture and leachate calculations.

Response:

*There are no regulatory requirements for this in the State or Federal regulations. However, the project specification is based on the soils that are typically imported to the landfill for daily cover use. The specification and placement of material are addressed in Section 2250, Parts I and III of the project specifications. In addition to the use of protective soil to protect the liner and LCRS, the initial 5-foot*

*layer of refuse placed is select waste which is inspected to prevent placement of large or rigid objects within 5 feet of the protective cover layer (Operations Plan, Section 10.1.6, page 10-8).*

*The HELP model analysis for the CML indicates peak leachate head levels on the liner will be less than 1 inch; substantially less than the regulatory limit of 12 inches.*

5. Liner subgrade on the Phase III floor is designed with minimum of 2% slope toward the central leachate collection trench, graded with minimum 1% slope toward the leachate collection sump. USEPA recommends that something greater than 0.5% be specified. It is very difficult to construct and maintain a 1% flowline slope although not totally uncommon. The main driver for the slope is the peak mounded leachate for which there appears to be no calculations to support the design on the base liner LCRS. These calculations should account for long term creep, clogging and potential construction irregularities. We would also recommend that construction CQA tolerances be very closely monitored and that a post construction monitoring, and potential cleaning system be proposed in case of sediment clogging.

*Response:*

*The liner system and LCRS over the floor area is designed with a minimum slope of 2% and the LCRS trench is designed with a minimum slope of 1.3%. The floor and trench slopes exceed the USEPA recommendation and the minimum project requirements.*

*The HELP model analysis for the CML (Attachment A) indicates peak leachate head levels on the liner will be less than 1 inch; substantially less than the regulatory limit of 12 inches.*

*The project meets the prescriptive standard. The construction specification and standards including the tolerances are addressed in Section 2225, Part III of the Project Specifications (Design Report, Appendix B).*

6. The Phase III/II over-liner is considered a new unit. Will the over-liner meet a point of compliance design criteria?

*Response:*

*Section 4.2.1.2 of the Design Report discusses the contaminant fate and transport modeling conducted to demonstrate the Phase II slope improvements in combination with the underlying site specific geologic and hydrogeologic conditions analysis will provide protection of the underlying groundwater resources and meet the point of compliance criteria. The results of this evaluation indicate the Phase II slope improvements provide protections to the underlying groundwater in a manner that is equivalent to or exceeds that of an impermeable liner as defined in HAR 11-58.1-3.*

7. Will the rain cap be left in place prior to the operations layer placement over the lateral drainage layer?

*Response:*

*Yes, the rain cap on the Phase II slope will be left in place (Design Report, Section 7, page 12, first paragraph).*

8. Rain cap on Phase II interface and Phase III liner. Cannot tell from Design Report or text if the rain cap is to be removed as operations proceed. Please clarify. If the rain cap is to be left in place, please ensure that this is incorporated into the slope stability analysis.

Response:

*The rain cap is proposed over the 2-foot lateral drainage layer/protective soil layer to be placed over the Phase II final cover to protect the crushed rock layer from rain and soil intrusion during operation. The rain cap will not be removed (Design Report, Section 7, page 12, first paragraph).*

*A rain cap that may be placed on the slopes of the Phase III liner is an optional operational feature to reduce the leachate generation the lined slopes are covered with refuse fill. Such a rain cap, if installed, will be removed incrementally by landfill operation as refuse fill progresses.*

9. Has the operations layer and over-liner been evaluated for leachate mounding of liner stability?

Response:

*Yes. The analysis included in the project submittal provides leachate head predictions for the Phase II slope (Design Report, Appendix C HELP Model Analysis) and is less than 1 inch which is less than the regulatory limit of 12 inches. The Phase II slope will be constructed with a 2-foot thick lateral drainage layer which connects to the 1-foot thick LCRS drainage layer over the Phase III liner and in combination will eliminate potential leachate mounding on the floor (Detail 4, Sheet 9, Appendix A, Design Report).*

10. Will potential future sub-surface elevation events or the existing waste subsidence under the over-liner be affect stability of leachate collection?

Response:

*Based on the results of the analysis presented in the submittal (Design Report, Appendix C HELP Model Analysis), the leachate head expected over the Phase II final cover is indicated to be less than 1 inch, which is significantly less than the regulatory limit of 12 inches.*

*The proposed 2-foot thick lateral drainage layer placed over the Phase II final cover is an inherently stable design component and is more than sufficient for any unexpected subsidence conditions. Settlement of the underlying Phase II slope is discussed in Section 6 of the Design Report. Monitoring the Phase II slope since closure in 2007 has documented uniform settlement and no instances of differential settlement. The Phase II slope is expected to continue to settle in a relatively uniform manner as Phase III is filled. Settlement of the slope will modestly flatten the slope and enhance overall stability of the slope. The low permeability compacted soil layer component of the Phase II final cover will be compressed under the additional load and its permeability further reduced. The 2-foot thick lateral drainage layer placed over the Phase II slope provides a sizable zone of high permeability material that can accommodate settlement and continue to effectively convey leachate down slope to the Phase III LCRS system.*

11. The construction plans provide no detail(s) on the extraction system design. The design report mentions an automatic pumping and control system. The vertical LCRS outfall/collection point is over a lined area. The operations plan, as already mentioned, provides that the leachate will be recirculated into the waste. The plans and/or Design Report should indicate if dual containment is

proposed as a good practice measure. In particular, if the tanks are not located over the lined areas of the landfill secondary containment should be considered.

Response:

*The LCRS sump is designed to hold the expected leachate generation volumes. The leachate pumping and control system will be consistent in design and operation as that currently implemented at CML. CML has utilized double-walled pipe for leachate conveyance outside the limits of the lined landfill footprint and all leachate storage tanks are located within a secondary containment. No new LCRS tanks are proposed for this project. As discussed in the Operations Plan (Section 8, page 8-1) leachate recirculation is proposed for all areas of the landfill that are constructed to prescriptive standards consistent with the State and Federal regulations. Consistent with this statement, leachate recirculation will be conducted in the portions of the Phase III are constructed with a prescriptive liner.*

12. It is unclear whether leachate will be recirculated in the Phase III area. Leachate may only be reintroduced [per HAR 11-58.1-15(i)(1)(B)] where there is a composite liner and leachate collection system. Please indicate whether leachate will be reintroduced in the Phase III area, and if so, provide detailed procedures that will ensure that leachate is not reintroduced in the alternative liner (Phase II slope) area.

Response:

*Leachate recirculation is proposed for only the portions of the Phase III area equipped with liner constructed to prescriptive standards consistent with the State and Federal regulations (Operations Plan, Section 8, page 8-1).*

13. Are there plans to connect Phase II horizontal landfill gas collection system into the vertical system on the Phase II slope interface?

Response:

*Yes. The proposed horizontal gas extraction system components are described and shown on the project submittals. As refuse fill progresses in Phase III, these horizontal collectors will be connected to the existing CML landfill gas collection system in a method consistent with that used for the horizontal gas collectors located in the active areas of Phase IV and Phase V.*

14. Please verify that a suitable low permeable soil is anticipated to be available to match the modeled soil profile in the alternative final cover analysis.

Response:

*Yes. CML landfill cells have been constructed with prescriptive composite liners since 2007 using a local low permeability soil source approved by DOH and we anticipate that sufficient materials will be available for construction of this project.*

15. 58.1-04, #2 – Clean Air: Covered Source Permit 0652-01-C, not noted in submittals.

Response:

*The subject permit is provided in Attachment B.*

16. 58.1-15, #4 – Explosive Gases Control: On Figure 7 of the Operations Plan landfill gas migration monitoring probe GP-8 will be between two refuse cells once Phase III is constructed. Suggest abandoning upon construction of Phase III.

Response:

*Comment noted. Three existing perimeter gas monitoring probes (GP-1, GP-2, and GP-10) will be impacted by construction of the Phase III area. These probes will be relocated to the perimeter of the Phase III area, as shown, on Figure 7, and the existing probes related to Phase III project will be abandoned.*

17. 58.1-16, #3 – GW Monitoring System: the latest GW Sampling and Analysis Plan by CH2M dated 2018 is mentioned in the Operations Plan (Section 15.4) but is not included as an Appendix.

Response:

*Attachment C contains a cover page for a new Operations Plan Appendix N for the Groundwater and Leachate Monitoring Plan by CH2M with an updated table of contents for the Operations Plan reflecting this new appendix. Due to the size of the document, we include only a reference/cover sheet of the latest version of the plan in the new appendix. We will provide a full copy of the plan under separate cover.*

18. 58.1-18, #6 – Financial Assurance for Corrective Action (CA): no discussion of CA financial assurance in any of the submittals.

Response:

*CML is a publicly owned County landfill and financial assurance documentation is submitted annually. Attachment D contains the most recent financial assurance documentation.*

19. Please clarify how the estimated peak ground acceleration of 0.36g was obtained for the design earthquake (i.e., an earthquake with a 2,475-year return period or 2% probability of exceedance in 50 years). The report referred to Figure 1 for the estimated design PGA. However, it appears Figure 1 shows the grading plan for the landfill. Note, the reviewer estimated the design PGA using the USGS Unified Hazard Tool, and the adopted PGA of 0.36g is acceptable.

Response:

*Attachment E includes Figure 1A, along with a modified page 1 of the slope stability report, with the revised reference to this figure (from Figure 1 to Figure 1A) which was used to estimate the PGA for the project location.*

20. For slope stability evaluation, the Consultant used the Modified Bishop and Modified Janbu methods incorporated in the computer software program STABL5M. These methods are acceptable, but the Spencer's method is preferred since it considers both the moment and force equilibrium. The reviewer checked the slope stability results for the Cross-Section III-S4 using the Spencer's method with the computer program SLOPE/W. It is noted that this analysis yielded similar results to the reported Factor of Safety values.

Response:

*We prefer to be conservative during the design stage.*

21. The Consultant used a seismic coefficient of 0.18g, which is 50 percent of the design PGA, in accordance with the recommendations presented in EPA (1995). The current standard of practice for seismic slope stability evaluation is to estimate the seismic coefficient based on the seismic deformation design criteria (typically 6 to 12 inches for the landfill liner system) using the procedures outlined by Bray and Travararou (2011).

Response:

*Based on our slope stability analysis the project will be stable during the design seismic event. Further, based on the EPA approved analyses procedures no seismic deformation is expected for this project, and therefore, the seismic deformation analysis procedures are not applicable for the project.*

22. A friction angle of 18 degrees was assigned to the base liner, which is conservative. Per the database by Koerner (2005), a peak shear strength with a friction angle of up to 25 degrees may be considered for the critical base liner interface between low permeability soil layer and 80 mil textured HDPE geomembrane.

Response:

*During the design stage, we prefer to be more conservative with our analysis and use lower shear strength values.*

23. Please clarify the groundwater conditions in the report text or in the computer output sheets in Appendix A. In the output sheets, the piezometer surface is designated as "W1". However, the surface "W1" was not presented in the cross-sections.

Response:

*Groundwater below the landfill is more than 200 feet below the liner grades and in the hard bedrock. The output file default print out includes this generic information.*

24. Provide a drawing with the existing gas probes overlapped with the proposed limits of waste for the Phase III area (please be sure to include the Phase III area over the Phase II slope).

Response:

*Attachment F includes Figure 3 of the project design drawings (Design Report, Appendix A), which illustrates the existing conditions of the project area, including the existing landfill gas monitoring probes in the vicinity of the project, has been modified to include the Phase III limits of waste as requested.*

Should you have any questions, please contact me at 949-206-0157.

Sincerely,



A-Mehr, Inc.  
M. Ali Mehrzarin, P.E.  
Principal Engineer



***Attachment A***

## Tuter, Patrick

---

**From:** Sage Kiyonaga <Sage.Kiyonaga@co.maui.hi.us>  
**Sent:** Tuesday, August 01, 2017 2:03 PM  
**To:** Tuter, Patrick  
**Cc:** ali@amehr.com; Michael Kehano; Virgilio Viernes  
**Subject:** Re: CMLF Help Model  
**Attachments:** CML V-B EXT HELP.pdf  
  
**Categories:** Permit Questions

Hi Patrick,

Per your request, attached is the HELP Model for CML. Please note that this is a conservative model reflecting greater than actual precipitation received (at CML) on a new cell with 5 feet of waste. The Model shows a maximum head of 0.5 inches above the liner.

Should you have any questions or comments, please feel free to call or email me.

Thanks,  
Sage

>>> "Tuter, Patrick" <patrick.tuter@doh.hawaii.gov> 7/13/2017 2:54 PM >>>  
Sage,

Just to follow up on our earlier discussion on the phone – it looks like the HELP model output should adequately demonstrate the maximum leachate head levels on the HDPE liner. I have attached an example output from the help model from Kekaha. The red underlined text on the last page is the max leachate head on the liner that is calculated by the model. As long as that is below 1ft/30cm requirement then we should be good.

Thanks,

**Patrick Tuter**  
*Environmental Engineer*

**Hawaii Department of Health**  
Solid Waste Branch  
919 Ala Moana Boulevard, Rm 212  
Honolulu, HI 96814  
(808) 586 4226  
[Patrick.tuter@doh.hawaii.gov](mailto:Patrick.tuter@doh.hawaii.gov)

# ***HELP Model- 5 ft. of Waste in 5-Acre Cell***

## ***Central Maui Landfill***

***Model : HELP***

*An US EPA model for predicting landfill hydrologic processes and testing of effectiveness of landfill designs*

***Author : A-Mehr Inc.***

***Client : County of Maui***

***Location : Kahului, HI***

***7/20/2017***

# 1. Profile. EPA profile1

## Model Settings

[HELP] Case Settings

Parameter	Value	Units
Runoff Method	User modified	(-)
Initial Moisture Settings	User specified	(-)

[HELP] Surface Water Settings

Parameter	Value	Units
Runoff Area	75	(%%)
Initial Surface Water	0	(ft)
Runoff Curve Number	75	(-)

## Profile Structure

Layer	Top ( ft)	Bottom ( ft)	Thickness ( ft)
Loam	11.0033	10.0033	1.0000
Municipal Waste (312 kg/cub.m)	10.0033	5.0033	5.0000
Loamy Sand 1	5.0033	3.0033	2.0000
Gravel (30.5cm)	3.0033	2.0033	1.0000
High Density Polyethylene	2.0033	2.0000	0.0033
Clay	2.0000	0.0000	2.0000

### 1.1. Layer. Loam

Top Slope Length: 200.0000  
 Bottom Slope Length: 98.4252  
 Top Slope: 4.0000  
 Bottom Slope : 30.0000

[HELP] Vertical Perc. Layer Parameters

Parameter	Value	Units
total porosity	0.463	(vol/vol)
field capacity	0.232	(vol/vol)
wilting point	0.116	(vol/vol)
sat.hydr.conductivity	3.7E-4	(cm/sec)
subsurface inflow	0	(mm/year)
Initial moisture content	0.13	(vol/vol)

### 1.2. Layer. Municipal Waste (312 kg/cub.m)

Top Slope Length: 98.4252  
 Bottom Slope Length: 98.4252  
 Top Slope: 30.0000  
 Bottom Slope : 30.0000

[HELP] Vertical Perc. Layer Parameters

Parameter	Value	Units
total porosity	0.6710	(vol/vol)
field capacity	0.2920	(vol/vol)
wilting point	0.0770	(vol/vol)
sat.hydr.conductivity	0.001	(cm/sec)
subsurface inflow	0.0000	(mm/year)
Initial moisture content	0.09	(vol/vol)

### 1.3. Layer. Loamy Sand 1

Top Slope Length: 200.0000  
 Bottom Slope Length: 98.4252  
 Top Slope: 2.0000  
 Bottom Slope : 2.0000

[HELP] Vertical Perc. Layer Parameters

Parameter	Value	Units
total porosity	0.437	(vol/vol)
field capacity	0.105	(vol/vol)
wilting point	0.047	(vol/vol)
sat.hydr.conductivity	0.0017	(cm/sec)
subsurface inflow	0	(mm/year)
Initial moisture content	0.06	(vol/vol)

### 1.4. Layer. Gravel (30.5cm)

Top Slope Length: 98.4252  
 Bottom Slope Length: 98.4252  
 Top Slope: 2.0000  
 Bottom Slope : 2.0000

[HELP] Lateral Drainage Layer Parameters

Parameter	Value	Units
total porosity	0.397	(vol/vol)
field capacity	0.032	(vol/vol)
wilting point	0.013	(vol/vol)
sat.hydr.conductivity	0.3	(cm/sec)
subsurface inflow	0.0000	(cm/day)
Initial moisture content	0.0100	(vol/vol)

### 1.5. Layer. High Density Polyethylene

Top Slope Length: 98.4252  
 Bottom Slope Length: 98.4252  
 Top Slope: 2.0000  
 Bottom Slope : 2.0000

[HELP] Geomembrane Liner Parameters

Parameter	Value	Units
sat.hydr.conductivity	2E-13	(cm/sec)
pinhole density	2	(#/ha)
installation defects	1	(#/ha)
placement quality	3	(-)
geotextile transmissivity	0	(cm <sup>2</sup> /sec)

### 1.6. Layer. Clay

Top Slope Length: 98.4252  
 Bottom Slope Length: 98.4252  
 Top Slope: 2.0000  
 Bottom Slope : 2.0000

[HELP] Barrier Soil Liner Parameters

Parameter	Value	Units
total porosity	0.75	(vol/vol)
field capacity	0.747	(vol/vol)
wilting point	0.4	(vol/vol)
sat.hydr.conductivity	1E-7	(cm/sec)
subsurface inflow	0	(mm/year)

## 2. Annual Totals volume (ft3)

	Year-1	Year-2	Year-3	Year-4	Year-5	Total
Precipitation (ft3)	5.19E+05	7.19E+05	7.02E+05	5.72E+05	7.49E+05	3.26E+06
Runoff (ft3)	0.00E+00	3.64E+03	8.92E+03	6.80E+01	5.20E+02	1.31E+04
Evapotranspiration (ft3)	4.64E+05	6.20E+05	5.26E+05	5.44E+05	6.70E+05	2.82E+06
Change in water storage (ft3)	5.50E+04	9.59E+04	1.21E+05	6.84E+03	2.68E+04	3.05E+05
Water budget balance (ft3)	-8.00E-03	-1.10E-02	-1.10E-02	-9.00E-03	-1.10E-02	-5.00E-02
Soil water (ft3)	5.36E+05	6.32E+05	7.53E+05	7.60E+05	7.86E+05	3.47E+06
Lateral drainage collected from Layer 4 (ft3)	0.00E+00	0.00E+00	4.66E+04	2.09E+04	5.21E+04	1.20E+05
Percolation or leakance through Layer 6 (ft3)	0.00E+00	0.00E+00	1.11E-01	9.40E-02	1.59E-01	3.64E-01

## 3. Accumulated volume (ft3)

	Year-1	Year-2	Year-3	Year-4	Year-5
Precipitation (ft3)	5.19E+05	1.24E+06	1.94E+06	2.51E+06	3.26E+06
Runoff (ft3)	0.00E+00	3.64E+03	1.26E+04	1.26E+04	1.31E+04
Evapotranspiration (ft3)	4.64E+05	1.08E+06	1.61E+06	2.15E+06	2.82E+06
Lateral drainage collected from Layer 4 (ft3)	0.00E+00	0.00E+00	4.66E+04	6.75E+04	1.20E+05
Percolation or leakance through Layer 6 (ft3)	0.00E+00	0.00E+00	0.00E+00	9.40E-02	2.53E-01

## 4. Peak daily values

	Rate	Volume	Day	Year
Precipitation	4.02E+00	7.30E+04	260	3
Runoff	4.34E-01	7.88E+03	260	3
Lateral drainage collected from Layer 4	9.01E-02	1.64E+03	284	3
Percolation or leakance through Layer 6	0.00E+00	3.61E-03	284	3

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**
HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 3.07 (1 November 1997)
DEVELOPED BY ENVIRONMENTAL LABORATORY
USAE WATERWAYS EXPERIMENT STATION
FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE: C:\WHI\HELP22\data\P106.VHP\weather1.dat
TEMPERATURE DATA FILE: C:\WHI\HELP22\data\P106.VHP\weather2.dat
SOLAR RADIATION DATA FILE: C:\WHI\HELP22\data\P106.VHP\weather3.dat
EVAPOTRANSPIRATION DATA: C:\WHI\HELP22\data\P106.VHP\weather4.dat
SOIL AND DESIGN DATA FILE: C:\WHI\HELP22\data\P106.VHP\385191.inp
OUTPUT DATA FILE: C:\WHI\HELP22\data\P106.VHP\O_385191 prt

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TIME: 9:38 DATE: 7/20/2017

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*****
TITLE: EPA profile1
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NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE SPECIFIED BY THE USER.

LAYER 1

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TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 8
THICKNESS = 30.48 CM
POROSITY = 0.4630 VOL/VOL
FIELD CAPACITY = 0.2320 VOL/VOL
WILTING POINT = 0.1160 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.1300 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.370000000000E-03 CM/SEC
NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 5.00
FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

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LAYER 2

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TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18
THICKNESS = 152.40 CM
POROSITY = 0.6710 VOL/VOL
FIELD CAPACITY = 0.2920 VOL/VOL
WILTING POINT = 0.0770 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.0900 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.100000000000E-02 CM/SEC

```

LAYER 3

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TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 4
THICKNESS = 60.96 CM

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POROSITY = 0.4370 VOL/VOL  
 FIELD CAPACITY = 0.1050 VOL/VOL  
 WILTING POINT = 0.0470 VOL/VOL  
 INITIAL SOIL WATER CONTENT = 0.0600 VOL/VOL  
 EFFECTIVE SAT. HYD. COND. = 0.170000000000E-02 CM/SEC

LAYER 4

TYPE 2 - LATERAL DRAINAGE LAYER  
 MATERIAL TEXTURE NUMBER 21  
 THICKNESS = 30.48 CM  
 POROSITY = 0.3970 VOL/VOL  
 FIELD CAPACITY = 0.0320 VOL/VOL  
 WILTING POINT = 0.0130 VOL/VOL  
 INITIAL SOIL WATER CONTENT = 0.0100 VOL/VOL  
 EFFECTIVE SAT. HYD. COND. = 0.300000000000 CM/SEC  
 SLOPE = 2.00 PERCENT  
 DRAINAGE LENGTH = 30.0 METERS

LAYER 5

TYPE 4 - FLEXIBLE MEMBRANE LINER  
 MATERIAL TEXTURE NUMBER 35  
 THICKNESS = 0.10 CM  
 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. = 0.200000000000E-12 CM/SEC  
 FML PINHOLE DENSITY = 2.00 HOLES/HECTARE  
 FML INSTALLATION DEFECTS = 1.00 HOLES/HECTARE  
 FML PLACEMENT QUALITY = 3 - GOOD

LAYER 6

TYPE 3 - BARRIER SOIL LINER  
 MATERIAL TEXTURE NUMBER 15  
 THICKNESS = 60.96 CM  
 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. = 0.100000000000E-08 CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM A USER-SPECIFIED CURVE NUMBER OF 75.0, A SURFACE SLOPE OF 4.%, AND A SLOPE LENGTH OF 61. METERS.

SCS RUNOFF CURVE NUMBER = 76.35  
 FRACTION OF AREA ALLOWING RUNOFF = 75.0 PERCENT  
 AREA PROJECTED ON HORIZONTAL PLANE = 2.0234 HECTARES  
 EVAPORATIVE ZONE DEPTH = 25.4 CM  
 INITIAL WATER IN EVAPORATIVE ZONE = 3.302 CM  
 UPPER LIMIT OF EVAPORATIVE STORAGE = 11.760 CM  
 LOWER LIMIT OF EVAPORATIVE STORAGE = 2.946 CM  
 INITIAL SNOW WATER = 0.000 CM  
 INITIAL WATER IN LAYER MATERIALS = 67.361 CM  
 TOTAL INITIAL WATER = 67.361 CM  
 TOTAL SUBSURFACE INFLOW = 0.00 MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA



NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM  
Honolulu HI

STATION LATITUDE = 21.32 DEGREES  
 MAXIMUM LEAF AREA INDEX = 5.00  
 START OF GROWING SEASON (JULIAN DATE) = 0  
 END OF GROWING SEASON (JULIAN DATE) = 365  
 EVAPORATIVE ZONE DEPTH = 10.0 INCHES  
 AVERAGE ANNUAL WIND SPEED = 11.70 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 WAS SYNTHETICALLY GENERATED USING  
COEFFICIENTS FOR Honolulu HI

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
3.00	3.00	3.00	3.00	3.00	3.00
3.00	3.00	3.00	3.00	3.00	3.00

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING  
COEFFICIENTS FOR Honolulu HI

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
72.60	72.90	74.40	75.70	77.50	79.10
80.10	81.00	80.60	79.50	76.60	74.00

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING  
COEFFICIENTS FOR Honolulu HI  
AND STATION LATITUDE = 20.87 DEGREES

HEAD #1: AVERAGE HEAD ON TOP OF LAYER 5  
 DRAIN #1: LATERAL DRAINAGE FROM LAYER 4 (RECIRCULATION AND COLLECTION)  
 LEAK #1: PERCOLATION OR LEAKAGE THROUGH LAYER 6

MONTHLY TOTALS (IN INCHES) FOR YEAR 1

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.95	1.51	2.40	1.30	1.96	1.80
	4.27	1.28	2.17	3.12	2.30	5.53
RUNOFF	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	0.591	1.486	2.286	1.299	1.585	1.855
	4.575	1.226	2.237	2.658	2.752	3.012
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON 0.000 0.000 0.000 0.000 0.000 0.000

TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	28.59	518897.190	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	25.561	463914.126	89.40
DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	3.029	54983.072	10.60
SOIL WATER AT START OF YEAR	26.520	481327.044	
SOIL WATER AT END OF YEAR	29.549	536310.116	
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	-0.008	0.00

HEAD #1: AVERAGE HEAD ON TOP OF LAYER 5  
DRAIN #1: LATERAL DRAINAGE FROM LAYER 4 (RECIRCULATION AND COLLECTION)  
LEAK #1: PERCOLATION OR LEAKAGE THROUGH LAYER 6

MONTHLY TOTALS (IN INCHES) FOR YEAR 2

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.11 5.82	2.83 2.86	3.19 3.74	1.49 0.54	8.24 3.25	3.51 2.08
RUNOFF	0.000 0.000	0.000 0.000	0.005 0.044	0.000 0.000	0.086 0.000	0.086 0.000
EVAPOTRANSPIRATION	5.147	2.580 2.622	2.408 3.114	3.258 0.540	1.498 3.047	5.062 2.040
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
-----------------------	-------	-------	-------	-------	-------	-------

TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.64	719450.319	100.00
RUNOFF	0.200	3638.189	0.51
EVAPOTRANSPIRATION	34.157	619943.154	86.17
DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000	—	
CHANGE IN WATER STORAGE	5.282	95868.986	13.33
SOIL WATER AT START OF YEAR	29.549	538310.116	
SOIL WATER AT END OF YEAR	34.832	632179.102	
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	-0.011	0.00

HEAD #1: AVERAGE HEAD ON TOP OF LAYER 5  
DRAIN #1: LATERAL DRAINAGE FROM LAYER 4 (RECIRCULATION AND COLLECTION)  
LEAK #1: PERCOLATION OR LEAKAGE THROUGH LAYER 6

MONTHLY TOTALS (IN INCHES) FOR YEAR 3

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.57 3.28	8.11 4.18	2.11 6.42	1.00 3.96	1.36 4.02	1.11 1.58
RUNOFF	0.000 0.019	0.002 0.000	0.000 0.434	0.000 0.000	0.000 0.036	0.000 0.000
EVAPOTRANSPIRATION	0.663 2.641	3.418 3.760	3.329 3.582	1.009 3.352	1.380 3.164	1.090 1.633
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.8960	0.0000 1.0842	0.0000 0.5864
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
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TOP OF LAYER 5	0.000	0.000	0.000	0.084	0.105	0.055
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.085	0.056	0.024

ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.70	702369.690	100.00
RUNOFF	0.492	8924.805	1.27
EVAPOTRANSPIRATION	29.001	526357.474	74.94
DRAINAGE COLLECTED FROM LAYER 4	2.5666	46583.340	6.83
PERC./LEAKAGE THROUGH LAYER 6	0.000006	0.111	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0203		
CHANGE IN WATER STORAGE	6.641	120523.972	17.16
SOIL WATER AT START OF YEAR	34.832	632179.102	
SOIL WATER AT END OF YEAR	41.472	752703.074	
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	-0.011	0.00

HEAD #1: AVERAGE HEAD ON TOP OF LAYER 5  
DRAIN #1: LATERAL DRAINAGE FROM LAYER 4 (RECIRCULATION AND COLLECTION)  
LEAK #1: PERCOLATION OR LEAKAGE THROUGH LAYER 6

MONTHLY TOTALS (IN INCHES) FOR YEAR 4

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.43 2.12	0.83 0.95	3.14 3.08	4.54 2.26	2.16 3.13	4.03 2.83
RUNOFF	0.000 0.000	0.000 0.000	0.000 0.000	0.004 0.000	0.000 0.000	0.000 0.000
EVAPOTRANSPIRATION	1.803 2.236	1.337 0.733	3.260 2.740	3.526 2.800	2.669 2.024	3.920
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.2235 0.1285	0.1288 0.0983	0.0987 0.0747	0.0754 0.0630	0.0322 0.0509	0.1356 0.0445
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.021	0.013	0.009	0.007	0.003	0.013
-----------------------	-------	-------	-------	-------	-------	-------

TOP OF LAYER 5	0.012	0.009	0.007	0.006	0.005	0.004
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.004	0.001	0.001	0.001	0.004	0.001
	0.001	0.001	0.000	0.000	0.000	0.000

ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	31.49	571531.043	100.00
RUNOFF	0.004	66.184	0.01
EVAPOTRANSPIRATION	29.956	543682.040	95.13
DRAINAGE COLLECTED FROM LAYER 4	1.1540	20945.177	3.66
PERC./LEAKAGE THROUGH LAYER 8	0.000005	0.094	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0091		
CHANGE IN WATER STORAGE	0.377	6837.556	1.20
SOIL WATER AT START OF YEAR	41.472	752703.074	
SOIL WATER AT END OF YEAR	41.849	759540.630	
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	-0.009	0.00

HEAD #1: AVERAGE HEAD ON TOP OF LAYER 5  
DRAIN #1: LATERAL DRAINAGE FROM LAYER 4 (RECIRCULATION AND COLLECTION)  
LEAK #1: PERCOLATION OR LEAKAGE THROUGH LAYER 8

MONTHLY TOTALS (IN INCHES) FOR YEAR 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.64 7.37	1.06 2.37	0.98 3.92	1.30 4.30	6.13 4.89	1.68 4.66
RUNOFF	0.000 0.025	0.000 0.003	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.001
EVAPOTRANSPIRATION	2.201 5.667	1.389 2.511	1.031 3.900	1.314 3.710	5.658 4.757	1.702 3.079
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0443 0.2345	0.0772 0.6076	0.2857 0.6421	0.1681 0.2570	0.1222 0.1144	0.1505 0.1644
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.004	0.008	0.027	0.016	0.011	0.015
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TOP OF LAYER 5	0.022	0.057	0.062	0.024	0.011	0.015
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.001	0.010	0.004	0.002	0.003	0.012
	0.004	0.054	0.019	0.005	0.008	0.008

ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.29	749397.166	100.00
RUNOFF	0.029	520.822	0.07
EVAPOTRANSPIRATION	36.919	670056.188	89.41
DRAINAGE COLLECTED FROM LAYER 4	2.8680	52053.431	6.96
PERC./LEAKAGE THROUGH LAYER 6	0.000009	0.159	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0227		
CHANGE IN WATER STORAGE	1.475	26766.580	3.57
SOIL WATER AT START OF YEAR	41.849	759540.630	
SOIL WATER AT END OF YEAR	43.324	786307.210	
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	-0.011	0.00

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
<u>PRECIPITATION</u>						
TOTALS	1.94 4.57	2.87 2.33	2.36 3.87	1.93 2.84	3.97 3.52	2.43 3.33
STD. DEVIATIONS	0.68 2.07	3.03 1.30	0.90 1.58	1.47 1.51	3.04 0.98	1.27 1.70
<u>RUNOFF</u>						
TOTALS	0.000 0.009	0.000 0.001	0.001 0.096	0.001 0.000	0.013 0.007	0.017 0.000
STD. DEVIATIONS	0.000 0.012	0.001 0.001	0.002 0.190	0.002 0.000	0.029 0.016	0.038 0.000
<u>EVAPOTRANSPIRATION</u>						
TOTALS	1.568 4.053	2.008 2.170	2.633 3.115	1.729 2.612	3.267 3.325	2.282 2.358
STD. DEVIATIONS	0.902 1.530	0.902 1.205	0.994 0.660	1.019 1.233	1.985 0.815	1.111 0.649
<u>LATERAL DRAINAGE COLLECTED FROM LAYER 4</u>						
TOTALS	0.0536 0.0726	0.0412 0.1412	0.0769 0.1434	0.0487 0.2432	0.0309 0.2499	0.0572 0.1591
STD. DEVIATIONS	0.0969 0.1062	0.0593 0.2642	0.1243 0.2807	0.0743 0.3798	0.0529 0.4687	0.0785 0.2482
<u>PERCOLATION/LEAKAGE THROUGH LAYER 6</u>						

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

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AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

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DAILY AVERAGE HEAD ON TOP OF LAYER 5

AVERAGES	0.0050	0.0042	0.0072	0.0047	0.0029	0.0055
	0.0068	0.0132	0.0138	0.0227	0.0241	0.0149
STD. DEVIATIONS	0.0091	0.0080	0.0116	0.0072	0.0049	0.0076
	0.0099	0.0247	0.0271	0.0355	0.0452	0.0232

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

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	INCHES		CU. FEET	PERCENT
PRECIPITATION	35.94 ( 5.562)		652333.1	100.00
RUNOFF	0.145 ( 0.2109)		2630.00	0.403
EVAPOTRANSPIRATION	31.119 ( 4.4610)		564790.60	88.580
LATERAL DRAINAGE COLLECTED FROM LAYER 4	1.31774 ( 1.36590)		23916.389	3.66628
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.00000 ( 0.00000)		0.073	0.00001
AVERAGE HEAD ON TOP OF LAYER 5	0.010 ( 0.011)			
CHANGE IN WATER STORAGE	3.361 ( 2.5990)		60996.03	9.350

---

PEAK DAILY VALUES FOR YEARS 1 THROUGH 5 and their dates (DDDDYY)

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	(INCHES)	(CU. FT.)	
PRECIPITATION	4.02	72961.40971	2600003
RUNOFF	0.434	7881.84518	2600003
DRAINAGE COLLECTED FROM LAYER 4		0.09012	1635.56120 2840003
PERCOLATION/LEAKAGE THROUGH LAYER 6		0.000000	0.00361 2840003
AVERAGE HEAD ON TOP OF LAYER 5	0.261	--	
MAXIMUM HEAD ON TOP OF LAYER 5	0.488	--	
LOCATION OF MAXIMUM HEAD IN LAYER 4 (DISTANCE FROM DRAIN)	6.3 FEET		
SNOW WATER	0.00	0.0000	0
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.4018	
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.1160	

\*\*\* 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

FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	2.3262	0.1939
2	17.6954	0.2949
3	4.9178	0.2049
4	0.3842	0.0320
5	0.0000	0.0000
6	18.0000	0.7500
SNOW WATER	0.000	



***Attachment B***

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



9401

SCAN

LORETTA J. FUDDY, A.C.S.W., M.P.H.  
DIRECTOR OF HEALTH

DIRECTOR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DEPUTY DIR.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PERS.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WWR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SECTY.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RECEIVED

DEPT. OF ENVIRONMENTAL MANAGEMENT  
STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P. O. BOX 337  
HONOLULU, HI 96807-3375

2013 JUN 28 PM 4 55

COUNTY OF MAUI  
ENVIRONMENTAL MANAGEMENT

June 25, 2013

**CERTIFIED MAIL**  
**RETURN RECEIPT REQUESTED**  
(7009 2820 0001 6573 4222)

Mr. Kyle K. Ginoza  
Director  
Department of Environmental Management  
County of Maui  
2200 Main Street, Suite 100  
Wailuku, Hawaii 96793

Dear Mr. Ginoza:

**Subject: Renewal of Covered Source Permit (CSP) No. 0652-01-C  
Renewal Application No. 0652-02  
Central Maui Municipal Solid Waste Landfill  
Landfill Gas Collection and Control System  
Located at: Pulehu Road, Puunene, Maui  
Date of Expiration: June 24, 2018**

13-557E CAB  
File No. 0652  
**SOLID WASTE DIVISION**

	INFO	ACTION	COPY	FILE
DIV CHIEF	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ASST. DIV CHIEF	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ENGINEERING	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FISCAL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SAFETY/TRNG	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
REFUSE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LANDFILL	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AVM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RECYCLING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SECRETARY	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The subject Covered Source Permit renewal 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 February 29, 2012 and April 18, 2013. A receipt for the application fee of \$3,000.00 was mailed under separate cover. This Covered Source Permit renewal 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

Mr. Kyle K. Ginoza  
June 25, 2013  
Page 2

The form(s) for submission are as follows:

Compliance Certification Form  
Monitoring Report Form:  
Monitoring Report Form:  
Annual Emissions Report Form:

Collection and Control System  
Visible Emissions  
Municipal Solid Waste Landfills

Supplemental Report Form:  
Supplemental Report Form:  
Supplemental Report Form:

Modification/Reconstruction of MSW Landfill  
Notification of Landfill Closure  
Notification of Collection and Control  
Equipment Removal

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 (hereinafter Department of Health), 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.

Sincerely,



STUART H. YAMADA, P.E., CHIEF  
Environmental Management Division

KK:smk

c: Blake Shiigi, EHS – Maui  
CAB Monitoring Section  
Solid and Hazardous Waste Branch

**ATTACHMENT I: STANDARD CONDITIONS  
COVERED SOURCE PERMIT NO. 0652-01-C**

**Issuance Date: June 25, 2013**

**Expiration Date: June 24, 2018**

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 of Health, 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 of Health.

(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 of Health 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 of Health, 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 of Health 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 of Health 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 of Health 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 of Health 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 of Health 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 Health 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 of Health 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 of Health.

(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:
- 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
  - 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 a covered source covered by this permit**, the discontinuance shall be reported in writing to the Department of Health 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 of Health 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 (6) 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 of Health 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  
919 Ala Moana Boulevard, Room 203  
Honolulu, HI 96814**

Upon request and as required by this permit, all correspondence to the State of Hawaii Department of Health 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. 0652-01-C**

**Issuance Date: June 25, 2013**

**Expiration Date: June 24, 2018**

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 attachment encompasses the following equipment and associated appurtenances:
  - a. Central Maui Municipal Solid Waste Landfill; and
  - b. 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 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 forty (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 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 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 Code of Federal Regulations, 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. An MSW landfill may also receive other types of RCRA 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 an MSW landfill may be separated by access roads. An MSW landfill may be publicly or privately owned. An 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 an 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 Central Maui municipal solid waste landfill gas collection and control system 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.

(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>

3. 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 60, Subparts A and WWW, and 40 CFR 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)<sup>1</sup>

4. The Central Maui municipal solid waste landfill is subject to the requirements of Civil Action No. CV12 00571 LEK RLP, filed in the United States District Court, District of Hawaii, on December 27, 2012. In the case of a conflict between the conditions of this attachment and the aforementioned Civil Action, the requirements of the Civil Action shall take precedence.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.1, §60.750)<sup>1</sup>

**Section D. Operational Standards for the Collection and Control System**

1. Landfill Air Emission Standards

- a. The permittee shall submit an initial design capacity report. The landfill may calculate design capacity in either megagrams (Mg) or cubic meters (m<sup>3</sup>) for comparison with the exemption values.
- b. The permittee shall submit to the administrator an amended design capacity report when there is any increase in the design capacity of a landfill subject to the provisions of 40 CFR 60, Subpart WWW.
- c. The control system for the landfill gas shall be designed and operated to reduce NMOC by ninety-eight (98) weight percent or reduce the outlet NMOC concentration to less than twenty (20) parts per million (ppm) by volume. The reduction efficiency or parts per million by volume shall be established by the initial performance test.

(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 an 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 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 Administrator.
- c. Operate each interior wellhead in the collection system with a landfill gas temperature less than 55 °C (131 °F) 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.
- ii. The oxygen level shall be determined by an oxygen meter using 40 CFR Part 60, Appendix A, Method 3A except that:
  - (A) The span shall be set so that the regulatory limit is between twenty (20) and fifty (50) percent of the span;
  - (B) A data recorder is not required;
  - (C) Only two (2) calibration gases are required, a zero and span, and ambient air may be used as the span;
  - (D) A calibration error check is not required; and
  - (E) The allowable sample bias, zero drift, and calibration drift are ten (10) percent.

Alternate test methods may be used provided prior approval is obtained from the Department of Health.

- d. Operate the collection system so that the methane concentration is less than five hundred (500) parts per million 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. 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; and
- f. Operate the control or treatment system at all times when the collected gas is routed to the system.

If monitoring demonstrates that the operational requirements of Attachment II, Special Conditions D.2.b, D.2.c, or D.2.d are not met, the permittee shall take corrective action as specified in Attachment II, Section E. 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. The permittee shall adopt a startup, shutdown and malfunction plan which conforms to the provisions of 40 CFR Part 63, Subpart A, §63.6. The permittee shall operate and maintain the facility in accordance with the procedures specified in the current startup, shutdown, and malfunction plan. Any revisions made to the startup, shutdown, and malfunction plan in accordance with the procedures established by 40 CFR §63.6(e)(3) shall not be deemed to



constitute permit revisions under 40 CFR 70 or 40 CFR 71. Moreover, none of the procedures specified by the startup, shutdown and malfunction plan for an affected source shall be deemed to fall within the permit shield provision in section 504(f) of the Clean Air Act.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.753, 40 CFR §63.6)<sup>1</sup>

#### 4. Discontinuance of Collection and Control System

The permittee may cap or remove a collection and control system provided that all the following conditions are met:

- a. The landfill is a closed landfill as defined in Attachment II, Section B.4. A closure report shall be submitted to the Department of Health as provided in Attachment II, Special Condition G.7;
- b. The collection and control system shall have been in operation a minimum of fifteen (15) years; and
- c. The calculated NMOC gas produced by the landfill shall be less than fifty (50) megagrams per year on three successive test dates. The procedures specified in Attachment II, Special Condition G.10, shall be used. The test dates shall be no less than ninety (90) days apart and no more than one hundred eighty (180) days apart.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.752(b))<sup>1</sup>

#### 5. Visible Emissions

- a. The permittee shall take measures to control fugitive dust at all material transfer points and throughout the workyard. The Department of Health 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 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 approved by the Department of Health, the permittee shall use the following methods to determine whether the gas collection system is in compliance with Attachment II, Special Condition D.2.

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  $L_o$  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 of Health. If  $k$  has been determined as specified in Attachment II, 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. The permittee may use actual flow data to project the maximum expected gas generation flow rate instead of, or in conjunction with, the equations listed in Attachment II, 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 paragraphs (a)(1)(i) or (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 Administrator, 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 permittee shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists:

- i. Action shall be initiated to correct the exceedance within five (5) calendar days, except for the three conditions allowed under Attachment II, Special Condition No. D.2.b.
- ii. 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 one hundred twenty (120) days of the initial measurement of positive pressure.
- iii. 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 Administrator for approval.

d. The permittee is not required to install additional wells as required in Attachment II, Special Condition E.1.c during the first one hundred eighty (180) days after gas collection system startup.

e. Identification of Excess Air Infiltration.

The permittee shall monitor each well monthly for temperature and concentration of nitrogen or oxygen as provided in Attachment II, Special Condition D.2.c. If a well exceeds one of these operating parameters,

- i. Action shall be initiated to correct the exceedance within five (5) calendar days.

- ii. 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 one hundred twenty (120) days of the initial exceedance.
- iii. 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 Administrator for approval.

(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 Attachment II, 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 Attachment II, 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 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 five hundred (500) parts per million 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 Attachment II, Special Condition D.2.d.
    - i. The location of each monitored exceedance shall be marked and the location recorded.  
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. 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.

- ii. If the re-monitoring shows a third exceedance for the same location, the action specified in Attachment II, Special Condition E.3.d.v, shall be taken, and no further monitoring of that location is required until the action specified in Attachment II, Special Condition E.3.d.v, has been taken.
  - iii. Any location that initially showed an exceedance but has a methane concentration less than five hundred (500) ppm methane above background at the ten-day (10-day) re-monitoring specified in Attachment II, Special Conditions E.3.d.ii or E.3.d.iii, shall be re-monitored one (1) month from the initial exceedance. If the one-month (1-month) re-monitoring shows a concentration less than five hundred (500) parts per million 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 Attachment II, Special Conditions E.3.d.ii or E.3.d.iii, shall be taken.
  - iv. For any location where monitored methane concentration equals or exceeds five hundred (500) parts per million above background three times within a quarterly period, a new well or other collection device shall be installed within one hundred twenty (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 Administrator 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 five hundred (500) parts per million in air.
  - c. To meet the performance evaluation requirements in section 3.1.3 of Method 21 of 40 CFR 60, Appendix A, the instrument evaluation procedures of section 4.4 of Method 21 of 40 CFR 60, Appendix A, shall be used.
  - d. The calibration procedures provided in section 4.2 of Method 21 of 40 CFR 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 Attachment II, 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>

## **Section F. Monitoring and Recordkeeping Requirements**

### **Monitoring Requirements**

#### **1. Gas Collection System**

Except as provided in the collection and control system design plan approved by the Administrator, each 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;
- b. Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis; and
- c. Monitor temperature of the landfill gas on a monthly basis.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.769)<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

Each permittee shall monitor surface concentrations of methane according to the instrument specifications and procedures provided in Attachment II, 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 five hundred (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 Administrator.

(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 Attachment II, 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 Attachment II, Sections D and E:

- a. Annual NMOC emission rates shall be calculated in accordance with Attachment II, Section G; and
- b. NMOC emission rate reports shall be submitted in accordance with Attachment II, 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. For each period, 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. Except where otherwise specified, all records, including supporting information, data, calculations, sample reports, and measurements used to calculate emissions, shall be true, accurate, and maintained in a permanent form suitable for inspection for **at least five (5) years** following the date of such records, and provided to the Department of Health or their authorized 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 of Health.

(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 of Health, the permittee shall maintain the following records:

- a. Equipment operating parameters specified to be monitored in Attachment II, 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 Attachment II, 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 Administrator.
  - ii. The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in Attachment II, 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, including:



- i. For enclosed combustors except for boilers and process heaters with design heat input capacity of forty-four (44) megawatts (150 million British thermal unit per hour) or greater: all three-hour (3-hour) periods of operation during which the average combustion temperature was more than 28 °C below the average combustion temperature.
- 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 Attachment II, 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 and 60.758)<sup>1</sup>

11. 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 and 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, 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 of Health. 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)**, shall be signed and dated by an authorized representative, and shall include:

- a. Information as required by the Initial Compliance Report in Attachment II, 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; and
- 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.

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 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 of Health determines that reasonable justification exists for the extension.

(Auth: HAR §11-60.1-3, §11-60.1-90)

### 4. Performance test reports

- a. At least **thirty (30) days prior to conducting a source performance test**, the permittee shall submit to the Department of Health a test plan in accordance with Attachment II, 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 of Health **within sixty (60) days after the completion of the performance test** in accordance with Special Condition H.6.

(Auth: HAR §11-60.1-3, §11-60.1-90)

### 5. Design Capacity Increase

The permittee shall submit information regarding landfill modifications (as defined in Attachment II, Special Condition B.12, to the Department of Health 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<sup>3</sup> and Mg);
- c. Current site-specific density (Mg/m<sup>3</sup>);
- 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 of Health; 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)

#### 6. Landfill Closure

The permittee shall submit a **closure report** to the Department of Health **within thirty (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 of Health 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>

#### 7. Equipment Removal Notification

The permittee shall submit an equipment removal report to the Department of Health **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 Attachment II, 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 of Health may request such additional information as may be necessary to verify that all of the conditions for removal in Attachment II, Special Condition G.10 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>

#### 8. Compliance Certification

During the permit term, the permittee shall submit at least **annually** to the Department of Health 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.

- 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 64 occurred; and
- g. Any additional information as required by the Department of Health 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 of Health determines that reasonable justification exists for the extension.*

(Auth.: HAR §11-60.1-4, §11-60.1-86, §11-60.1-90)

9. 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 (m<sup>3</sup>/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 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 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 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 Administrator.

(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 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) parts per million by volume, dry basis as hexane at three (3) percent oxygen.

The Department of Health 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. On an annual basis or other times as may be specified by the Department of Health, 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 of Health shall be used:
  - a. The permittee shall use Method 25, 25C, or Method 18 of 40 CFR 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 of Health.
  - b. The permittee shall use Method 3 or 3A 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) parts per million NMOC as carbon (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).
  - 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 of Health.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90, SIP §11-60-15)<sup>2</sup>

- 5. **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 of Health 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 of Health 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>

- 6. 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 of Health before the tests.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

- 7. **Within sixty (60) days after completion of the performance test**, the permittee shall submit to the Department of Health 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)

- 8. Upon written request and justification, the Department of Health 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)

**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. 0652-01-C**

**Issuance Date: June 25, 2013**

**Expiration Date: June 24, 2018**

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 of Health 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 of Health 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 of Health 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 of Health 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;
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 64 occurred; and
7. Any additional information as required by the Department of Health 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 of Health determines that reasonable justification exists for the extension.

In lieu of addressing each emission unit, 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 I, Standard Condition No. 28.

(Auth: HAR §11-60.1-4, §11-60.1-90)

**ATTACHMENT III: ANNUAL FEE REQUIREMENTS  
COVERED SOURCE PERMIT NO. 0652-01-C**

**Issuance Date: June 25, 2013**

**Expiration Date: June 24, 2018**

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 of Health.
4. The annual fees and the emission data shall be mailed to:

**Clean Air Branch  
Environmental Management Division  
Hawaii Department of Health  
919 Ala Moana Boulevard, Room 203  
Honolulu, HI 96814**

**ATTACHMENT IV: ANNUAL EMISSIONS REPORTING REQUIREMENTS  
COVERED SOURCE PERMIT NO. 0652-01-C**

**Issuance Date: June 25, 2013**

**Expiration Date: June 24, 2018**

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  
919 Ala Moana Boulevard, Room 203  
Honolulu, HI 96814**

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. 0652-01-C**  
**PAGE 1 OF \_\_\_\_\_**

**Issuance Date:** June 25, 2013

**Expiration Date:** June 24, 2018

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. 0652-01-C**  
**(CONTINUED, PAGE 2 OF \_\_\_\_)**

**Issuance Date: June 25, 2013**

**Expiration Date: June 24, 2018**

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. 0652-01-C  
(CONTINUED, PAGE \_\_\_\_ OF \_\_\_\_)**

**Issuance Date: June 25, 2013**

**Expiration Date: June 24, 2018**

**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 II, 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. 0652-01-C  
(CONTINUED, PAGE \_\_\_\_ OF \_\_\_\_)**

**Issuance Date: June 25, 2013**

**Expiration Date: June 24, 2018**

**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:	
		Beginning:  Ending:	
		Beginning:  Ending:	
		Beginning:  Ending:	
		Beginning:  Ending:	
		Beginning:  Ending:	
		Beginning:  Ending:	

**(Make Additional Copies if Needed)**

**MONITORING REPORT FORM  
COLLECTION AND CONTROL SYSTEM  
COVERED SOURCE PERMIT NO. 0652-01-C**

(Page 1 of 3)

**Issuance Date:** June 25, 2013

**Expiration Date:** June 24, 2018

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 \_\_\_\_\_

- 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. (°C) of landfill gas						
Surface Conc. of Methane (ppmv as hexane)						

- 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 NO. 0652-01-C  
(PAGE 2 of 3)**

**Issuance Date: June 25, 2013**

**Expiration Date: June 24, 2018**

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(s)	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 Time(s)	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 Time(s)	Duration	Future Protocol, Comments

**MONITORING REPORT FORM  
COLLECTION AND CONTROL SYSTEM  
COVERED SOURCE PERMIT NO. 0652-01-C  
(PAGE 3 of 3)**

**Issuance Date:** June 25, 2013

**Expiration Date:** June 24, 2018

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

7. 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

8. Identify any instances when the gas flow has been diverted from the control device, enclosed combustor, or open flare. If there were no occurrences, then write "no occurrences" in the table.

Description and Reason	Dates	Start/End Times	Duration	Comments

**ANNUAL EMISSIONS REPORT FORM  
MUNICIPAL SOLID WASTE LANDFILLS  
COVERED SOURCE PERMIT NO. 0652-01-C**

**Issuance Date:** June 25, 2013

**Expiration Date:** June 24, 2018

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 <sub>4</sub> /Mg refuse)		
Methane generation rate constant, $k$ ( $yr^{-1}$ )		
Concentration of CH <sub>4</sub> in landfill gas (ppmv)		
Concentration of CO <sub>2</sub> in landfill gas (ppmv)		
Concentration of N <sub>2</sub> in landfill gas (ppmv)		
Concentration of O <sub>2</sub> in landfill gas (ppmv)		
Temperature of landfill gas (°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: \_\_\_\_\_

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. 0652-01-C**

Issuance Date: June 25, 2013

Expiration Date: June 24, 2018

*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. 0652-01-C**

**Issuance Date: June 25, 2013**

**Expiration Date: June 24, 2018**

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  
NOTIFICATION OF COLLECTION AND CONTROL EQUIPMENT REMOVAL  
COVERED SOURCE PERMIT NO. 0652-01-C**

**Issuance Date:** June 25, 2013

**Expiration Date:** June 24, 2018

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. 0652-01-C**

**Issuance Date: June 25, 2013**

**Expiration Date: June 24, 2018**

The following Visible Emissions (VE) Form shall be completed **monthly** (*each calendar month*) for each equipment subject to opacity limits in by a certified reader accordance with Method 9.

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 true, accurate, 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.

***Attachment C***

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- Appendix M Leachate Reintroduction Operation Log and Related Diagrams
- Appendix N **Groundwater and Leachate Monitoring Plan**

## **Appendix N**

# **Groundwater and Leachate Monitoring Plan**

REPORT

# Groundwater and Leachate Monitoring Plan Central Maui Landfill Puunene, Maui

*Prepared for*

The County of Maui  
Department of Environmental Management  
Solid Waste Division

Updated March 2019



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***Attachment D***

MICHAEL P. VICTORINO  
Mayor

ERIC A. NAKAGAWA, P.E.  
Acting Director

SHAYNE R. AGAWA, P.E.  
Deputy Director

MICHAEL P. RATTE  
Solid Waste Division

SCOTT R. ROLLINS, P.E.  
Wastewater Reclamation Division

TAMARA FARNSWORTH  
Environmental Protection &  
Sustainability Division



**COUNTY OF MAUI  
DEPARTMENT OF  
ENVIRONMENTAL MANAGEMENT**  
2050 MAIN STREET, SUITE 2B  
WAILUKU, MAUI, HAWAII 96793

April 22, 2019

Ms. Lene Ichinotsubo, P.E., (Acting) Chief  
Environmental Management Division  
Solid and Hazardous Waste Branch  
State of Hawaii Department of Health  
2827 Waimano Home Road  
Pearl City, HI 96782

Dear Ms. Ichinotsubo:

I Scott Teruya, Director of Finance for the County of Maui, 200 South High Street, 2nd Floor, Wailuku, Hawaii 96793 submit this letter to demonstrate and certify financial responsibility for closure, post-closure, and corrective action costs related to the following municipal solid waste landfills (MSWLFs) owned and operated by the County of Maui:

- Central Maui Landfill
- Molokai Integrated Solid Waste Facility
- Lanai Landfill
- Hana Landfill

The total amount of costs to be assured as of June 30, 2018 is approximately \$51.7 million for MSWLF costs.<sup>1</sup> The maximum amount that the County of Maui can assure under federal rules is limited to 43% of total annual revenues or approximately \$231.3 million as of June 30, 2018. Details of the cost estimates and the calculation of the maximum assurance amount are shown on Schedule 1 attached to this letter.

The County of Maui is a local government entity. The County's annual financial statements are provided in its Comprehensive Annual Financial Report (CAFR). The most recent CAFR reports the County's financial condition for the fiscal year concluding June 30, 2018 and is published for public inspection on the county website at [www.co.maui.hi.us](http://www.co.maui.hi.us) via the link for the department of finance (documents). The County's A-133 Single Audit report for the same period is also available at the same location. I certify that the financial statements of the County of Maui as of June 30, 2018 were prepared in conformity with Generally Accepted Accounting Principles for governments. The CAFR for the fiscal year concluding June 30, 2018 was audited by N&K CPAs, Inc. as independent certified public accountants.

<sup>1</sup> Estimated accrued cost of \$36.3M and future costs of \$15.4M as accounted and reported in County of Maui CAFR, June 30, 2018, Page 76.

<sup>2</sup> Total annual revenues for County of Maui governmental activities was \$537.8M as reported in County of Maui CAFR, June 30, 2018, Page 44.

As of June 30, 2018, the County of Maui had bond ratings of "Aa1", "AA+", and "AA+" by Moody's, Standard & Poor's, and Fitch, respectively.

I further certify that:

- a) The County of Maui is not currently in default on any outstanding general obligation bonds;
- b) The County of Maui does not have any outstanding general obligation bonds rated lower than Baa as issued by Moody's or BBB as issued by Standard and Poor's;
- c) The County of Maui has not operated at a deficit equal to five percent or more of annual revenue in each of the past two fiscal years; and
- d) The County of Maui has not received an adverse opinion, disclaimer of opinion, or other qualified opinion from independent certified public accountants in either of the past two fiscal years.

I certify that the County of Maui has complied with the requirements of Government Accounting Standards Board Statement (GASB) No. 18 and including information on closure and post-closure costs in its CAFR as of June 30, 2018. Copies of the CAFR are available at the County of Maui website at [www.co.maui.hi.us](http://www.co.maui.hi.us) via the link for the department of finance (documents). Information on any corrective action taken in the future will be placed in the operating record of the appropriate MSWLF facility until the next available CAFR is prepared.

I certify that the County of Maui conforms with the requirements of 40 CFR Part 258, Section 258.70(f)(4), relating to the calculation of costs to be assured and the maximum amount of assurance possible through this financial assurance mechanism. Details of the calculations are Schedule 1 attached to this letter.

Dated at Wailuku, Hawaii, April 22, 2019.

Submitted for your consideration.

  
\_\_\_\_\_  
SCOTT TERUYA, Director  
Department of Finance

Attachments  
cc: Sage Kiyonaga, SWD

**Schedule 1**

**County of Maui**  
**Local Government Financial Test Worksheet Fiscal Year Ended June 30, 2018**  
**(Amounts in Millions)**

Audited	<u>2018</u>
Calculation of costs to be assured:	
Total annual revenue	537.8
Maximum assurance (43% of Total Annual Revenue)	231.3
Costs to be assured at June 30, 2018:	
Central Maui Landfill	22.2
Molokai Landfill	6.7
Lanai Landfill	12.4
Hana Landfill	10.4
<b>Costs to be assured at June 30, 2018:</b>	<b>51.7</b>

***Attachment E***

**Slope Stability Analysis**  
**Central Maui Landfill – Phases III**  
January 2019

**Introduction**

Central Maui Landfill (CML) is located within a “seismic impact zone”, defined by Hawaii Administrative Rules (HAR) Section 11-58.1-13(e), as an area with a ten percent or greater probability of experiencing a horizontal acceleration in lithified earth material, due to seismic shaking, of more than 0.10 g in a 250 year period.

The United States Geological Survey (USGS) has classified the island of Maui in UBC Seismic Zone 2B, defined as having a ten percent probability of exceeding a peak ground acceleration of 0.15 g in 50 years. (USGS, 2004a) USGS earthquake hazard maps estimate the peak horizontal ground acceleration in central Maui to be 0.36 g with a 2% probability of occurrence in 50 years (See Figure 1A). A probability of exceedance of 2% in 50 years is approximately equivalent to a probability of 10% in 250 years (USGS, 2004b), and represents an event expected to occur one time in approximately 2,400 years (USGS, 1996).

HAR 1.58.1-13(e) prohibits municipal solid waste landfills to be constructed or expanded in a seismic impact zone unless the landfill operator or owner demonstrates that the containment structures of the landfill are designed to withstand the maximum horizontal acceleration due to an earthquake. A-Mehr, Inc. has prepared the following analysis to make the required demonstration.

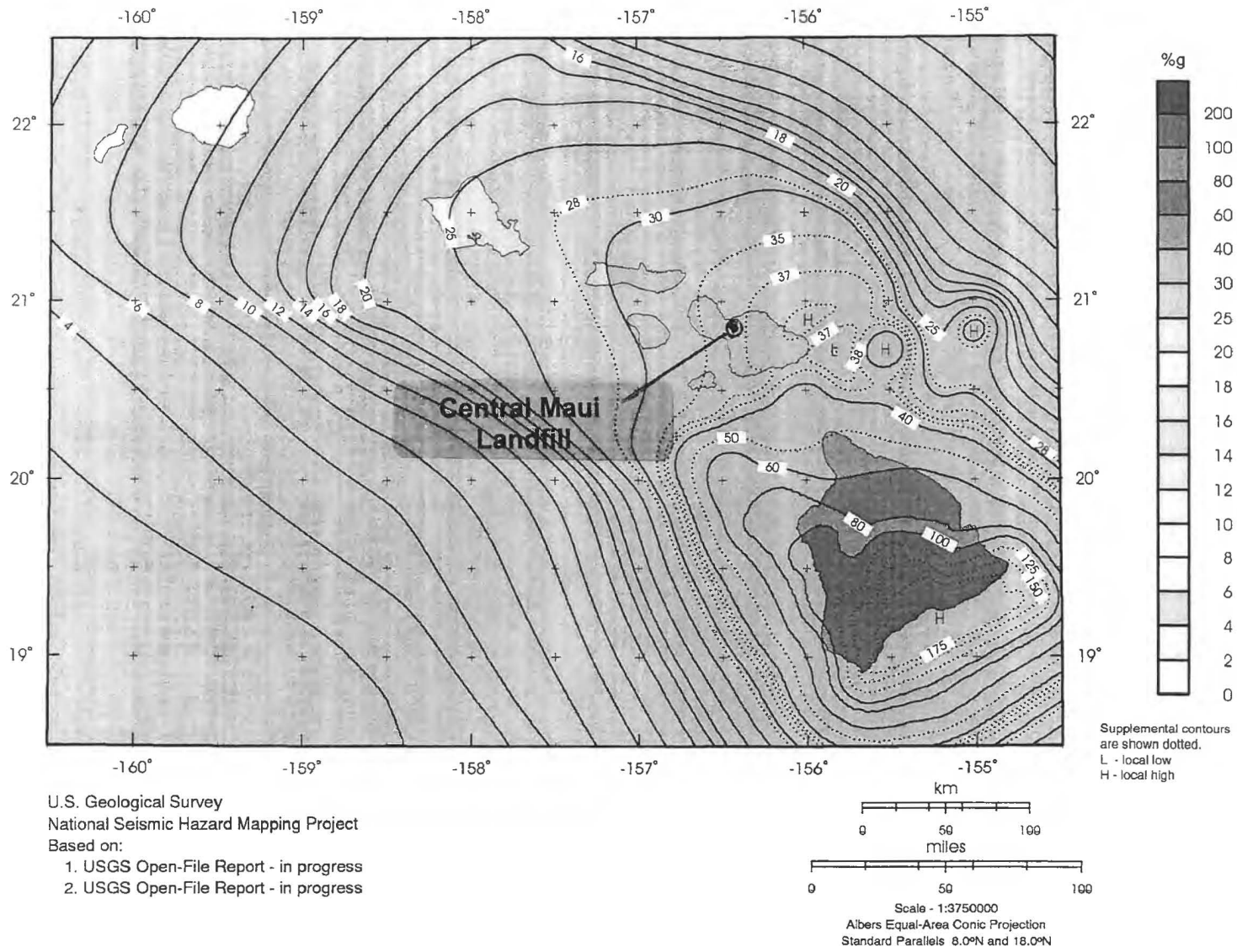
**Methodology**

A-Mehr, Inc. used the slope stability analysis computer program STABL5M as well as STED (which is a pre- and post-processor program for data input and output) to compute the static factor of safety and yield acceleration. The program uses the Modified Bishop and Modified Janbu methods, to determine the location of the lowest factor of safety for failure planes through the liner system for static and pseudostatic conditions.

The analysis is based on a gross slope stability evaluation of the landfill at the time when the landfill has reached its maximum permitted elevation, with design final slope gradients generally 3:1 (horizontal to vertical), and no steeper than 2.5:1 (horizontal to vertical).

Five critical cross-sections were developed for analysis, located as shown on Figures 1, and 2 on site plans displaying Phase III landfill liner grades existing final cover, and schematic grades of the refuse bottom in Phases I and II, and proposed final refuse over Phase III, which blend into the adjacent Phases I and II area. These sections, designated as III-S1, III-S2, III-S3, III-S4, and III-S5, show maximum thickness of refuse over the liner system roughly on the order of 70 to 170 feet.

The analysis was conducted according to procedures specified in the document “RCRA Subtitle D (248) Seismic Design Guidance for Municipal Solid Waste Facilities (U.S. Environmental

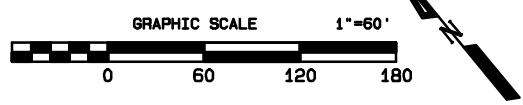
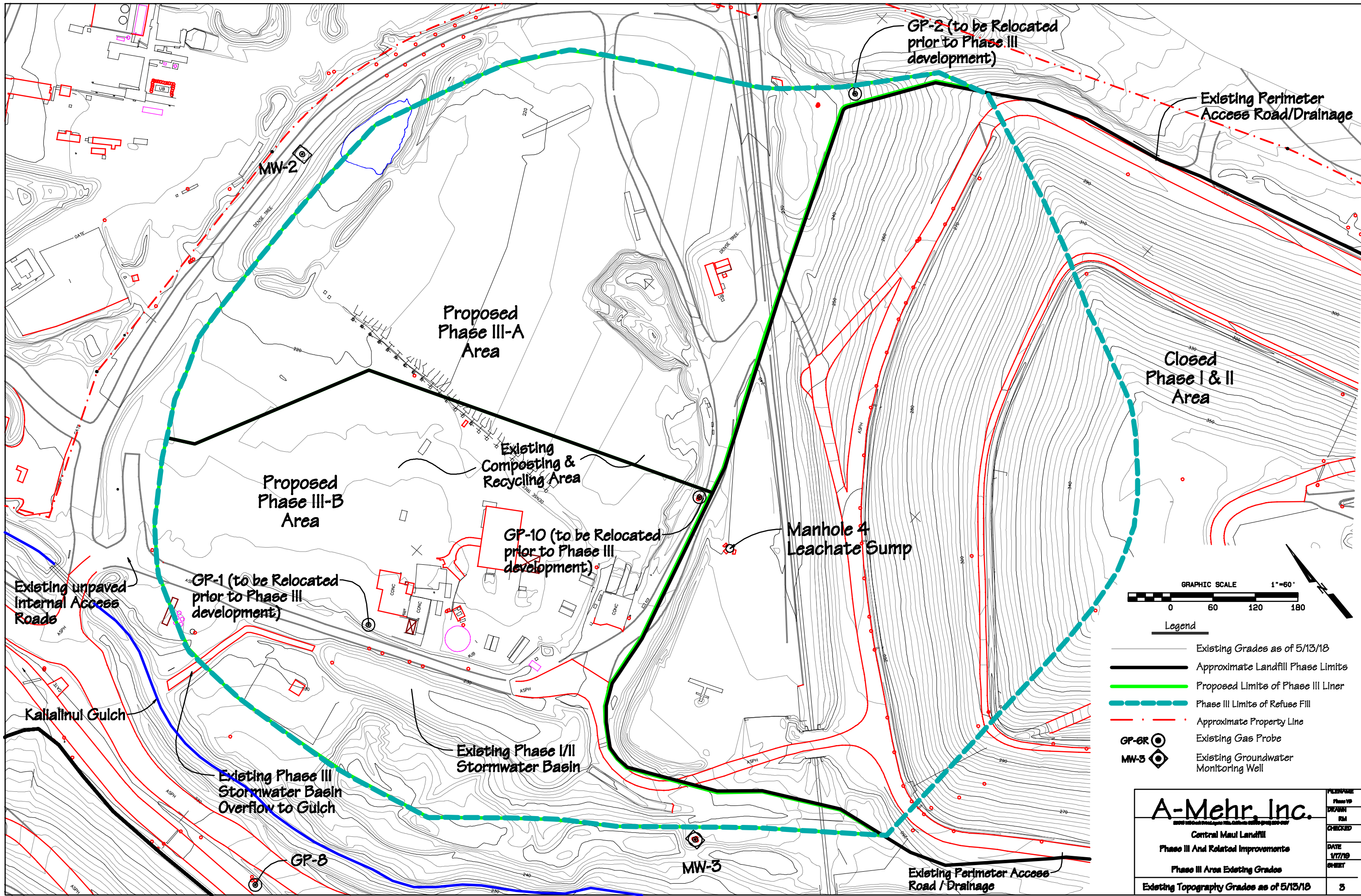


Horizontal Ground Acceleration (%g)  
With 2% Probability of Exceedance in 50 Years  
Firm Rock - 760 m/sec shear wave velocity

Figure 1A



***Attachment F***



- Legend**
- Existing Grades as of 5/13/18
  - Approximate Landfill Phase Limits
  - Proposed Limits of Phase III Liner
  - Phase III Limits of Refuse Fill
  - · - · - Approximate Property Line
  - GP-6R Existing Gas Probe
  - MW-3 Existing Groundwater Monitoring Well

<b>A-Mehr, Inc.</b>		FILENAME
Central Maui Landfill		Phase III
Phase III And Related Improvements		DRAWN
Phase III Area Existing Grades		CHECKED
Existing Topography Grades as of 5/13/18		DATE
		1/7/19
		SHEET
		3