

ADMINISTRATIVE RECORD

MAUI ELECTRIC COMPANY, LTD.
Maalaea Generating Station

Application for Significant Modification No. 0067-014
Application for Significant Modification No. 0067-015

Located At: Maalaea Generation Station, Maalaea, Maui

CSP No. 0067-01-C

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PUBLIC NOTICE

**REQUEST FOR PUBLIC COMMENTS
ON DRAFT AIR PERMITS
REGULATING THE EMISSIONS OF AIR POLLUTANTS**

(Docket No. 20-CA-PA-06)

Pursuant to Hawaii Revised Statutes (HRS), Chapter 342B-13, and Hawaii Administrative Rules (HAR), Chapter 11-60.1, the Department of Health, State of Hawaii (DOH), is requesting public comments on **DRAFT PERMITS** presently under review for the following affected facilities subject to greenhouse gas (GHG) emission reductions:

A. Independent Power Producers (IPPs)

(1) Amendment of Covered Source Permit (CSP) No. 0087-02-C

Application for Significant Modification No. 0087-09
AES Hawaii, LLC (AES)
203 MW Coal-Fired Cogeneration Plant
Located At: 91-086 Kaomi Loop, Kapolei, Oahu

(2) Amendment of Covered Source Permit (CSP) No. 0243-01-C

Application for Significant Modification No. 0243-07
Hamakua Energy, LLC (Hamakua Energy)
Hamakua Energy Plant (HEP)
65 MW Cogeneration Facility
Located At: 45-300 Lehua Street, Honokaa, Hawaii

(3) Amendment of Covered Source Permit (CSP) No. 0214-01-C

Application for Significant Modification No. 0214-10
Kalaeloa Partners, L.P. (KPLP)
Kalaeloa Cogeneration Plant (KCP)
223.5 MW Kalaeloa Cogeneration Plant
Located At: 91-111 Kalaeloa Boulevard, Kapolei, Oahu

B. Hawaiian Electric Companies

(1) Amendment of Covered Source Permit (CSP) No. 0548-01-C

Application for Significant Modification No. 0548-09
Hawaiian Electric Company, Inc. (HECO)
Campbell Industrial Park (CIP) Generating Station
Located At: 91-196 Hanua Street, Kapolei, Oahu

(2) Amendment of Covered Source Permit (CSP) No. 0240-01-C

Application for Significant Modification No. 0240-08
Hawaiian Electric Company, Inc. (HECO)
Kahe Generating Station
Located At: 92-200 Farrington Highway, Waianae, Oahu

- (3) Amendment of Covered Source Permit (CSP) No. 0238-01-C**
Application for Significant Modification No. 0238-05
Hawaiian Electric Company, Inc. (HECO)
Honolulu Generating Station
Located At: 170 Ala Moana Boulevard, Honolulu, Oahu
- (4) Amendment of Covered Source Permit (CSP) No. 0239-01-C**
Application for Significant Modification No. 0239-06
Hawaiian Electric Company, Inc. (HECO)
Waiau Generating Station
Located At: 475 Kamehameha Highway, Pearl City, Oahu
- (5) Amendment of Covered Source Permit (CSP) No. 0234-01-C**
Application for Significant Modification No. 0234-05
Hawaii Electric Light Company, Inc. (HELCO)
Kanoiehua-Hill Generating Station
Located At: 54 Halekauila Street, Hilo, Hawaii
- (6) Amendment of Covered Source Permit (CSP) No. 0007-01-C**
Application for Significant Modification No. 0007-07 (0007-01-C)
Application for Significant Modification No. 0070-04 (0070-01-C)
Hawaii Electric Light Company, Inc. (HELCO)
Keahole Generating Station
Located At: 73-4249 Pukiawe Street, Kailua Kona, Hawaii
- (7) Amendment of Covered Source Permit (CSP) No. 0235-01-C**
Application for Significant Modification No. 0235-04
Hawaii Electric Light Company, Inc. (HELCO)
Puna Generating Station
Located At: Puna Mill Road, Keaau, Hawaii
- (8) Amendment of Covered Source Permit (CSP) No. 0232-01-C**
Application for Significant Modification No. 0232-06
Maui Electric Company, Ltd. (MECO)
Kahului Generating Station
Located At: 200 Hobron Avenue, Kahului, Maui
- (9) Amendment of Covered Source Permit (CSP) No. 0067-01-C**
Application for Significant Modification No. 0067-14 (0067-01-C)
Application for Significant Modification No. 0067-15 (0067-02-C)
Maui Electric Company, Ltd. (MECO)
Maalaea Generating Station
Located At: Maalaea Generating Station, Maalaea, Maui
- (10) Amendment of Covered Source Permit (CSP) No. 0031-04-C**
Application for Significant Modification No. 0031-08
Maui Electric Company, Ltd. (MECO)
Palaau Generating Station
Located At: 32 Ulili Street, Kaunakakai, Molokai

The **DRAFT PERMITS** are described as follows:

The permit amendments incorporate GHG emission caps in accordance with HAR Chapter 11-60.1, Subchapter 11, to limit GHG emissions from affected facilities. Affected facilities are permitted covered sources with potential carbon dioxide equivalent (CO₂e) emissions (biogenic plus nonbiogenic) equal to or greater than 100,000 short tons per year.

Pursuant to HAR Chapter 11-60.1, Subchapter 11, the amendments incorporate provisions for partnering between thirteen (13) electric plants to combine emissions for flexibility in achieving the GHG reductions. Three (3) affected facilities are independent power producers (IPPs) owned and operated by AES, Hamakua Energy, and KPLP. The remaining ten (10) affected facilities are from the Hawaiian Electric Companies that include HECO, HELCO, and MECO.

The partnering facilities propose a total combined GHG emission baseline for establishing the facility-wide GHG emissions cap of 7,584,991 metric tons (8,361,022 short tons) per year. Partnering facilities used 2010 as the baseline year, except for the KCP cogeneration plant which used 2009 for its baseline year because 2010 was deemed unrepresentative due to an overhaul of its steam turbine generator. Emissions from HECO's Shipman Generating Station which closed at the end of 2015 were included in the baseline emissions. The total combined GHG emissions cap proposed for the partnering facilities for calendar year 2020 and beyond is 6,371,392 metric tons (7,023,257 short tons) of CO₂e emissions per calendar year which is a 16% reduction from the proposed total combined GHG emission baseline level.

For calendar year 2019, cap adjustments are necessary to compensate for the continuing unavailability of renewable energy from Puna Geothermal Venture (PGV) and delays to new renewable energy projects for reasons outside of the control of the partnering facilities. The cap adjustments will temporarily increase the total combined GHG emissions cap proposed for the partnering facilities to 6,539,587 metric tons (7,208,661 short tons) for a 13.78% reduction from the proposed total combined GHG emission baseline level. Alternate operating scenarios are added to the permits for continuing with the cap adjustments by adding one twelfth (1/12) of the 2019 annual adjustments for every month that PGV generation is delayed into and beyond calendar year 2020. The 2019 annual CO₂e adjustments for each individual facility on the island of Hawaii only are 97,524 short tons for Hamakua Energy, LLC, 17,132 short tons for Kanoelehua-Hill Generating Station, 31,213 short tons for Keahole Generating Station, and 39,535 short tons for Puna Generating Station. The total combined CO₂e adjustment for these facilities is 185,404 short tons. For delays in PGV generation into and beyond calendar year 2020, monthly adjustments for each individual facility on the island of Hawaii are 8,127 short tons for Hamakua Energy, LLC, 1,428 short tons for Kanoelehua-Hill Generating Station, 2,601 short tons for Keahole Generating Station, and 3,295 short tons for Puna Generating Station for a total monthly CO₂e adjustment of 15,450 short tons. These alternate operating scenarios apply to each individual cap for partnering facilities on the island of Hawaii and the total combined emissions cap for all partnering facilities until PGV restores net generation of electricity to levels that preceded its shutdown due to the volcanic activity that was determined to be 26,883 MWh. Once net generation of 26,883 MWh per month from the PGV facility is reached, the alternate operating scenarios no longer applies and no further adjustments will be made to the CO₂e emissions caps, thereafter.

For calendar year 2020 and beyond, AES further reduced its individual GHG emissions cap by 16% below its individual GHG emission baseline level. Emissions from the AES cap adjustments were distributed evenly among partnering facilities on the island of Oahu, excluding the AES plant and the HECO Honolulu Generating Station.

The three (3) IPP permits and CSP No. 0548-01-C for HECO's CIP Generating Station will specify individual and total combined GHG emission caps established for the partnering facilities. Any GHG emission cap revision will require each of these facilities (AES, Hamakua Energy, KPLP, and HECO's CIP Generating Station) to submit a significant permit modification for the change.

The permits for the remaining partnering facilities operated by HECO, HELCO, and MECO will not specify individual and total combined GHG emission caps, but instead reference GHG emission caps included in CSP No. 0548-01-C for HECO's CIP Generating Station. Designating CSP No. 0548-01-C as the main permit will reduce the burden of modifying all Hawaiian Electric Companies' permits should an emissions cap be revised. Only CSP No. 0548-01-C would require modification as the emission caps will not be incorporated separately into each facility's permit.

Individual and total combined GHG emission caps were established in each facility's GHG emission reduction plan. Each facility may exceed its individual cap as long as the total combined GHG emissions cap is met. Biogenic carbon dioxide emissions are excluded in determining compliance with the CO₂e emissions caps.

A. Independent Power Producers (IPPs)

- (1) The significant modification of **CSP No. 0087-02-C** will grant conditional approval to incorporate an individual CO₂e emissions cap of 1,534,598 metric tons (1,691,605 short tons) for calendar year 2019 and 1,281,442 metric tons (1,412,548 short tons) for calendar year 2020 and beyond that applies specifically to the AES cogeneration plant. The conditional approval includes temporarily increasing the total combined CO₂e emissions cap proposed in partnering with the other affected facilities to 6,539,587 metric tons (7,208,661 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. A total combined CO₂e emissions cap of 6,371,392 metric tons (7,023,257 short tons) is specified for calendar year 2020 and beyond. The alternate operating scenarios will no longer apply once a net generation of 26,883 MWh per month from PGV is reached.
- (2) The significant modification of **CSP No. 0243-01-C** will grant conditional approval to temporarily increase individual CO₂e emissions cap to 227,906 metric tons (251,223 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emission cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. For 2020 and beyond, an individual CO₂e emissions cap of 139,433 metric tons (153,699 short tons) is specified for the Hamakua Energy cogeneration plant. The conditional approval includes temporarily increasing the total combined CO₂e

emission cap proposed in partnering with the other affected facilities to 6,539,587 metric tons (7,208,661 short tons) for calendar year 2019 and alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. A total combined CO₂e emissions cap of 6,371,392 metric tons (7,023,257 short tons) is specified for calendar year 2020 and beyond. The alternate operating scenarios will no longer apply once a net generation of 26,883 MWh per month from PGV is reached.

- (3) The significant modification of **CSP No. 0214-01-C** will grant conditional approval to incorporate an individual CO₂e emissions cap of 993,198 metric tons (1,094,813 short tons) for calendar year 2019 and 1,056,486 metric tons (1,164,577 short tons) for calendar year 2020 and beyond that applies specifically to the KPLP cogeneration plant. The conditional approval includes temporarily increasing the total combined CO₂e emissions cap proposed in partnering with the other affected facilities to 6,539,587 metric tons (7,208,661 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. A total combined CO₂e emission cap of 6,371,392 metric tons (7,023,257 short tons) is specified for calendar year 2020 and beyond. The alternate operating scenarios will no longer apply once a net generation of 26,883 MWh per month from PGV is reached.

B. Hawaiian Electric Companies

- (1) The significant modification of **CSP No. 0548-01-C** will grant conditional approval to incorporate an individual CO₂e emissions cap of 48,752 metric tons (53,740 short tons) for calendar year 2019 and 112,041 metric tons (123,504 short tons) for calendar year 2020 and beyond that applies specifically to the HECO CIP Generating Station. The conditional approval includes temporarily increasing the total combined CO₂e emissions cap proposed in partnering with the other affected facilities to 6,539,587 metric tons (7,208,661 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. A total combined CO₂e emission cap of 6,371,392 metric tons (7,023,257 short tons) is specified for calendar year 2020 and beyond. The alternate operating scenarios will no longer apply once a net generation of 26,883 MWh per month from PGV is reached.
- (2) The significant modification of **CSP No. 0238-01-C** will grant conditional approval to incorporate an individual CO₂e emissions cap 0 metric tons (0 short tons) per calendar year that applies specifically to the HECO Honolulu Generating Station. The conditional approval includes temporarily increasing the total combined CO₂e emissions cap proposed in partnering with the other affected facilities to 6,539,587 metric tons (7,208,661 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for

every month that PGV's restoration is delayed into and beyond calendar year 2020. A total combined CO₂e emission cap of 6,371,392 metric tons (7,023,257 short tons) is specified for calendar year 2020 and beyond. The alternate operating scenarios will no longer apply once a net generation of 26,883 MWh per month from PGV is reached.

- (3) The significant modification of **CSP No. 0240-01-C** will grant conditional approval to incorporate an individual CO₂e emissions cap 1,935,707 metric tons (2,133,752 short tons) for calendar year 2019 and 1,998,996 metric tons (2,203,516 short tons) for calendar year 2020 and beyond that applies specifically to the HECO Kahe Generating Station. The conditional approval includes temporarily increasing the total combined CO₂e emissions cap proposed in partnering with the other affected facilities to 6,539,587 metric tons (7,208,661 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. A total combined CO₂e emission cap of 6,371,392 metric tons (7,023,257 short tons) is specified for calendar year 2020 and beyond. The alternate operating scenarios will no longer apply once a net generation of 26,883 MWh per month from PGV is reached.
- (4) The significant modification of **CSP No. 0239-01-C** will grant conditional approval to incorporate an individual CO₂e emissions cap of 733,265 metric tons (808,286 short tons) for calendar year 2019 and 796,554 metric tons (878,050 short tons) for calendar year 2020 and beyond that applies specifically to the HECO Waiau Generating Station. The conditional approval includes temporarily increasing the total combined CO₂e emissions cap proposed in partnering with the other affected facilities to 6,539,587 metric tons (7,208,661 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed beyond into and beyond calendar year 2020 to a total combined CO₂e emission cap of 6,371,392 metric tons (7,023,257 short tons) in partnering with all other affected facilities. The alternate operating scenarios will no longer apply once a net generation of 26,883 MWh per month from PGV is reached.
- (5) The significant modification of **CSP No. 0234-01-C** will grant conditional approval to temporarily increase the individual CO₂e emissions cap to 171,991 metric tons (189,588 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. For calendar year 2020 and beyond, an individual CO₂e emissions cap of 156,449 metric tons (172,456 short tons) per calendar year is specified for the HELCO Kanoelehua-Hill Generating Station. The conditional approval includes temporarily increasing the total combined CO₂e emissions cap proposed in partnering with the other affected facilities to 6,539,587 metric tons (7,208,661 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emission cap for every month that PGV's restoration is delayed into and beyond calendar

year 2020. A total combined CO₂e emission cap of 6,371,392 metric tons (7,023,257 short tons) is specified for calendar year 2020 and beyond. The alternate operating scenarios will no longer apply once PGV net generation of 26,883 MWh per month is reached.

- (6) The significant modification of **CSP No. 0007-01-C** will grant conditional approval to temporarily increase the individual CO₂e emissions cap to 248,043 metric tons (273,421 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. For calendar year 2020 and beyond, an individual CO₂e emissions cap of 219,727 metric tons (242,208 short tons) per calendar year is specified for the HELCO Keahole Generating Station. The conditional approval includes temporarily increasing the total combined CO₂e emissions cap proposed in partnering with the other affected facilities to 6,539,587 metric tons (7,208,661 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. A total combined CO₂e emission cap of 6,371,392 metric tons (7,023,257 short tons) is specified for calendar year 2020 and beyond. The alternate operating scenarios will no longer apply once a net generation of 26,883 MWh per month from PGV is reached.
- (7) The significant modification of **CSP No. 0235-01-C** will grant conditional approval to temporarily increase the individual CO₂e emissions cap to 64,666 metric tons (71,282 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. For calendar year 2020 and beyond an individual CO₂e emissions cap of 28,800 metric tons (31,747 short tons) per calendar year for the HELCO Puna Generating Station. The conditional approval includes temporarily increasing the total combined CO₂e emissions cap proposed in partnering with the other affected facilities to 6,539,587 metric tons (7,208,661 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. A total combined CO₂e emission cap of 6,371,392 metric tons (7,023,257 short tons) is specified for calendar year 2020 and beyond. The alternate operating scenarios will no longer apply once a net generation of 26,883 MWh per month from PGV is reached.
- (8) The significant modification of **CSP No. 0232-01-C** will grant conditional approval to incorporate an individual CO₂e emissions cap of 140,281 metric tons (154,633 short tons) per calendar year that applies specifically to the MECO Kahului Generating Station. The conditional approval includes temporarily increasing the total combined CO₂e emissions cap proposed in partnering with the other affected facilities to 6,539,587 metric tons (7,208,661 short tons) for calendar year 2019 and an alternate operating scenario that

adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. A total combined CO₂e emission cap of 6,371,392 metric tons (7,023,257 short tons) is specified for calendar year 2020 and beyond. The alternate operating scenarios will no longer apply once a net generation of 26,883 MWh per month from PGV is reached.

- (9) The significant modification of **CSP No. 0067-01-C** will grant conditional approval to incorporate an individual CO₂e emissions cap of 417,182 metric tons (459,864 short tons) per calendar year that applies specifically to the MECO Maalaea Generating Station. The conditional approval includes temporarily increasing the total combined CO₂e emissions cap proposed in partnering with the other affected facilities to 6,539,587 metric tons (7,208,661 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. A total combined CO₂e emission cap of 6,371,392 metric tons (7,023,257 short tons) is specified for calendar year 2020 and beyond. The alternate operating scenarios will no longer apply once PGV net generation of 26,883 MWh per month is reached.
- (10) The significant modification of **CSP No. 0031-04-C** will grant conditional approval to incorporate an individual CO₂e emissions cap of 23,999 metric tons (26,454 short tons) per calendar year that applies specifically to the MECO Palaau Generating Station. The conditional approval includes temporarily increasing the total combined CO₂e emissions cap proposed in partnering with the other affected facilities to 6,539,587 metric tons (7,208,661 short tons) for calendar year 2019 and an alternate operating scenario that adds one twelfth (1/12) of the 2019 annual adjustments to the 2020 and beyond GHG emissions cap for every month that PGV's restoration is delayed into and beyond calendar year 2020. A total combined CO₂e emission cap of 6,371,392 metric tons (7,023,257 short tons) is specified for calendar year 2020 and beyond. The alternate operating scenarios will no longer apply once a net generation of 26,883 MWh per month from PGV is reached.

The **ADMINISTRATIVE RECORDS**, consisting of the **APPLICATIONS, GHG EMISSION REDUCTION PLANS**, and non-confidential supporting material from the applicant, the permit review summary, and the **DRAFT PERMITS**, are available for public inspection during regular office hours, Monday through Friday, 7:45 a.m. to 4:15 p.m., at the following locations:

Oahu:

State of Hawaii
Clean Air Branch
2827 Waimano Home Road, #130
Pearl City, HI 96782

Hawaii:

Hilo: Hawaii District Health Office, Department of Health
1582 Kamehameha Avenue, Hilo, Hawaii 96720

Kona: Sanitation Branch, Department of Health
79-1020 Haukapila Street, Room 115, Kona, Hawaii 96750

Maui:

Maui District Health Office, Department of Health
54 High Street, Wailuku, Maui 96793

Kauai:

Kauai District Health Office, Department of Health
3040 Umi Street, Lihue, Kauai 96766

All comments on the draft permits and any request for a public hearing must be in writing, addressed to the Clean Air Branch at the above address on Oahu and must be postmarked or received by **August 14, 2020**.

Any person may request a public hearing by submitting a written request that explains the party's interest and the reasons why a hearing is warranted. The DOH may hold a public hearing if a hearing would aid in DOH's decision. If a public hearing is warranted, a public notice for the hearing will be published at least thirty (30) days in advance of the hearing.

Interested persons may obtain copies of the administrative record or parts thereof by paying **five (5) cents per page copying costs**. Please send written requests to the Oahu office of the Clean Air Branch listed above or call Mr. Dale Hamamoto (CSPs for Hamakua Energy and KPLP facilities) or Mr. Michael Madsen (CSPs for AES, HECO, HELCO, and MECO facilities) at the Clean Air Branch office at (808) 586-4200. Electronic copies of the draft permits, permit reviews, and GHG emission reduction plans may be found online at <http://health.hawaii.gov/cab/public-notices/>.

Comments on the draft permits should address, but need not be limited to, the permit conditions and the facility's compliance with federal and state air pollution laws, including: (1) the National and State Ambient Air Quality Standards; and (2) HRS, Chapter 342B and HAR, Chapter 11-60.1.

DOH will make a final decision on the permits after considering all comments and will send notice of the final decision to each person who has submitted comments or requested such notice.

Bruce S. Anderson, Ph.D.
Director of Health

DRAFT PERMIT

DATE

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
(xxxx xxxx xxxx xxxx xxxx)

20-xxxE CAB
File No. 0067

Mr. Mathew McNeff
Director, Power Supply Division
Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawaii 96733

Dear Mr. McNeff:

**SUBJECT: Amendment of Covered Source Permit (CSP) No. 0067-01-C
Application for Significant Modification No. 0067-14 (0067-01-C)
Application for Significant Modification No. 0067-15 (0067-02-C)
Maui Electric Company, Limited (MECO)
Four (4) 20 MW (Nominal) Combustion Turbine Generators (Units M14, M16,
M17, and M19), and Sixteen (16) Diesel Engine Generators (Units M1
through M13, X1, X2, and SG1).
Located At: Maalaea Generating Station, Maalaea, Maui
Date of Expiration: July 27, 2009 (Expiration Date to be Revised Upon Permit Renewal)**

In accordance with Hawaii Administrative Rules (HAR), Chapter 11-60.1, and pursuant to your application for a significant modification received on March 28, 2018, the updated greenhouse gas (GHG) emission reduction plans received on October 19, 2018, May 15, 2019, and July 26, 2019, revision to application for significant permit modification received on December 26, 2018, for the Campbell Industrial Park (CIP) Generating Station, revision to the application for significant permit modification received on July 26, 2019, for the subject facility, and the additional information received on January 23, 2020, February 14, 2020, April 2, 2020, May 22, 2020, and June 9, 2020, from Hawaiian Electric Company, Inc. submitted on behalf of the partnership for cap adjustments, the Department of Health, Clean Air Branch (herein after referred to as Department), hereby amends CSP No. 0067-01-C issued to MECO for Maalaea Generating Station on October 16, 2018.

In accordance with HAR, Chapter 11-60.1, Subchapter 11, the amendment incorporates provisions for partnering with other affected plants to combine emissions for flexibility in achieving GHG reductions. The amendment includes GHG emission cap adjustments for 2019 and a total combined GHG emission cap for 2020 and beyond that is a sixteen percent (16%) reduction from the combined partnership baseline GHG emissions level. The amendment also includes alternate operating scenarios for partnering facilities on the island of Hawaii in the event delays are encountered in restoring the Puna Geothermal Venture (PGV) facility to the net generation that preceded its shutdown in 2018. Individual and total combined GHG emission caps established in each facility's GHG emission reduction plan are incorporated in the amendment with associated provisions pursuant to HAR §11-60.1-204(d)(6)(C). The partnering facilities included in this amendment are:

Independent Power Producers (IPPs)

- AES Hawaii, LLC (AES), CSP No. 0087-02-C
- Hamakua Energy, LLC (Hamakua Energy), CSP No. 0243-01-C
- Kalaeloa Partners, L.P. (KPLP), CSP No. 0214-01-C

Hawaiian Electric Companies

- Hawaiian Electric Company, Inc. (HECO), CSP No. 0548-0-C
- Hawaiian Electric Company, Inc. (HECO), CSP No. 0238-01-C
- Hawaiian Electric Company, Inc. (HECO), CSP No. 0239-01-C
- Hawaiian Electric Company, Inc. (HECO), CSP No. 0240-01-C
- Hawaii Electric Light Company, Inc. (HELCO), CSP No. 0007-01-C
- Hawaii Electric Light Company, Inc. (HELCO), CSP No. 0234-01-C
- Hawaii Electric Light Company, Inc. (HELCO), CSP No. 0235-01-C
- Maui Electric Company, Ltd. (MECO), CSP No. 0031-04-C
- Maui Electric Company, Ltd. (MECO), CSP No. 0067-01-C
- Maui Electric Company, Ltd. (MECO), CSP No. 0232-01-C

The three (3) IPP permits and CSP No. 0548-01-C (HECO's CIP Generating Station) will specify individual and total combine GHG emission caps established for all of the partnering facilities. Any GHG emission cap revision, except for reasonably anticipated alternate operating scenarios due to the PGV facility shutdown, will require each of these facilities (AES, Hamakua Energy, KPLP, and HECO CIP) to submit a significant permit modification.

The permits for the remaining partnering facilities operated by HECO, HELCO, and MECO will not specify individual and total combine GHG emission caps, but will reference GHG emission caps included in CSP No. 0548-01-C. Designating CSP No. 0548-01-C as the main HECO permit will reduce the burden of modifying all Hawaiian Electric Companies' permits should an emission cap be revised. Only CSP No. 0548-01-C would require modification as the emission caps will not be incorporated separately into each facility's permit.

The following enclosed Attachment II – GHG and monitoring report form are hereby added to CSP No. 0067-01-C issued on October 16, 2018, to incorporate the GHG permitting provisions:

- 1) Attachment II - GHG: Special Conditions – GHG Reduction Requirements
- 2) Monitoring Report Form: GHG Emissions

All other permit conditions of CSP No. 0067-01-C issued on October 16, 2018, shall not be affected and shall remain valid.

Mr. Mathew McNeff
DATE
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If there are any questions regarding these matters, please contact Mr. Michael Madsen of the Clean Air Branch at (808) 586-4200.

Sincerely,

_____, P.E., ACTING CHIEF
Environmental Management Division

MM:tkg

Enclosures

DRAFT

**ATTACHMENT II - GHG: SPECIAL CONDITIONS
GHG REDUCTION REQUIREMENTS
COVERED SOURCE PERMIT NO. 0067-01-C**

Amended Date: DATE

Expiration Date: July 27, 2009

(Expiration Date to be Revised Upon Permit Renewal)

In addition to the standard conditions of the CSP, the following special conditions shall apply to the permitted facility:

Section A. Equipment Description

1. Attachment II - GHG of this permit encompasses the following equipment and associated appurtenances for Maalaea Generating Station:

<u>Unit</u>	<u>Description</u>
M-1	2.5 MW General Motor Diesel Engine Generator (DEG), Model No. 20-645E4, 29.2 MMBtu/hr.
M-2	2.5 MW General Motor DEG, Model No. 20-645E4, 29.2 MMBtu/hr.
M-3	2.5 MW General Motor DEG, Model No. 20-645E4, 29.2 MMBtu/hr.
M-4	5.6 MW Cooper-Bessemer DEG, Model No. LSV-20-T, 58.8 MMBtu/hr.
M-5	5.6 MW Cooper-Bessemer DEG, Model No. LSV-20-T, 58.8 MMBtu/hr.
M-6	5.6 MW Cooper-Bessemer DEG, Model No. LSV-20-T, 58.8 MMBtu/hr.
M-7	5.6 MW Cooper-Bessemer DEG, Model No. LSV-20-T, 58.8 MMBtu/hr.
M-8	5.6 MW Colt Industries DEG, Model No. C-P PC2V, 60.2 MMBtu/hr.
M-9	5.6 MW Colt Industries DEG, Model No. C-P PC2V, 60.2 MMBtu/hr.
M-10	12.5 MW Mitsubishi DEG, Model No. 185V52/55A, 122.7 MMBtu/hr.
M-11	12.5 MW Mitsubishi DEG, Model No. 185V52/55A, 122.7 MMBtu/hr.
M-12	12.5 MW Mitsubishi DEG, Model No. 185V52/55A, 122.7 MMBtu/hr.
M-13	12.5 MW Mitsubishi DEG, Model No. 185V52/55A, 122.7 MMBtu/hr.
M-14	20 MW General Electric Combustion Turbine, Model No. LM2500, 275 MMBtu/hr.
M-16	20 MW General Electric Combustion Turbine, Model No. LM2500, 275 MMBtu/hr.

<u>Unit</u>	<u>Description</u>
M-17	20 MW Nominal (24.66 MW Peak Load) General Electric LM2500 Combustion Turbine Generator (Maximum Heat Input: 275 MMBtu/hr) Capable of Operating in Simple (Dry) or Combined Cycle (Wet) Mode with the Exhaust Routed through the One Through Steam Generator (OTSG). Combined Cycle Operation is Defined as When the Feed Water Valve Through the OTSG is Open.
M-19	20 MW Nominal (24.66 MW Peak Load) General Electric LM2500 Combustion Turbine Generator (Maximum Heat Input: 275 MMBtu/hr) Capable of Operating in Simple (Dry) or Combined Cycle (Wet) Mode with the Exhaust Routed through the OTSG. Combined Cycle Operation is Defined as When the Feed Water Valve Through the OTSG is Open.
X1	2.5 MW General Motors DEG, Model No. 20-645E4, 28.5 MMBtu/hr.
X2	2.5 MW General Motors DEG, Model No. 20-645E4, 28.5 MMBtu/hr.
SG1	600 kW General Motors/Detroit Black Start DEG, Model No. 12V92TAB/8123-7416 (Auth.: HAR §11-60.1-3)

2. The equipment is subject to GHG emission reduction requirements of HAR, Chapter 11-60.1, Subchapter 11 and associated permit conditions based on information from the GHG emission reduction plan and permit application for significant modification. The GHG emission reduction plan shall become a part of the CSP application process for renewals and any required modifications pursuant to HAR, Chapter 11-60.1, Subchapter 5. With each subsequent GHG emission reduction plan submittal, the permittee shall report:
 - a. The GHG emission reduction status;
 - b. Factors contributing to the emission changes;
 - c. Any control measure updates; and
 - d. Any new developments or changes that would affect the basis of the facility-wide GHG emissions cap.

(Auth.: HAR §11-60.1-5, §11-60.1-204(g))

Section B. GHG Permit Conditions

1. Permit conditions specified in Attachment II – GHG, including provisions to limit maximum potential GHG emissions, are state-only enforceable requirements which are not federally enforceable under the federal Clean Air Act.

(Auth.: HAR §11-60.1-3, §11-60.1-90, 11-60.1-161; 40 CFR §70.6)¹

2. The permittee shall comply with all applicable provisions of these conditions, including all emission limits, notification, testing, monitoring, and reporting requirements. The major requirements of these provisions are detailed in the special conditions of this attachment.

(Auth.: HAR §11-60.1-3, §11-60.1-90, 11-60.1-161)¹

Section C. GHG Emission Limitations

1. GHG Emission Caps

- a. Maalaea Generating Station shall not emit or cause to be emitted carbon dioxide equivalent (CO₂e) emissions in excess of its individual caps specified in Attachment II - GHG, Special Condition No. C.1.a of CSP No. 0548-01-C for CIP Generating Station, except as specified in Attachment II - GHG, Special Condition No. C.1.c.iv of this permit.
- b. All partnering facilities shall not emit or cause to be emitted total combined CO₂e emissions in excess of the combined limits specified in Attachment II - GHG, Special Condition No. C.1.b of CSP No. 0548-01-C for CIP Generating Station.
- c. For purposes of the CO₂e emission limits in Attachment II - GHG, Special Condition Nos. C.1.a and C.1.b of this permit:
 - i. The CO₂e emissions shall have the same meaning as that specified in HAR §11-60.1-1;
 - ii. In accordance with HAR §11-60.1-204(d)(6)(B), biogenic carbon dioxide (CO₂) emissions shall not be included when determining compliance with the emissions limit;
 - iii. The permittee shall be in compliance with the applicable emissions limits by the end of 2019 and each calendar year thereafter;
 - iv. The permittee may exceed the emissions cap specified in Attachment II – GHG, Special Condition No. C.1.a, if the GHG emissions limit specified in Attachment II - GHG, Special Condition No. C.1.b is met; and
 - v. At no time shall the permittee exceed Attachment II – GHG, Special Condition Nos. C.1.a and C.1.b simultaneously over a calendar year. For incidences when Attachment II - GHG, Special Condition Nos. C.1.a and C.1.b are exceeded simultaneously, emissions in excess of the total combined cap shall be allocated according to the following equation for compliance purposes:

$$X = XG \frac{(A - C)}{\sum_{A_i > C_i} (A_i - C_i)}$$

Where:

- X = Adjusted portion in metric tons or short tons of GHG emissions that are in excess of total combined cap specified in Attachment II – GHG, Special Condition No. C.1.b. The equation applies to all affected facilities that do not meet the individual and total combined GHG emission caps specified in Attachment II – GHG, Special Condition Nos. C.1.a and C.1.b, respectively.
- XG = Total combined actual GHG emissions from affected facilities minus total combined GHG emissions cap.
- A = Actual GHG emissions from the affected facility.
- C = GHG emissions cap for the affected facility.
- $\sum_{A_i > C_i} (A_i - C_i)$ = The sum of the difference between the actual emissions and cap emissions for all facilities that did not achieve the individual facility-wide GHG emissions cap.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90, §11-60.1-204)

2. GHG Emission Cap Revisions

- a. The facility-wide GHG emissions cap may be re-evaluated and revised by the Department in accordance with HAR §11-60.1-204(h).
- b. Any revision to the facility-wide GHG emissions caps shall be considered a significant modification subject to the application and review requirements of HAR §11-60.1-104. For each GHG emission cap revision, the Department may impose additional emission limits or requirements, or limit the time-frame allowed for the revised GHG emissions cap.

(Auth.: HAR §11-60.1-3, §11-60.1-90, §11-60.1-204)

3. Alternate Operating Scenarios

The alternate operating scenario for the PGV facility shutdown due to volcanic activity on the island of Hawaii in 2018, shall remain in effect until an additional net energy generation of 26,883 MWh per month from the PGV facility is reached in any month of the year. The following shall apply to the individual and total combined alternate operating scenario GHG emission cap adjustments starting January 1, 2020, and for any subsequent year until these alternate operating scenarios no longer apply:

- a. Attachment II – GHG, Special Condition No. C.3 no longer applies when:

$$NG_{PGV-R} \geq NG_{PGV2017}$$

Where:

- $NG_{PGV2017}$ = 26,883 Net Generating capacity from the PGV facility in calendar year 2017 on an average monthly basis (MWh) preceding its shutdown.
- NG_{PGV-R} = Net Generation from the restored PGV facility (MWh per month)

- b. The alternate scenario individual GHG emission cap adjustment for calendar year 2019 is 97,524 short tons for Hamakua Energy, LLC, 17,132 short tons for Kanoelehua-Hill Generating Station, 31,213 short tons for Keahole Generating Station, and 39,535 short tons for Puna Generating Station. Starting on January 1, 2020, and for any subsequent year, the alternate scenario GHG emissions individual cap adjustment for each of the foregoing island of Hawaii partnering facilities shall be calculated by adding one-twelfth (1/12) of the 2019 annual adjustment for each facility's individual GHG emissions cap specified in Attachment II – GHG, Special Condition No. C.1.a.ii of CSP No. 0548-01-C for CIP Generating Station per month for the facilities from January 1 of that year. Monthly adjustments to the individual GHG emission caps shall be determined as specified in Attachment II – GHG, Special Condition No. C.3.d until this alternate operating scenario no longer applies as specified in Attachment II – GHG, Special Condition No. C.3.a. A full one-twelfth (1/12) of the annual cap adjustment shall apply per month until the criteria in Attachment II – GHG, Special Condition No. C.3.a are met and not thereafter.
- c. The PGV alternate scenario total combined cap adjustment for calendar year 2019 is 185,404 short tons. Starting on January 1, 2020, and for any subsequent year, the PGV alternate operating scenario total combined GHG emissions cap adjustment shall be calculated by adding one-twelfth (1/12) of the 2019 annual adjustment of 15,450 short tons to the total combined cap specified in Attachment II – GHG, Special Condition No. C.1.b.ii of CSP No. 0548-01-C for CIP Generating Station per month from January 1 of that year. Monthly adjustments to the total combined GHG emissions cap shall be determined as specified in Attachment II – GHG, Special Condition No. C.3.d until this alternate operating scenario no longer applies as specified in Attachment II – GHG, Special Condition No. C.3.a. A full one-twelfth (1/12) of the annual cap adjustment shall apply per month until the criteria in Attachment II – GHG, Special Condition No. C.3.a are met and not thereafter.
- d. Monthly adjustments to the individual and total combined GHG emission caps shall be determined with the following equation:

$$AC = FAC/12$$

Where:

FAC = Full Adjustment to CO₂e caps (short tons – refer to table below)

AC = Monthly adjustment to GHG Emissions Caps

Generating Station	Full Adjustment to CO₂e Caps (Short Tons)	2020 CO₂e Cap (Short Tons)	FAC/12 (Short Tons)^b
Hamakua Energy	97,524	153,699	8,127
Kanoelehua-Hill	17,132	172,456	1,428
Keahole	31,213	242,208	2,601
Puna	39,535	31,747	3,295
Combined	185,404	see note ^a	15,450

^aTotal combined CO₂e cap for all partnering facilities is 7,023,257 short tons.

^bMonthly full CO₂e cap adjustment.

- e. Individual GHG emission cap adjustments, affecting the total combined GHG emissions cap, shall only apply to partnering facilities on the island of Hawaii.
- f. The permittee may exceed the adjusted individual GHG emissions cap as determined in Attachment II – GHG, Special Condition No. C.3.b, if the adjusted total combined GHG emission cap as determined in Attachment II – GHG, Special Condition No. C.3.c is met.
- g. Alternate operating scenario records shall be maintained in accordance with Attachment II - GHG, Special Condition No. D.3.
- h. The terms and conditions under each operating scenario shall meet all applicable requirements, including the special conditions of this permit.

(Auth.: HAR §11-60.1-3, §11-60.1-5; §11-60.1-204(h))

Section D. Monitoring and Recordkeeping Requirements

1. GHG Emissions

For calculating CO₂e emissions to assess fees and for determining compliance with the GHG emission caps, and quality assurance/quality control requirements, the permittee shall:

- a. Monitor mass CO₂ emissions data for the stationary source combustion units listed in Attachment II - GHG, Special Condition No. A.1 with the appropriate methods specified in 40 Code of Federal Regulations (CFR) §98.34;
- b. Estimate missing data in accordance with the applicable procedures in 40 CFR §98.35;
- c. Determine the metric tons of CO₂, methane (CH₄), and nitrous oxide (N₂O) in accordance with 40 CFR §98.33;
- d. Calculate the GHG emissions, expressed in metric tons of CO₂e, using Equation A-1 of 40 CFR §98.2;
- e. Convert the metric tons of CO₂e emissions to short tons for monitoring and annual emissions reporting as applicable. For the conversion, one (1) short ton is equal to 0.90718474 metric tons;
- f. Provide total actual CO₂e emissions semi-annually to HECO in Item 1 of **Monitoring Report Form: GHG Emissions**. The monitoring report form, with Item 1 emissions data, shall be signed and dated by a responsible official; and
- g. Report CO₂e emissions to the Department in accordance with Attachment II - GHG Special Condition No. E.4.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90; §11-60.1-204d(6)(c); 40 CFR §98.2, §98.33, §98.34, §98.35, §98.6)¹

2. Records

All records, including support information, shall be maintained for **at least five (5) years** from the date of the monitoring sample, measurement, test, report, or applications. Support information includes all maintenance, inspection, and repair records, and copies of all reports required by this permit. These records shall be true, accurate, and maintained in a permanent form suitable for inspection and be made available to the Department or authorized representative(s) upon request.

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

3. Alternate Operating Scenarios

- a. The permittee shall contemporaneously with making a change from one operating scenario to another record in a log, the scenario under which it is operating.
- b. The permittee shall maintain all records corresponding to the implementation of an alternate operating scenario.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90)

Section E. Notification and Reporting Requirements

1. Standard Condition Reporting

Notification and reporting pertaining to the following events shall be done in accordance with Attachment I, Standard Condition Nos. 17 and 24, respectively:

- a. Emissions of air pollutants in violation of HAR, Chapter 11-60.1 or this permit (excluding technology-based emission exceedances due to emergencies); and
- b. 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, SIP §11-60-16)²

2. Deviations

- a. Except as specified in Attachment II – GHG, Special Condition No. E.2.b, the permittee shall report in writing **within five (5) working days** any deviations from permit requirements, including those attributed to upset conditions, the probable cause of such deviations, and any corrective actions or preventive measures taken. Corrective actions may include a requirement for testing, or more frequent monitoring, or could trigger implementation of a corrective action plan.

- b. The permittee shall report in writing any CO₂e emissions exceeding the GHG emission cap specified in Attachment II – GHG, Special Condition No. C.1.c.v, the probable cause of such deviations, and any corrective actions or preventive measures taken. Corrective actions may include a requirement for testing, more frequent monitoring, or could trigger implementation of a corrective action plan. Reports shall be submitted **within sixty (60) days** following the end of each calendar year.

(Auth.: HAR §11-60.1-3, §11-60.1-15, §11-60.1-16, §11-60.1-90)

3. Compliance Certification

- a. During the permit term, the permittee shall submit at least **annually** to the Department and U.S. Environmental Protection Agency (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. For making this certification for the partnering facility conditions in Attachment II – GHG, the permittee is relying on information provided by other partners that these partners independently certify. The compliance certification shall include, at a minimum, the following information:
 - i. The identification of each term or condition of the permit that is the basis of the certification;
 - ii. The compliance status;
 - iii. Whether compliance was continuous or intermittent;
 - iv. The methods used for determining the compliance status of the source currently and over the reporting period;
 - v. 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;
 - vi. Brief description of any deviations including identifying as possible exceptions to compliance any periods during which compliance is required and which the excursion or exceedances as defined in 40 CFR Part 64 occurred; and
 - vii. Any additional information as required by the Department, including information to determine compliance.
- b. 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.
- c. Upon the written request of the permittee, the deadline for submitting the compliance certification may be extended, if the Department determines that reasonable justification exists for the extension.

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

4. Monitoring Reports

- a. The permittee shall complete and submit **semi-annual** monitoring reports to the Department that provide the metric tons and short tons of CO₂e emitted by all partnering facilities, except that biogenic CO₂ shall be excluded from the total CO₂e emissions. All reports 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). The following enclosed form, or equivalent form, shall be used for reporting and shall be signed and dated by a responsible official:

Monitoring Report Form: GHG Emissions

- b. For calendar year 2019, the permittee shall report the CO₂e emissions **within sixty (60) days** after the issuance of this permit. The Monitoring Report Form: GHG Emissions, or equivalent form, for the 2019 calendar year shall be used for reporting and shall be signed and dated by a responsible official.
- c. For calendar year 2020, the permittee shall report the CO₂e emissions **within sixty (60) days** after the issuance of this permit or **within sixty (60) days** after the end of the semi-annual calendar period, whichever is later. The Monitoring Report Form: GHG Emissions, or equivalent form, for the 2020 calendar year shall be used for reporting and shall be signed and dated by a responsible official.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90)

Section F. Agency Notification

Any document (including reports) required to be submitted by this permit shall be done in accordance with Attachment I, Standard Condition No. 28.

(Auth.: HAR §11-60.1-4, §11-60.1-90)

¹The citations to the 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.

²The 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.

**MONITORING REPORT FORM
GHG EMISSIONS
COVERED SOURCE PERMIT NO. 0067-01-C
(PAGE 1 OF 2)**

Amended Date: DATE

Expiration Date: July 27, 2009
(Expiration Date to be Revised Upon Permit Renewal)

In accordance with the HAR, 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: _____

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. In making this certification for the partnering facility conditions in Items 2 and 3 of this form, I am relying on information provided by other partners that these partners independently certify.

Responsible Official (Print): _____

Title: _____

Responsible Official (Signature): _____

1. Report the CO₂e emitted by Maalaea Generating Station during each reporting period for purposes of the facility's individual GHG emissions cap:

Emission Year Reporting For _____					
Reporting Period	Maalaea Generating Station Emissions (Metric Tons of CO ₂ e)			Maalaea Generating Station Emissions (Total CO ₂ e)	
	CO ₂ (Non-biogenic)	CH ₄	N ₂ O	Metric Tons	Short Tons
January 1 – June 30 (1 st Semi-annual Period)					
July 1 – December 31 (2 nd Semi-annual Period)					
Total Emissions →					

Provide the CO₂e emitted by Maalaea Generating Station in Item 1 above to HECO during each reporting period for purposes of calculating total combined GHG emissions from the partnering facilities.

**MONITORING REPORT FORM
GHG EMISSIONS
COVERED SOURCE PERMIT NO. 0067-01-C
(CONTINUED, PAGE 2 OF 2)**

Amended Date: DATE

Expiration Date: July 27, 2009

(Expiration Date to be Revised Upon Permit Renewal)

In accordance with the HAR, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the following information semi-annually:

2. Report the total combined CO₂e emitted by all partnering facilities during each reporting period for purposes of the total combined GHG emissions cap for these facilities:

Emission Year Reporting For _____					
Reporting Period	Total Combined Emissions from All Partnering Facilities (Metric Tons of CO ₂ e)			Total CO ₂ e	
	CO ₂ (Non-biogenic)	CH ₄	N ₂ O	Metric-tons	Short Tons
January 1 – June 30 (1 st Semi-annual Period)					
July 1 – December 31 (2 nd Semi-annual Period)					
Total Emissions →					

3. For incidences when the individual cap for Maalaea Generating Station and total combined cap for all partnering facilities are exceeded, report the emissions in excess of the total combined cap using the following equation:

$$X = XG \frac{(A-C)}{\sum_{A_i > C_i} (A_i - C_i)} = \underline{\hspace{2cm}}$$

Where:

X = Adjusted portion in metric tons or short tons of GHG emissions that are in excess of total combined cap specified in Attachment II – GHG, Special Condition No. C.1.b. The equation applies to all affected facilities that do not meet the individual and total combined GHG emission caps specified in Attachment II – GHG, Special Condition Nos. C.1.a and C.1.b, respectively.

XG = Total combined actual GHG emissions from affected facilities minus total combined GHG emissions cap.

A = Actual GHG emissions from the affected facility.

C = GHG emissions cap for the affected facility.

$\sum_{A_i > C_i} (A_i - C_i)$ = The sum of the difference between the actual emissions and cap emissions for all facilities that did not achieve the individual facility-wide GHG emissions cap.

DRAFT REVIEW SUMMARY

PERMIT APPLICATION REVIEW
GREENHOUSE GAS (GHG) EMISSION REDUCTION PLAN
Covered Source Permit (CSP) No. 0067-01-C
Application for Significant Permit Modification No. 0067-14 (0067-01-C)
Application for Significant Permit Modification No. 0067-15 (0067-02-C)

Applicant: Maui Electric Company, Ltd. (MECO)
Facility: Maalaea Generating Station
Located At: North Kihei Road, Kihei, Hawaii 96753
UTM Coordinates: 2,302,400 Meters N and 760,700 Meters E

Mailing Address: P.O. Box 398
Kahului, Hawaii 96733

Responsible Official: Mathew McNeff
Director, Power Supply Division
MECO
(808) 872-3245

Contact: Karin Kimura
Director, Environmental Division
Hawaiian Electric Company, Inc. (HECO)
(808) 543-4522
karin.kimura@hawaiianelectric.com

Background

MECO has applied for a significant modification to CSP No. 0067-01-C for Maalaea Generating Station to incorporate facility-wide GHG emission caps as defined in Hawaii Administrative Rules (HAR) §11-60.1-202. Site specific limits were previously established in the Hawaiian Electric Companies' GHG emission reduction plan that was updated on July 26, 2019, January 23, 2020, and February 14, 2020, May 22, 2020, and June 9, 2020, for modifying the permit. Updates include proposed cap adjustments due to complications arising from the shutdown of a geothermal energy plant and allocation of emissions for reducing the individual GHG emissions cap for the AES Hawaii, LLC cogeneration plant by sixteen percent (16%) below its baseline level. Affected facilities subject to GHG reductions are existing covered sources with maximum potential carbon dioxide equivalent (CO₂e) emissions (biogenic plus non-biogenic) equal to or greater than 100,000 short tons per year. The emission reductions are required by HAR, Subchapter 11 pursuant to Hawaii Act 234, 2007 which directed the Department of Health Clean Air Branch (CAB) to develop rules for regulating GHGs. Partnering will be used as a measure to comply with the emission caps in accordance with HAR §11-60.1-204(d)(6)(A).

Maalaea Generating Station is partnering with affected facilities of three (3) independent power producers (IPPs) and nine (9) affected plants owned and operated by the Hawaiian Electric Companies to allow flexibility in dispatching generating units for meeting requirements to cap GHGs. The three (3) IPPs are AES Hawaii, LLC, Hamakua Energy, LLC, and Kalaeloa Partners, L.P. Hawaiian Electric Companies' affected plants are from HECO, Hawaii Electric Light Company, Inc. (HELCO), and MECO. Flexibility for dispatching units is a concern in the event a facility has unplanned outages or there is reduced output from renewable generation such as solar (e.g., due to extended cloudy or rainy weather) or geothermal (e.g., deactivation of 38 megawatt (MW) geothermal plant due to volcanic activity on Hawaii Island).

The table below list affected facilities that have mutually agreed to partner.

Partnering Facilities^a			
IPP Plants			
Facility	Permit No.	Description	Island
AES Hawaii, LLC Cogeneration Plant	CSP No. 0087-02-C	203 MW Coal Fired Generation Plant Consisting of Two (2) CFB Boilers and Two (2) Limestone Dryers. The Boilers are Each Equipped with Lime Injection, SNCR, and a Baghouse.	Oahu
Hamakua Energy, LLC Cogeneration Plant	CSP No. 0243-01-C	65 MW Cogeneration Facility Consisting of Two (2) 23 MW CTs with Water Injection and SCR, Two (2) HRSGs, 1,250 kW Black Start DEG, and 19 MW Steam Turbine.	Hawaii
Kalaeloa Partners, L.P. Cogeneration Plant	CSP No. 0214-01-C	Two (2) 86 MW CTs with Steam Injection, Two (2) HRSGs, and 51 MW Steam Turbine.	Oahu
HECO Plants			
Facility	Permit No.	Description	Island
Campbell Industrial Park Generating Station	CSP No. 0548-01-C	135 MW CT with Water Injection and Two (2) 2,250 kW Black Start DEGs.	Oahu
Kahe Power Plant	CSP No. 0240-01-C	Six (6) Boilers (92 MW to 142 MW) and Two (2) 2.5 MW Black Start DEGs. A 142 MW Boiler is Equipped with Low NO _x Burners.	Oahu
Honolulu Power Plant	CSP No. 0238-01-C	56 MW Boiler and 57 MW Boiler.	Oahu
Waiau Power Plant	CSP No. 0239-01-C	Six (6) Boilers (49 MW to 92 MW), 50 MW CT and 52 MW CT.	Oahu
HELCO Plants			
Facility	Permit No.	Description	Island
Kanoiehua-Hill Power Plant	CSP No. 0234-01-C	14.1 MW Boiler, 23 MW Boiler, 11.6 MW CT, 2.0 MW DEG with Oxidation Catalyst, and Three (3) 2.75 MW DEGs with Oxidation Catalyst.	Hawaii
Keahole Power Plant	CSP No. 0007-01-C	Two (2) 20 MW CTs with Water Injection and SCR, Two (2) HRSGs, Three (3) 2.5 MW DEGs with FITR and Oxidation Catalyst, 500 kW Black Start DEG, 16 MW Steam Turbine, and 18 MW CT with Water Injection.	Hawaii
Puna Power Plant	CSP No. 0235-01-C	20 MW CT with water injection, 1,250 hp Black Start DEG, and 15.5 MW Boiler with Multicyclone Dust Collector.	Hawaii
MECO Plants			
Facility	Permit No.	Description	Island
Kahului Power Plant	CSP No. 0232-01-C	Two (2) 5.0 MW Boilers, One (1) 11.5 MW Boiler, and 12.5 MW Boiler.	Maui
Maalaea Power Plant	CSP No. 0067-01-C	Three (3) 2.5 MW DEGs with Oxidation Catalyst and Lube Oil Separator, Six (6) 5.6 MW DEGs with Oxidation Catalyst and Open Crankcase Filtration System, Two (2) 12.5 MW DEGs with Oxidation Catalyst and Open Crankcase Filtration System, Two (2) 12.5 MW DEGs with Oxidation Catalyst, Crankcase Filtration System, and FITR, Two (2) 20 MW CTs with Water Injection, Two (2) HRSGs, 18 MW Steam Turbine, Two (2) 20 MW CTs with Water Injection, HRSG, Two (2) 2.5 MW DEGs with Oxidation Catalyst, Lube Oil Separator, and FITR, and 600 kW Black Start DEG.	Maui
Palaa Power Plant	CSP No. 0031-04-C	Two (2) 1.25 MW DEGs with FITR and Oxidation Catalyst, Four (4) 1.0 MW DEGs with FITR and Oxidation Catalyst, Three (3) 2.2 MW DEGs with FITR, Oxidation Catalyst, and intake cooling, and 2.0 MW CT.	Molokai

^aCFB-circulating fluidized bed, CT- combustion turbine, DEG-diesel engine generator, FITR-fuel injection timing retard, HRSG-heat recovery steam generator, kW-kilowatt, MW-megawatt, SCR-selective catalytic reduction, and SNCR-selective non-catalytic reduction.

The GHG emission reduction plan for Maalaea Generating Station was used to establish the following for the significant permit modification to CSP No. 0067-01-C to incorporate GHG emission caps:

1. A total combined limit on CO₂e emissions from affected facilities operated by HECO, HELCO, MECO, and three (3) IPPs not to exceed 7,023,057 short tons (6,371,392 metric tons) per calendar year for calendar, except for calendar year 2019;
2. A total combined cap on CO₂e emissions from affected facilities operated by HECO, HELCO, MECO, and three (3) IPPs not to exceed 7,208,661 short tons (6,539,587 metric tons) for calendar year 2019;
3. Individual facility-wide limit on CO₂e emissions from the Maalaea Generating Station not to exceed 459,864 short tons (417,182 metric tons) per calendar year that will not apply as long as the total combined cap among partnering facilities is met; and
4. An equation allocating GHG emissions in excess of the total combined cap for facilities violating the individual and total combined GHG emission caps.

CSP No. 0548-01-C for Campbell Industrial Park (CIP) Generating Station will be the main permit for specifying individual and total combined GHG emission caps for all partnering facilities that will be referenced in permits issued to the HECO, HELCO, and MECO affected facilities. This will enable the modification of a single permit if CO₂e emission caps need to be revised and reduce the burden of modifying all of Hawaiian Electric Companies' permits had the caps been incorporated separately into each facility's permit.

The IPPs will have separate permits specifying individual and total combined GHG caps. Any GHG emissions cap revision will require each IPP to submit a separate permit application for significant modification since caps are incorporated separately into each affected facility's permit.

An opportunity for public comment on the draft GHG emissions reduction plan and revised permit for Maalaea Generating Station will be provided in accordance with HAR §11-60.1-205.

The Standard Industrial Classification Code (SICC) for this facility is 4911 – Electric Services.

Permitted Equipment Subject to GHG Emissions Cap

The following permitted equipment and associated appurtenances are subject to GHG emission reductions specified in Subchapter 11 of the HAR:

<u>Unit</u>	<u>Description</u>
M1	2.5 MW General Motor Diesel Engine Generator (DEG), Model No. 20-645E4, 29.2 MMBtu/hr;
M2	2.5 MW General Motor DEG, Model No. 20-645E4, 29.2 MMBtu/hr;
M3	2.5 MW General Motor DEG, Model No. 20-645E4, 29.2 MMBtu/hr;
M4	5.6 MW Cooper-Bessemer DEG, Model No. LSV-20-T, 58.8 MMBtu/hr;
M5	5.6 MW Cooper-Bessemer DEG, Model No. LSV-20-T, 58.8 MMBtu/hr;
M6	5.6 MW Cooper-Bessemer DEG, Model No. LSV-20-T, 58.8 MMBtu/hr;
M7	5.6 MW Cooper-Bessemer DEG, Model No. LSV-20-T, 58.8 MMBtu/hr;
M8	5.6 MW Colt Industries DEG, Model No. C-P PC2V, 60.2 MMBtu/hr;
M9	5.6 MW Colt Industries DEG, Model No. C-P PC2V, 60.2 MMBtu/hr;

M10	12.5 MW Mitsubishi DEG, Model No. 185V52/55A, 122.7 MMBtu/hr;
M11	12.5 MW Mitsubishi DEG, Model No. 185V52/55A, 122.7 MMBtu/hr;
M12	12.5 MW Mitsubishi DEG, Model No. 185V52/55A, 122.7 MMBtu/hr;
M13	12.5 MW Mitsubishi DEG, Model No. 185V52/55A, 122.7 MMBtu/hr;
M14	20 MW General Electric Combustion Turbine, Model No. LM2500, 275 MMBtu/hr;
M16	20 MW General Electric Combustion Turbine, Model No. LM2500, 275 MMBtu/hr;
M17	20 MW Nominal (24.66 MW Peak Load) General Electric LM2500 Combustion Turbine Generator (Maximum Heat Input: 275 MMBtu/hr) Capable of Operating in Simple (Dry) or Combined Cycle (Wet) Mode with the Exhaust Routed Through the One Through Steam Generator (OTSG). Combined Cycle Operation is Defined as When the Feed Water Valve Through the OTSG is Open;
M19	20 MW Nominal (24.66 MW Peak Load) General Electric LM2500 Combustion Turbine Generator (Maximum Heat Input: 275 MMBtu/hr) Capable of Operating in Simple (Dry) or Combined Cycle (Wet) Mode with the Exhaust Routed Through the OTSG. Combined Cycle Operation is Defined as When the Feed Water Valve Through the OTSG is Open;
X1	2.5 MW General Motors DEG, Model No. 20-645E4, 28.5 MMBtu/hr;
X2	2.5 MW General Motors DEG, Model No. 20-645E4, 28.5 MMBtu/hr; and
SG1	600 kW General Motors/Detroit Black Start DEG, Model No. 12V92TAB/8123-7416.

Air Pollution Controls

A diesel oxidation catalyst is used to control carbon monoxide (CO) emissions from DEG Units M1 through M13, X1, and X2. The diesel oxidation catalyst will reduce CO emissions by at least seventy percent (70%) or limit CO emissions to twenty-three (23) parts per million volume dry (ppmvd) or less at fifteen percent (15%) O₂.

Water injection is used for combustion turbine Units M14, M16, M17, and M19 to limit nitrogen oxide (NO_x) emissions to forty-two (42) ppmvd at fifteen percent (15%) O₂ with fuel-bound nitrogen content of 0.015% by weight or less.

FITR is used on Units M12, M13, X1, and X2 to control NO_x emissions.

Applicable Requirements

State Requirements:

Hawaii Administrative Rules

Title 11, Chapter 60.1	Air Pollution Control
Subchapter 1	General Requirements
HAR 11-60.1-1	Definitions
Subchapter 2	General Prohibitions
HAR 11-60.1-31	Applicability
HAR 11-60.1-32	Visible Emissions
HAR 11-60.1-38	Sulfur Oxides from Fuel Combustion
HAR 11-60.1-39	Storage of Volatile Organic Compounds
Subchapter 5	Covered Sources
HAR 11-60.1-81	Definitions

HAR 11-60.1-104	Applications for Significant Modification
Subchapter 6	Fees for Covered Sources, Noncovered Sources, and Agricultural Burning
HAR 11-60.1-111	Definitions
HAR 11-60.1-112	General Fee Provisions for Covered Sources
HAR 11-60.1-113	Application Fees for Covered Sources
HAR 11-60.1-114	Annual Fees for Covered Sources
HAR 11-60.1-115	Basis of Annual Fees for Covered Sources
Subchapter 8	Standards of Performance for Stationary Sources
Subchapter 9	Hazardous Air Pollution Sources
HAR 11-60.1-174	Maximum Achievable Control Technology (MACT) Emission Standards
Subchapter 11	Greenhouse Gas Emissions

HAR, Chapter 11-60.1, Subchapter 11, §11-60.1-204, GHG Emission Reduction Plan

1. Applicability to Subchapter 11 Pursuant to HAR §11-60.1-204(a)

HAR §11-60.1-204 is applicable to the Maalaea Generating Station since this facility is a permitted covered source with potential CO_{2e} emissions (biogenic plus non-biogenic) equal to or above 100,000 tons per year.

2. Baseline Emission Rate and Cap

Pursuant to HAR §11-60.1-204(b) and (c), MECO is proposing to establish annual facility-wide GHG emission caps for Maalaea Generating Station. Pursuant to HAR §11-60.1-204(d)(6)(A), MECO is proposing to combine the Maalaea Generating Station GHG emissions cap with other GHG emission caps established for partnering facilities to leverage emission reductions. Each facility may exceed its individual cap as long as the total combined GHG cap is met.

Partnering facilities used 2010 as the baseline year to establish the cap, except for the Kalaeloa Cogeneration Plant which used 2009 as the baseline year because 2010 was deemed unrepresentative due to an overhaul this facility's steam turbine.

During the public comment period held from April 16, 2019, to May 15, 2019, to consider draft permits for the partnering facilities, the Hawaiian Electric Companies requested a temporary adjustment to the collective partnership GHG emissions cap. The Hawaiian Electric Companies stated that the loss of renewable energy from PGV on Hawaii Island and the delay of new renewable energy projects planned for 2019, for reasons outside the direct control of the companies, has eliminated the additional compliance margin anticipated and relied upon in the GHG emission calculations. As indicated by the Hawaiian Electric Companies, the PGV plant was shut down in May 2018 due to the Kilauea eruption. Also, lava destroyed the Puna complex substation, the adjacent warehouse, and covered a few of PGV's geothermal wells, as well as cut off access to the PGV power plant. HECO, ultimately requested a 185,404 ton increase to the original partnership GHG emissions cap due to the loss of PGV for the entire 2019 operating year. This adjustment is documented in HECO's July 26, 2019, GHG emissions reduction plan.

According to HECO's February 14, 2020, correspondence, although a substantial amount of renewable energy was added, other renewable energy projects for 2019 and 2020 have been delayed until 2021. Preliminary GHG emissions of the partnership for calendar year 2019 are estimated to be 7,103,530 tons per year. This level of emissions exceeds the overall partnership GHG emissions cap of 7,023,257 tons per year that results in a sixteen percent (16%) reduction of GHG emissions from the total combined baseline emissions level.

Upon incorporating the temporary increase requested in HECO's February 14, 2020, correspondence, the DOH returned the revised draft permits to HECO and the partnering IPPs for another review on March 18, 2020. In April 2, 2020, correspondence, HECO requested the DOH to consider a provision in the permits that allows the 2020 PGV allowance to be increased to the 2019 level adjusted for the loss of PGV in the event the PGV plant implementation is delayed until later in 2020; and additionally allow for the 2019 level adjusted for the loss of PGV to be continued into 2021 if implementation is delayed into 2021. HECO, AES Hawaii, LLC, and Kalaehoa Partners, L.P. also requested that the DOH clarify that no penalties could be asserted for that period given that GHG levels for 2019 are already documented and the permit will be approved after year end 2019.

To address concerns after a public hearing on September 26, 2019, and second public comment period from August 14, 2019, to September 27, 2019, HECO stated in a May 22, 2020, email that AES Hawaii, LLC has agreed to reduce its individual GHG emissions cap by sixteen percent (16%) from its baseline emissions level. It was also HECO's understanding that PGV will not likely return to its level of pre-volcanic service by the end of 2020.

Recognizing the magnitude of legal uncertainties, an alternate operating scenario was incorporated into permits to address HECO's concerns on the delay in restoring operation of the PGV facility. The modification for CSP 0548-01-C was redrafted and returned to HECO for review on May 29, 2020.

The following provisions in the HAR allow the GHG emissions cap to be adjusted for events that are beyond the control of the owner or operator of an affected facility:

- a. HAR §11-60.1-204(h)(4) allows the facility-wide GHG emissions cap to be re-evaluated and revised if renewable energy producers cease operations or fail to meet contractual obligations with the affected source, and there are no other reasonable alternatives.
- b. HAR §11-60.1-204(h)(5) allows the facility-wide GHG emissions cap to be re-evaluated and revised when there are unforeseen events beyond the control of the permittee, resulting in long-term or temporary emission changes, whereby maintenance of the GHG emissions cap would be detrimental to the health and welfare of the public.

Based on the recent unforeseen events, the proposed revision to the facility-wide emissions cap for calendar year 2019 and the alternate operating scenario to address the delay in restoring operation to the PGV facility are considered to be within the provisions of HAR §11-60.1-204(h).

Pursuant to HAR §11-60.1-204(h)(4) and HAR §11-60.1-204(h)(5), CAB has agreed to temporarily adjust the GHG emission caps for calendar year 2019 due to the PGV shutdown. Calculations to reallocate emissions for facilities on Hawaii Island were provided by the Hawaiian Electric Companies and were updated on July 7, 2019, with lower numbers. For the adjustment, HECO determined the difference in emissions between electric plants on the Big Island operating with and without PGV. Emissions with PGV in operation were based on 2017 numbers from EPA's electronic Greenhouse Reporting Tool (e-GGRT). Since the PGV plant shutdown in May 2018, GHG emissions without PGV in operation were based on twelve (12) months of data from Hawaii Island electric plants from the beginning of July 2018 to the end of June 2019. The following tables provide results from HECO's evaluation to determine extra yearly GHG emissions from fossil fuel fired electric plants without renewable energy from PGV:

Big Island Plant GHG Emissions				
Big Island Plant	GHG Emissions (tons)			
	2017	2018	2019	July 2018- June 2019
	e-GGRT	Jul-Dec	Jan-Jun	
Hamakua Energy, LLC	98,962	112,722	126,252	238,974
HELCO Kanoelehua-Hill	193,103	90,662	89,683	180,345
HELCO Keahole	243,346	144,943	115,147	260,090
HELCO Puna	26,400	34,188	33,618	67,806
Total→	561,811	382,515	364,700	747,215

GHG Emissions Cap Adjustment for PGV Shutdown		
GHG Emissions (tons)		
2017 e-GGRT	July 2018- June 2019	Cap Adjustment (July 2018 – June 2019) Minus (2017 e-GGRT)
561,811	747,215	185,404

Individual GHG Emissions Caps for PGV Shutdown			
Big Island Plant	GHG Cap (tons)	Temporary GHG Cap (tons)	
	July 26, 2019 Greenhouse Gas Emission Reduction Plan (Page A-1)	Adjustment	CAP After PGV Shutdown
Hamakua Energy, LLC	153,699	97,524	251,223
HELCO Kanoelehua-Hill	172,456	17,132	189,588
HELCO Keahole	242,208	31,213	273,421
HELCO Puna	31,747	39,535	71,282
Total→		185,404	785,514

The CAB has agreed to revise the permits to temporarily adjust individual and total combined GHG emission caps for calendar year 2019 as a result of the PVG shutdown. The GHG emission cap adjustment for calendar year 2019 adds 185,404 short tons per year of GHG emissions to the original total combined cap referenced in the July 26, 2019, GHG emission reduction plan with PGV in operation. The adjustment is the extra amount of GHG emissions that would result from fossil fuel combustion to replace renewable energy provided by PGV that is distributed to partnering facilities on the island of Hawaii that include Hamakua Energy, LLC, Kanoelehua-Hill Generating Station, Keahole Generating Station, and Puna Generating Station. Temporary adjustments to the caps are as follows for the 2019 emission year:

2019 Temporary CO ₂ e Cap Adjustment due to PGV Shutdown			
Generating Station	CSP Permit No.	CO ₂ e Emission Cap ^{c, d}	
		Metric Tons per Year ^b	Short Tons per Year
AES Hawaii, LLC Cogeneration Plant ^a	0087-02-C	1,534,598	1,691,605
Hamakua Energy, LLC Cogeneration Plant	0243-01-C	227,906	251,223
Kalaeloa Partners, L.P. Cogeneration Plant	0214-01-C	993,198	1,094,813
HECO Campbell Industrial Park Generating Station	0548-01-C	48,752	53,740
HECO Honolulu Generating Station	0238-01-C	0	0
HECO Kahe Generating Station	0240-01-C	1,935,707	2,133,752
HECO Waiiau Generating Station	0239-01-C	733,265	808,286
HELCO Kanoelehua-Hill Generating Station	0234-01-C	171,991	189,588
HELCO Keahole Generating Station	0007-01-C	248,043	273,421
HELCO Puna Generating Station	0235-01-C	64,666	71,282
HELCO Shipman Generating Station	0236-01-C	0	0
MECO Kahului Generating Station	0232-01-C	140,281	154,633
MECO Maalaea Generating Station	0067-01-C	417,182	459,864
MECO Palaau Generating Station	0031-04-C	23,999	26,454
Combined		6,539,587	7,208,661

^aAES Hawaii, LLC proposal cap is 10,000 short tons of CO₂e emissions above the baseline of 1,681,605 short tons.

^bMetric Tons = (0.90718474) x (Short Tons).

^cIndividual caps that were adjusted for facilities on Hawaii Island due to the PGV shutdown are highlighted in red.

^dTotals may not sum due to independent rounding.

The temporary combined emissions caps for 2019 will be made part of the permit for each partnering facility in accordance with HAR §11-60.1-204(d)(6)(C). Pursuant to HAR §11-60.1-202, a “facility-wide GHG emissions cap” means a permit emissions limitation, applicable to a covered source, limiting the entire source’s annual non-biogenic GHG, and biogenic nitrous oxide and methane emissions. In accordance with HAR §11-60.1-202, a facility-wide GHG emissions cap may also be defined in multiple CSPs to identify partnering facilities with an approved combined GHG emissions cap as described in HAR §11-60.1-204(d)(6)(A).

The temporary total combined cap of 7,208,661 short tons for operating year 2019 is a 13.78% reduction from the total combined baseline emissions of 8,361,021 short tons. Although the reduction is less than sixteen percent (16%) from the total combined baseline GHG emissions level, there are no provisions in HAR §11-60.1-204(h) that require a GHG control assessment for revising the cap due to reasonably unforeseen events beyond the control of the owner or operator of an affected source.

In response to public comments on draft permits to incorporate GHG cap provisions to limit GHGs, AES Hawaii, LLC negotiated adjustments to its initial individual GHG cap proposal of 1,691,605 short tons. The initial cap proposal by AES Hawaii, LLC was 10,000 short tons above its individual GHG baseline level of 1,681,605 short tons. As indicated in HECO's January 23, 2020, letter regarding the adjustment of site-specific caps, AES Hawaii, LLC agreed to reduce its individual GHG emissions cap by 10,000 short tons for a zero percent reduction from its individual baseline level.

After further negotiations, AES Hawaii, LLC ultimately agreed to a GHG cap adjustment of sixteen percent (16%) below its baseline level which is documented in May 22, 2020, and June 9, 2020, emails from HECO. This sixteen percent (16%) reduction (269,075 short tons of CO₂e) from the GHG baseline plus 10,000 short tons reduction from the initial GHG cap proposal of 1,691,605 short tons was distributed evenly among four (4) partnering facilities on Oahu that included Kalaeloa Partners, L.P, HECO CIP Generating Station, HECO Kahe Generating Station, and HECO Waiiau Generating Station. Each individual cap for these four (4) facilities was increased by 69,764 short tons of CO₂e emissions for a total combined CO₂e emission increase of 279,056 short tons. Therefore, the total combined partnership GHG emissions cap is unchanged. This adjustment to distribute emissions to Oahu partnering plants excluded HECO Honolulu Generating Station and the AES Hawaii, LLC cogeneration plant.

For 2020 and beyond, individual caps will remain at the levels originally proposed by the partnering facilities, except that for AES, Hawaii, LLC, Kalaeloa Partners, L.P, HECO CIP Generating Station, HECO Kahe Generating Station, and HECO Waiiau Generating Station, individual caps will remain at the level agreed in the partnership for distributing emissions after adjusting the individual GHG emission cap for AES Hawaii, LLC. The individual GHG emissions cap for AES Hawaii, LLC will be a sixteen (16%) reduction from its individual GHG emission baseline level.

Individual caps for the Hawaii Island facilities will return to the levels proposed prior to the PGV shutdown. The levels are provided in the table on Page 7 showing GHG caps proposed on Page A-1 of the GHG emission reduction plan before deciding to request an adjustment to the caps due to the shutdown of PGV as a result of volcanic activity.

The CO₂e emission baselines and GHG emission caps proposed for the partnering facilities, that achieve a sixteen percent (16%) reduction in GHG emissions from the total combined baseline level, are provided in the following table pursuant to HECO's June 9, 2020, email for calendar year 2020 and beyond:

2020 and Beyond CO ₂ e Facility Emission Caps and Actual GHG Baseline						
Plant	CSP Permit No.	Emissions (short tons)				% Reduction
		Baseline CO ₂ e	Baseline Biogenic CO ₂	Baseline CO ₂ e Less Biogenic CO ₂	CO ₂ e Cap (see notes a,b,& c)	
		(a)	(b)	(c)=(a)-(b)	Proposed	
AES	0087-02-C	1,681,605	0	1,681,605	1,412,548	16.0%
Hamakua	0243-01-C	182,975	0	139,433	153,699	16.0%
Kalaeloa	0214-01-C	1,094,813	0	1,094,813	1,164,577	-6.4%
HECO CIP	0548-01-C	19,179	4,233	14,946	123,504	-726.3%
HECO Honolulu ^a	0238-01-C	133,609	0	133,609	0	100%
HECO Kahe	0240-01-C	2,776,073	0	2,776,073	2,203,516	20.6%
HECO Waiiau	0239-01-C	1,074,359	0	1,074,359	878,050	18.3%
HELCO Hill	0234-01-C	222,784	0	222,784	172,456	22.6%
HELCO Keahole	0007-01-C	191,387	0	191,387	242,208	-26.6%
HELCO Puna	0235-01-C	99,691	0	99,691	31,747	68.2%
HELCO Shipman	0236-01-C	10,192	0	10,192	0	100% Plant Closed
MECO Kahului	0232-02-C	230,839	0	230,839	154,633	33.0%
MECO Maalaea	0067-01-C	620,654	1,142	619,512	459,864	25.8%
MECO Palaaui	0031-04-C	28,236	0	28,236	26,454	6.3%
Combined		8,366,396	5,375	8,361,021 ^d	7,023,256 ^d	16.0%

^a HECO Honolulu Generating Station is currently deactivated (not operating but could restart if necessary).

^b AES Hawaii, LLC individual cap was adjusted to reduce the cap by 10,000 short tons plus 16% reduction (269,057 short tons) below baseline level for a total 279,057 short ton reduction as shown in brown. AES Hawaii, LLC's individual GHG cap was adjusted to reduce the cap by 279,057 short tons.

^c Adjustment due to AES Hawaii, LLC cap reduction is 69,764 short tons that add up to 279,056 tons for four (4) facilities highlighted in red. Adjustments in the table above were made to individual caps proposed on page A-1 of HECO's GHG emission reduction plan submitted on July 26, 2019 pursuant to HECO's June 9, 2020 email with documents prepared by the partners. Individual caps were adjusted for facilities in the table above due to the PGV shutdown and the AES Hawaii, LLC individual cap adjustment. The AES Hawaii, LLC cap adjustment is a 10,000 short ton reduction from the previous proposal plus a 16% reduction (269,057 short tons) from the individual baseline level from another proposal. Adjustments were distributed equally among four (4) Oahu facilities excluding AES Hawaii, LLC and the Honolulu Generating Station. The Individual cap adjustment to these facilities was an additional 69,764 short tons of CO₂e emissions for each of the four (4) facilities highlighted in red. Totals may not sum due to independent rounding.

^d Total combined partnering facility proposed GHG baseline and GHG emission cap are 8,361,022 and 7,023,257 short tons, respectively. Totals may not sum due to independent rounding.

The combined emissions cap for 2020 and beyond will be made part of the permit for each partnering facility in accordance with HAR §11-60.1-204(d)(6)(C). Pursuant to HAR §11-60.1-202, a "facility-wide GHG emissions cap" means a permit emissions limitation, applicable to a covered source, limiting the entire source's annual non-biogenic GHG, and biogenic nitrous oxide and methane emissions. In accordance with HAR §11-60.1-202, a facility-wide GHG emissions cap may also be defined in multiple CSPs to identify partnering facilities with an approved combined GHG emissions cap as described in HAR §11-60.1-204(d)(6)(A).

The total combined GHG emissions cap for 2020 and beyond is a sixteen percent (16%) reduction from the total combined baseline emissions level established for the partnering facilities.

For information, the table below titled “Actual GHG Baseline and Notional 16% CO₂e Facility Emission Caps” shows the total combined baseline and GHG emissions cap if a sixteen percent (16%) reduction had been applied to each partnering facility separately. The total combined emissions cap in the table below achieves the same reduction as that proposed for the partnering facilities that have combined their facility-wide emission caps to leverage emission reductions in meeting the combined GHG emission caps in accordance with HAR, Subparagraph 11-60.1-204(d)(6)(A). The total combined CO₂e cap in the table below for the notional cap is 7,023,258 short tons per year which is a sixteen percent (16%) reduction from the total combined baseline. The total combined CO₂e emission cap proposed, as shown in the table on Page 10 of this review for 2020 and beyond, is 7,023,257 short tons per year which is a sixteen percent (16%) reduction from the total combined baseline. Totals may not sum due to independent rounding.

Actual GHG Baseline and Notional 16% CO ₂ e Facility Emission Caps						
Plant	CSP Permit No.	Emissions (short tons)				% Reduction
		Baseline CO ₂ e	Baseline Biogenic CO ₂	Baseline CO ₂ e Less Biogenic CO ₂	CO ₂ e Cap	
		(a)	(b)	(c)=(a)-(b)	Notional	
AES	0087-02-C	1,681,605	0	1,681,605	1,412,548	16.0%
Hamakua	0243-01-C	182,975	0	182,975	153,699	16.0%
Kalaeloa	0214-01-C	1,094,813	0	1,094,813	919,643	16.0%
HECO CIP	0548-01-C	19,179	4,233	14,946	12,555	16.0%
HECO Honolulu ^a	0238-01-C	133,609	0	133,609	112,232	16.0%
HECO Kahe	0240-01-C	2,776,073	0	2,776,073	2,331,901	16.0%
HECO Waiiau	0239-01-C	1,074,360	0	1,074,360	902,462	16.0%
HELCO Hill	0234-01-C	222,784	0	222,784	187,139	16.0%
HELCO Keahole	0007-01-C	191,387	0	191,387	160,765	16.0%
HELCO Puna	0235-01-C	99,691	0	99,691	83,740	16.0%
HELCO Shipman	0236-01-C	10,192	0	10,192	8,561	16.0%
MECO Kahului	0232-02-C	230,839	0	230,839	193,905	16.0%
MECO Maalaea	0067-01-C	620,654	1,142	619,512	520,390	16.0%
MECO Palaau	0031-04-C	28,236	0	28,236	23,718	16.0%
Combined		8,366,396	5,375	8,361,022	7,023,258	16.0%

^aThe HECO Honolulu Generating Station is currently deactivated (not operating but could restart if necessary).

For information, the CAB requested HECO to address GHG emission reductions as a result of the ongoing pandemic. According to an April 9, 2020, press release from Hawaiian Electric at: <https://www.hawaiianelectric.com/hawaiian-electric-sees-drop-in-demand-during-pandemic>, there has been a significant reduction in the use of electricity as tourism activities cease, businesses close, and thousands of residents stay home to slow the spread of COVID-19.

In a May 22, 2020, email, Hawaiian Electric anticipates that the resumption of economic activity will increase the use of electricity to levels that could approach pre-COVID-19 conditions; however, it is not clear to HECO when that will occur.

The CAB used a Tier 1 methodology in 40 Code of Federal Regulations (CFR) Part 98, §98.33, to validate the proposed individual and total combined GHG emission caps. Enclosure 1 provides a bar chart of fuel consumption for Maalaea Generating station. Enclosure 2 provides data on fuel consumption and spreadsheet calculations of GHG emissions. Enclosure 3 shows curves in short tons and metric tons of GHGs emitted from Maalaea Generating Station between years 2005 and 2016. Emissions for these curves are provided in Enclosure 2. Enclosure 4 shows curves in short tons and metric tons of the total combined GHGs emitted by partnering facilities between years 2005 and 2016.

Calculations in Enclosure 2 show that the 2010 baseline GHG emission proposed for Maalaea Generating Station are about 0.346% higher than that estimated by CAB. The CAB used default heating values for estimating GHGs whereas MECO used the Tier 2 methodology prescribed by the Environmental Protection Agency (EPA) under 40 CFR Part 98 for primary fuel burned with actual fuel heating values from sampling fuel. Since actual heating values were used, MECO's estimates are considered to be more representative of actual emissions.

3. Proposed Control Strategy

MECO is forecasting a sixteen percent (16%) combined facility-wide reduction in GHG emissions based on implementation of various strategies that will allow a portion of the increased demand for electricity to be met from non-fossil fueled resources. As new renewable energy projects come online, the operation of existing fossil-fuel units can be reduced. As indicated by HECO at a meeting that took place on May 2, 2017, an E3 Plan in the Power Supply Improvement Plan (PSIP) will be used as the preferred plan to achieve one hundred percent (100%) renewable energy. According to Hawaiian Electric Companies' December 2016 PSIP Update Report, new alternative generating resources from the E3 Plan include:

- a. A 24 MW Na Pua Makani Wind Project, 109.6 MW Replacement Waiver Projects, 15 MW Grid-Scale photovoltaic (PV)-Community Based Renewable Energy (CBRE), 70 MW Contingency Battery, and 20 MW West Loch PV project by the end of 2019, as forecasted for HECO;
- b. 5.74 MW from PV Projects, Install 1 MW Grid-Scale PV-CBRE, Install 2 MW Wind-CBRE, and 9 MW Contingency Battery by the end of 2019 as forecasted for MECO; and
- c. Install 1 MW Grid-Scale PV-CBRE and 2 MW Wind-CBRE by the end of 2019, as forecasted for HELCO.

Federal Requirements:

40 CFR Part 98, Subpart A, Mandatory Greenhouse Gas Reporting is applicable to this facility because actual CO₂e emissions from stationary fuel combustion units at Maalaea Generating Station are greater than 25,000 metric tons per year.

40 CFR Part 98, Subpart C, General Stationary Fuel Combustion Sources is applicable to this facility because the DEG and combustion turbines are stationary fuel combustion sources as defined in §98.30 and Maalaea Generating Station meets the applicability requirements of 40 CFR §98.2(a)(2).

40 CFR Part 63 - National Emission Standards for Hazardous Air Pollutants (NESHAP) for Source Categories (Maximum Achievable Control Technologies (MACT) Standards) are listed as follows:

DEG Units M1 through M13, X1, and X2 are subject to 40 CFR Part 63 Subpart ZZZZ - NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE) since these units were constructed before June 12, 2006, and are existing stationary RICE located at an area source of hazardous air pollutant (HAP) emissions. As indicated in the permit application for a significant modification, the diesel oxidation catalyst will reduce CO emissions by at least seventy percent (70%) or limit CO emissions to twenty-three (23) ppmvd at fifteen percent (15%) O₂. Federal RICE regulations require the use of ultralow sulfur diesel (ULSD) in accordance with

40 CFR §63.6604 and §80.510 for Units M1, M2, M3, X1, and X2. Requirements from the RICE NESHAP are being incorporated into the permit renewal for this facility.

Black start DEG Unit SG1 is subject to 40 CFR Part 63, Subpart ZZZZ - NESHAP for Stationary RICE since the unit was constructed before June 12, 2006, and is an existing stationary RICE located at an area source of HAP emissions. However, as an emergency engine it must operate in accordance with §63.6640(f)(2) of Subpart ZZZZ.

40 CFR Part 60, Subpart GG, New Source Performance Standards, Standards of Performance for Stationary Gas Turbines is applicable to stationary gas turbines with a heat input at peak load equal to or greater than ten (10) MMBtu/hr and at facilities with these units that commence construction, reconstruction, or modification after October 3, 1977. The existing permit specifies Subpart GG applicability for combustion turbine Units M14, M16, M17, and M19.

Non-Applicable Requirements

State Requirements:

Hawaii Administrative Rules (HAR)

Title 11, Chapter 60.1	Air Pollution Control
Subchapter 3	Open Burning
Subchapter 4	Noncovered Sources
Subchapter 7	Prevention of Significant Deterioration Review
Subchapter 9	Hazardous Air Pollution Sources
HAR 11-60.1-180	National Emission Standards for Hazardous Air Pollutants
Subchapter 11	
HAR 11-60.1-204(d)(2)	GHG Control Assessment
HAR 11-60.1-204(d)(3)	Available Control Measures
HAR 11-60.1-204(d)(4)	The Technically Feasible Measures
HAR 11-60.1-204(d)(5)	Control Effectiveness and Cost Evaluation

GHG Control Assessment

MECO will be limited to a total combined GHG emissions reduction of sixteen percent (16%) below the combined partnering facility baseline level by the end of 2020 using the total combined baseline emissions estimated for the partnering facilities to establish the cap. An alternate operating scenario will apply if the generating capacity of the PGV facility is not restored to levels preceding its shutdown due to volcanic activity in 2018. Pursuant to HAR §11-60.1-202, a facility-wide GHG emissions cap may be defined in multiple CSPs to identify partnering facilities with an approved combined GHG emissions cap as described in HAR §11-60.1-204(d)(6)(A).

As specified in HAR §11-60.1-204(d)(2), if the required GHG emissions cap requiring a sixteen percent (16%) emissions reduction from baseline year is deemed unattainable, the permittee shall conduct a GHG control assessment.

Since the facility-wide GHG emissions cap (total combined GHG cap for partnering facilities) is sixteen percent (16%) below the total combined baseline GHG emissions level, a GHG control assessment is not required for determining whether the required GHG emissions cap is attainable for 2020 and beyond.

A GHG control assessment is also not required for temporary cap adjustments due to events which are beyond the control of the owner or operator of an affected facility. The PGV facility shutdown due to volcanic activity on the Big Island is outside the control of the partnering facilities.

Although a GHG control assessment is not required, the GHG emission reduction plan for the Hawaiian Electric Companies evaluated GHG emission control options. The following table summarizes the GHG control assessment provided in the GHG emission reduction plan for the Hawaiian Electric Companies' affected facilities:

GHG Control Option	Feasibility and Benefit
Carbon Capture and Storage (CCS)	Not economically viable. Please refer to Attachment B of the GHG emission reduction plan.
Fuel Switching or Co-Fired Fuels (Natural Gas)	Not feasible – Hawaiian Electric Companies explored importing liquefied natural gas. However, the Hawaii Public Utilities Commission (PUC) rejected that option as part of its decision to deny the merger of the Hawaiian Electric Companies with NextEra. Please refer to Attachment C of the GHG emission reduction plan.
Fuel Switching or Co-Fired Fuels (Biofuels)	Not feasible on a large scale – Hawaiian Electric Companies are currently permitted and are burning limited quantities of biodiesel as indicated in Attachment D of GHG emission reduction plan.
Energy Efficiency Upgrades and Combustion Improvements	No economically viable improvements were identified that would contribute significantly towards reducing GHG emissions. Please refer to Attachment E of the GHG emission reduction plan.

GHG Control Option	Feasibility and Benefit
Restrictive Operations or Equipment Retirement	If one of the generating facilities in the Hawaiian Electric Companies' electrical grids restricts operation to limit its GHG emissions, other facilities must operate more to meet customer demand. The Partnership concept provides flexibility for lower emitting facilities to operate more to lower overall emissions and Hawaiian Electric intends to do this as much as possible within the system and economic constraints.
Restrictive Operations or Equipment Retirement (continued)	<p>As new renewable energy projects come online, the operation of existing fossil-fueled units can be reduced or these units can be retired. The Hawaiian Electric Companies' have deactivated or retired the following facilities:</p> <ul style="list-style-type: none"> • Shipman Generating Station closed on December 31, 2015. • Honolulu Generating Station was deactivated January 2014.
Renewable Energy Projects (Wind and Solar) and Battery Energy Storage Systems.	Please refer to control strategies in the December 2016 PSIP for the Hawaiian Electric companies.

Federal Requirements:

40 CFR Part 52.21 - Prevention of Significant Deterioration of Air Quality
40 CFR Part 61 – NESHAP

Best Available Control Technology (BACT)

The BACT analysis from the previous permit application review is still valid. A BACT analysis is required for new or modified sources that have the potential to emit or increase emissions above significant amounts as defined in HAR §11-60.1-1. Since this is not a new source, nor are any modifications proposed that have the potential to cause a significant increase in air emissions, a BACT analysis is not required.

Prevention of Significant Deterioration (PSD)

The PSD determination from the previous permit application review is still valid and additional PSD review is not required. This facility is not a new major stationary source, nor does this application propose any major modifications to a major stationary source as defined in 40 CFR Part 52.21. A major modification is defined as a project at an existing major source that will result in a significant and a significant net emissions increase above specified emission thresholds for pollutants subject to regulation.

Major Source/ Synthetic Minor Applicability

The facility's classification as a major source remains unchanged from the previous permit application review.

A synthetic minor source is a facility with operational limitations in order to keep potential emissions lower than major source levels (\geq one hundred (100) tons per year of criteria pollutants or \geq ten (10) tons per year of individual HAP or twenty-five (25) tons per year of a combination of HAPs). This facility is a major source and therefore is not a synthetic minor source.

Compliance Assurance Monitoring (CAM), 40 CFR Part 64

The purpose of CAM is to provide reasonable assurance that compliance is being achieved with large emission units that rely on air pollution control device equipment to meet an emissions limit or standard. Pursuant to 40 CFR Part 64, for CAM to be applicable, the emissions unit must:

- (1) Be located at a major source;
- (2) Be subject to an emissions limit or standard;
- (3) Use a control device to achieve compliance;
- (4) Have potential pre-control emissions that are greater than the major source level; and
- (5) Not otherwise be exempt from CAM.

Although the DEG Units M1 through M13, X1, and X2 rely on an oxidation catalyst to meet a CO emissions standard in 40 CFR Part 63, Subpart ZZZZ, and seven (7) of the fifteen (15) units have potential pre-control emissions greater than the major source level for CO based on AP-42 uncontrolled emission factor from Table 3.4-1, NSPS and NESHAP/MACT standards proposed after November 15, 1990, are exempt from CAM requirements pursuant to 40 CFR §64.2(b). The CAM regulation does not apply for monitoring CO emissions from these DEGs because Subpart ZZZZ was promulgated after November 15, 1990.

CAM is not applicable to combustion turbine generators M14, M16, M17, and M19. Although these units rely on a water injection system to achieve compliance with federal NO_x standards (PSD/BACT and Subpart GG), a continuous monitoring system (CEMS) is used to determine compliance with the NO_x emissions limit. Also, water injection is not considered a control device as defined in §64.1 of the CAM regulation. As such, the combustion turbine generators are exempt from CAM for NO_x.

Air Emissions Reporting Requirements (AERR)

40 CFR Part 51, Subpart A – AERR, is based on the emissions of criteria air pollutants from point sources (as defined in 40 CFR Part 51, Subpart A), which exceed the AERR thresholds as shown in the following table:

Pollutant	Potential Emissions (TPY) ¹	AERR Triggering Level ¹ (TPY)		Pollutant	In-house Total Facility Triggering Levels ¹ (TPY)
		1 Year Cycle (Type A)	3 Year Cycle (Type B)		
NO _x	13,306	≥2,500	100	NO _x	≥25
SO ₂	3,523	≥2,500	100	SO ₂	≥25
CO	1,597	≥2,500	1,000	CO	≥250
PM ₁₀ /PM _{2.5}	1,014	≥250/250	100	PM ₁₀ /PM _{2.5}	≥25/25
VOC	975	≥250	100	VOC	≥25
Pb (see note 2)	0.004	---	≥0.5 (actual)	Pb	≥5
HAPs	19.54	---	---	HAPs	≥5

¹Criteria pollutants include NO_x, sulfur dioxide (SO₂), CO, particulate matter less than ten (10) microns in diameter (PM₁₀), particulate matter less than 2.5 microns in diameter (PM_{2.5}), ozone (formed from precursor VOCs), and lead (Pb).

²Based on 2016 actual emissions.

This facility exceeds Type A and B triggering levels. Therefore, AERR requirements are applicable.

The CAB also requests annual emissions reporting from those facilities that have facility-wide emissions of a single air pollutant exceeding in-house triggering levels or is a covered source. Annual emissions reporting for the facility will be required for in-house recordkeeping purposes since this is a covered source.

Insignificant Activities

Insignificant activities identified in MECO's August 21, 2012, permit application to renew CSP Nos. 0067-01-C and 0067-02-C, that meet exemption criteria in HAR §11-60.1-82(f) and (g), are as follows:

<u>Basis for Exemption</u>	<u>Description</u>
§11-60.1-82(f)(1)	120 gallon diesel day tank for each of the following units: M1, M2, M3, X1, and X2; 523 gallon diesel day tank for each of the following units: M4, M5, M6, M7, M8, M9, M10, M11, M12, and M13 185 gallon fire pump diesel fuel tank; 23,739 gallon M14/M16 day tank; 13,500 gallon M17 day tank; 5,000 gallon used oil tanker; 130 gallon SG1 day tank; 300 gallon biodiesel tanks (Tank Nos. 1 and 2); 1,860 gallon biodiesel tank; 304 gallon lube oil tank (Tank No.4) for units M4 through M9; 500 gallon used oil tank for Units M4 through M9; 1,800 gallon lube oil tank for Units M8 and M9; 1,800 gallon used lube oil tank for Units M8 and M9; 1,846 gallon used oil/sludge tank for Units M4 through M9; 4,202 gallon used engine lube oil for Units M10 through M13; and

<u>Basis for Exemption</u>	<u>Description</u>
	6,770 gallon used oil tank for Units M10 through M13.
§11-60.1-82(f)(2)	There may occasionally be fuel burning equipment with a heat input capacity less than one (1) MMBtu/hr used at the station.
§11-60.1-82(f)(5)	There may occasionally be standby generators and other emergency equipment.
§11-60.1-82(f)(7)	Fugitive equipment leaks form valves, flanges, pump seals, and VOC water separators; Solvents are used for maintenance purposes; 12,600 barrel fuel oil tanks (Tanks A and B) storing No. 2 diesel; 8,057 barrel fuel oil tanks (Tanks 1A and 2A) storing No. 2 diesel; 24,674 barrel fuel oil tank (Tank 3A) storing No. 2 diesel; and 32,227 barrel fuel oil tank (Tank 4A) storing No. 2 diesel.

Alternate Operating Scenarios

The application for significant modification did not propose any new alternate operating scenarios, however, in April 2, 2020, correspondence, HECO requested the DOH to consider provisions in the permits that allows the emissions cap for partnering facilities to be increased for calendar years 2019 and 2020 in the event the start-up of PGV operations is delayed. In response, the DOH has agreed to amend the permits to incorporate the following alternate operating scenarios:

For the PGV facility shutdown due to volcanic activity on the island of Hawaii in 2018, if the combined generation of the PGV facility and other renewable energy sources on Hawaii Island are not restored to levels that PGV had preceding its shutdown, the following alternate individual and total combined GHG emissions caps will be calculated as follows:

- a. One-twelfth (1/12) of the 2019 individual GHG emission cap adjustments for Hawaii Island partnering facilities less combined net generation from additional Hawaii Island renewable energy sources will be added to the individual GHG emission caps of these facilities set forth for 2020 and beyond for each month the renewable energy levels are not restored to PGV system levels preceding its shutdown.
- b. One-twelfth (1/12) of the total combined cap adjustment for 2019 of 185,404 short tons less combined net generation from additional Hawaii Island renewable energy sources will be added to the total combined GHG emission cap specified for 2020 and beyond for each month renewable energy levels are not restored to PGV system levels preceding its shutdown.

Project Emissions

Emissions of NO_x, CO, VOC, particulate matter (PM), SO₂, and HAPs were evaluated. Emissions were based on the maximum capacity of the equipment and 8,760 hours per year of operation except for Units X1, X2, and SG1 that were based on hour limits for this equipment. It was assumed, conservatively, that PM is equal to PM₁₀ and PM₁₀ is equal to PM_{2.5}. Because of the uncertainties associated with AP-42 emission factors, compliance factors (based on stack test data) greater than AP-42 emission factors were used for certain emission rates. A seventy percent (70%) reduction was assumed for estimating CO emissions from DEGs with diesel engine oxidation catalyst. Some of the HAPs were determined using EPRI PISCES Air Toxic Database, while some were based on 1994 test data from HECO's Waiiu Generating Station.

NO_x Emissions					
Unit	AP-42 EF (lb/MMBtu)	Assumed EF (lb/MMBtu)	Heat Input (MMBtu/hr)	Emission Rate (lb/hr)	Emission Rate (TPY)
M1	3.2	3.362	29.20	98.2	430
M2	3.2	3.362	29.20	98.2	430
M3	3.2	3.362	29.20	98.2	430
M4	3.2	4.999	58.80	293.9	1,287
M5	Not applicable	4.300	58.80	252.8	1,107
M6	3.2	4.999	58.80	293.9	1,287
M7	Not applicable	5.700	58.80	335.2	1,468
M8	3.2	3.732	60.20	224.7	984
M9	3.2	3.732	60.20	224.7	984
M10	Not applicable	1.5	122.70	184.1	806
M11	Not applicable	1.5	122.70	184.1	806
M12	Not applicable	2.087	122.70	256.1	1,122
M13	Not applicable	2.087	122.70	256.1	1,122
M14 (see Note a)	-----	-----	-----	42.3	185
M16 (see Note a)	-----	-----	-----	42.3	185
M17 (see Note a)	-----	-----	-----	42.3	185
M19 (see Note a)	-----	-----	-----	42.3	185
X1 (see Note b)	Not applicable	2.400	28.50	68.4	150
X2 (see Note b)	Not applicable	2.400	28.50	68.4	150
SG1 (see Note c)	3.2	3.202	6.34	20.3	3.0
Total→					13,306

^aBased on maximum permitted emission limit.

^bBased on 4,380 hours per year operation.

^cBased on 300 hours per year operation.

CO Emissions					
Unit	AP-42 EF (lb/MMBtu)	Assumed EF (lb/MMBtu)	Heat Input (MMBtu/hr)	Emission Rate (lb/hr)	Emission Rate (TPY)
M1	0.26	0.362	29.20	10.6	46
M2	0.26	0.362	29.20	10.6	46
M3	0.26	0.362	29.20	10.6	46
M4	0.26	0.403	58.80	23.7	104
M5	0.26	0.403	58.80	23.7	104
M6	0.26	0.403	58.80	23.7	104
M7	0.26	0.403	58.80	23.7	104
M8	0.26	0.394	60.20	23.7	104
M9	0.26	0.394	60.20	23.7	104
M10	Not applicable	0.123	122.70	15.1	66
M11	Not applicable	0.123	122.70	15.1	66
M12	Not applicable	0.173	122.70	21.2	93
M13	Not applicable	0.173	122.70	21.2	93
M14 (see Note a)	-----	-----	-----	26.9	118
M16 (see Note a)	-----	-----	-----	26.9	118
M17 (see Note a)	-----	-----	-----	26.8	117
M19 (see Note a)	-----	-----	-----	26.8	117
X1 (see Note b)	0.26	0.371	28.50	10.6	23
X2 (see Note b)	0.26	0.371	28.50	10.6	23
SG1 (see Note c)	0.26	0.852	6.34	5.40	0.8
Total→					1,597

^aBased on maximum permitted emission limit.

^bBased on 4,380 hours per year operation.

^cBased on 300 hours per year operation.

VOC Emissions					
Unit	AP-42 EF (lb/MMBtu)	Assumed EF (lb/MMBtu)	Heat Input (MMBtu/hr)	Emission Rate (lb/hr)	Emission Rate (TPY)
M1	0.08	0.238	29.20	6.95	30
M2	0.08	0.238	29.20	6.95	30
M3	0.08	0.238	29.20	6.95	30
M4	0.08	0.238	58.80	14.0	61
M5	0.08	0.238	58.80	14.0	61
M6	0.08	0.238	58.80	14.0	61
M7	0.08	0.238	58.80	14.0	61
M8	0.08	0.238	60.20	14.3	63
M9	0.08	0.238	60.20	14.3	63
M10	0.08	0.071	122.70	8.76	38
M11	0.08	0.238	122.70	29.2	128
M12	Not applicable	0.258	122.70	31.7	139
M13	Not applicable	0.258	122.70	31.7	139
M14 (see Note a)	-----	-----	-----	0.80	3.5
M16 (see Note a)	-----	-----	-----	0.80	3.5
M17 (see Note a)	-----	-----	-----	3.80	17
M19 (see Note a)	-----	-----	-----	3.80	17
X1 (see Note b)	0.08	0.238	28.50	6.78	15
X2 (see Note b)	0.08	0.238	28.50	6.78	15
SG1(see Note c)	0.08	0.090	6.34	0.57	0.1
Total→					975

^aBased on maximum permitted emission limit.

^bBased on 4,380 hours per year operation.

^cBased on 300 hours per year operation.

PM/PM ₁₀ /PM _{2.5} Emissions					
Unit	AP-42 EF (lb/MMBtu)	Assumed EF (lb/MMBtu)	Heat Input (MMBtu/hr)	Emission Rate (lb/hr)	Emission Rate (TPY)
M1	0.0573	0.098	29.20	2.86	13
M2	0.0573	0.098	29.20	2.86	13
M3	0.0573	0.098	29.20	2.86	13
M4	0.0573	0.112	58.80	6.59	29
M5	0.0573	0.112	58.80	6.59	29
M6	0.0573	0.112	58.80	6.59	29
M7	0.0573	0.112	58.80	6.59	29
M8	0.0573	0.186	60.20	11.2	49
M9	0.0573	0.186	60.20	11.2	49
M10	Not applicable	0.054	122.70	6.63	29
M11	Not applicable	0.054	122.70	6.63	29
M12	Not applicable	0.319	122.70	39.1	171
M13	Not applicable	0.319	122.70	39.1	171
M14 (see Note a)	-----	-----	-----	19.7	86
M16 (see Note a)	-----	-----	-----	19.7	86
M17 (see Note a)	-----	-----	-----	19.7	86
M19 (see Note a)	-----	-----	-----	19.7	86
X1 (see Note b)	0.0573	0.131	28.50	3.73	8.2
X2 (see Note b)	0.0573	0.131	28.50	3.73	8.2
SG1 (see Note c)	0.0573	0.069	6.34	0.44	0.1
Total→					1,014

^aBased on maximum permitted emission limit.

^bBased on 4,380 hours per year operation.

^cBased on 300 hours per year operation.

SO ₂ Emissions					
Unit	AP-42 EF (lb/MMBtu)	Assumed EF (lb/MMBtu)	Heat Input (MMBtu/hr)	Emission Rate (lb/hr)	Emission Rate (TPY)
M1	0.002	0.002	29.20	0.06	0.2
M2	0.002	0.002	29.20	0.06	0.2
M3	0.002	0.002	29.20	0.06	0.2
M4	0.404	0.413	58.80	24.3	106
M5	0.404	0.413	58.80	24.3	106
M6	0.404	0.413	58.80	24.3	106
M7	0.404	0.413	58.80	24.3	106
M8	0.404	0.413	60.20	24.9	109
M9	0.404	0.413	60.20	24.9	109
M10	0.404	0.413	122.70	50.7	222
M11	0.404	0.413	122.70	50.7	222
M12	Not applicable	0.473	122.70	58.0	254
M13	Not applicable	0.473	122.70	58.0	254
M14 (see Note a)	-----	-----	-----	110.0	482
M16 (see Note a)	-----	-----	-----	110.0	482
M17 (see Note a)	-----	-----	-----	110.0	482
M19 (see Note a)	-----	-----	-----	110.0	482
X1 (see Note b)	0.002	0.002	28.50	0.06	0.1
X2 (see Note b)	0.002	0.002	28.50	0.06	0.1
SG1 (see Note c)	0.404	0.404	6.34	2.6	0.4
Total→					3,523

^aBased on maximum permitted emission limit.

^bBased on 4,380 hours per year operation.

^cBased on 300 hours per year operation.

The HAP emissions from MECO's permit application for significant modification for Maalaea Generating Station to incorporate GHG emission caps for partnering facilities are as follows:

HAP	Emissions (TPY) – M1, M2, M3, M4, & M6					
	M1	M2	M3	M4	M5	Total
Acetaldehyde	3.22E-03	3.22E-03	3.22E-03	6.49E-03	6.49E-03	2.26E-02
Acrolein	1.01E-03	1.01E-03	1.01E-03	2.03E-03	2.03E-03	7.09E-03
1,3 Butadiene	2.05E-03	2.05E-03	2.05E-03	4.12E-03	4.12E-03	1.44E-02
Benzene	9.92E-02	9.92E-02	9.92E-02	2.00E-01	2.00E-01	6.98E-01
Formaldehyde	1.01E-02	1.01E-02	1.01E-02	2.03E-02	2.03E-02	7.09E-02
Naphthalene	1.66E-02	1.66E-02	1.66E-02	3.35E-02	3.35E-02	1.17E-01
Toluene	3.59E-02	3.59E-02	3.59E-02	7.24E-02	7.24E-02	2.53E-01
Xylene	2.47E-02	2.47E-02	2.47E-02	4.97E-02	4.97E-02	1.74E-01
Arsenic Compounds	1.41E-03	1.41E-03	1.41E-03	2.83E-03	2.83E-03	9.89E-03
Beryllium Compounds	3.96E-05	3.96E-05	3.96E-05	7.98E-05	7.98E-05	2.78E-04
Cadmium Compounds	6.14E-04	6.14E-04	6.14E-04	1.24E-03	1.24E-03	4.32E-03
Chromium Compounds	1.41E-03	1.41E-03	1.41E-03	2.83E-03	2.83E-03	9.89E-03
Lead Compounds	1.79E-03	1.79E-03	1.79E-03	3.61E-03	3.61E-03	1.26E-02
Manganese Compounds	1.01E-01	1.01E-01	1.01E-01	2.03E-01	2.03E-01	7.09E-01
Mercury Compounds	1.53E-04	1.53E-04	1.53E-04	3.09E-04	3.09E-04	1.08E-03
Nickel Compounds	5.88E-04	5.88E-04	5.88E-04	1.18E-03	1.18E-03	4.12E-03
Polycyclic Organic Matter	2.71E-02	2.71E-02	2.71E-02	5.46E-02	5.46E-02	1.91E-01
Selenium Compounds	3.20E-03	3.20E-03	3.20E-03	6.44E-03	6.44E-03	2.25E-02
Total	3.30E-01	3.30E-01	3.30E-01	6.65E-01	6.65E-01	2.32

HAP	Emissions (TPY) – M5, M7, M8, & M9				
	M6	M7	M8	M9	Total
Acetaldehyde	6.49E-03	6.49E-03	6.64E-03	6.64E-03	2.63E-02
Acrolein	2.03E-03	2.03E-03	2.08E-03	2.08E-03	8.22E-03
1,3 Butadiene	4.12E-03	4.12E-03	4.22E-03	4.22E-03	1.67E-02
Benzene	2.00E-01	2.00E-01	2.05E-01	2.05E-01	8.10E-01
Formaldehyde	2.03E-02	2.03E-02	2.08E-02	2.08E-02	8.22E-02
Naphthalene	3.35E-02	3.35E-02	3.43E-02	3.43E-02	1.36E-01
Toluene	7.24E-02	7.24E-02	7.41E-02	7.41E-02	2.93E-01
Xylene	4.97E-02	4.97E-02	5.09E-02	5.09E-02	2.01E-01
Arsenic Compounds	2.83E-03	2.83E-03	2.90E-03	2.90E-03	1.15E-02
Beryllium Compounds	7.98E-05	7.98E-05	8.17E-05	8.17E-05	3.23E-04
Cadmium Compounds	1.24E-03	1.24E-03	1.27E-03	1.27E-03	5.02E-03
Chromium Compounds	2.83E-03	2.83E-03	2.90E-03	2.90E-03	1.15E-02
Lead Compounds	3.61E-03	3.61E-03	3.69E-03	3.69E-03	1.46E-02
Manganese Compounds	2.03E-01	2.03E-01	2.08E-01	2.08E-01	8.22E-01
Mercury Compounds	3.09E-04	3.09E-04	3.16E-04	3.16E-04	1.25E-03
Nickel Compounds	1.18E-03	1.18E-03	1.21E-03	1.21E-03	4.78E-03
Polycyclic Organic Matter	5.46E-02	5.46E-02	5.59E-02	5.59E-02	2.21E-01
Selenium Compounds	6.44E-03	6.44E-03	6.59E-03	6.59E-03	2.61E-02
Total	6.65E-01	6.65E-01	6.81E-01	6.81E-01	2.69

HAP	Emissions (TPY) – M10, M11, M12, & M13				
	M10	M11	M12	M13	Total
Acetaldehyde	1.35E-02	1.35E-02	1.35E-02	1.35E-02	5.40E-02
Acrolein	4.23E-03	4.23E-03	4.23E-03	4.23E-03	1.69E-02
1,3 Butadiene	8.60E-03	8.60E-03	8.60E-03	8.60E-03	3.44E-02
Benzene	4.17E-01	4.17E-01	4.17E-01	4.17E-01	1.67E+00
Formaldehyde	4.24E-02	4.24E-02	4.24E-02	4.24E-02	1.70E-01
Naphthalene	6.99E-02	6.99E-02	6.99E-02	6.99E-02	2.80E-01
Toluene	1.51E-01	1.51E-01	1.51E-01	1.51E-01	6.04E-01
Xylene	1.04E-01	1.04E-01	1.04E-01	1.04E-01	4.16E-01
Arsenic Compounds	5.91E-03	5.91E-03	5.91E-03	5.91E-03	2.36E-02
Beryllium Compounds	1.67E-04	1.67E-04	1.67E-04	1.67E-04	6.68E-04
Cadmium Compounds	2.58E-03	2.58E-03	2.58E-03	2.58E-03	1.03E-02
Chromium Compounds	5.91E-03	5.91E-03	5.91E-03	5.91E-03	2.36E-02
Lead Compounds	7.52E-03	7.52E-03	7.52E-03	7.52E-03	3.01E-02
Manganese Compounds	4.25E-01	4.25E-01	4.25E-01	4.25E-01	1.70E+00
Mercury Compounds	6.45E-04	6.45E-04	6.45E-04	6.45E-04	2.58E-03
Nickel Compounds	2.47E-03	2.47E-03	2.47E-03	2.47E-03	9.88E-03
Polycyclic Organic Matter	1.14E-01	1.14E-01	1.14E-01	1.14E-01	4.56E-01
Selenium Compounds	1.34E-02	1.34E-02	1.34E-02	1.34E-02	5.36E-02
Total	1.39	1.39	1.39	1.39	5.56

HAP	Emissions (TPY) – M14, M16, M17, & M19				
	M14	M16	M17	M19	Total
Acetaldehyde	3.04E-02	3.04E-02	3.04E-02	3.04E-02	1.22E-01
Acrolein	9.49E-03	9.49E-03	9.49E-03	9.49E-03	3.80E-02
1,3 Butadiene	1.93E-02	1.93E-02	1.93E-02	1.93E-02	7.72E-02
Benzene	6.62E-02	6.62E-02	6.62E-02	6.62E-02	2.65E-01
Formaldehyde	3.37E-01	3.37E-01	3.37E-01	3.37E-01	1.35E+00
Naphthalene	4.22E-02	4.22E-02	4.22E-02	4.22E-02	1.69E-01
Toluene	3.38E-01	3.38E-01	3.38E-01	3.38E-01	1.35E+00
Xylene	2.32E-01	2.32E-01	2.32E-01	2.32E-01	9.28E-01
Arsenic Compounds	1.32E-02	1.32E-02	1.32E-02	1.32E-02	5.28E-02
Beryllium Compounds	3.73E-04	3.73E-04	3.73E-04	3.73E-04	1.49E-03
Cadmium Compounds	5.78E-03	5.78E-03	5.78E-03	5.78E-03	2.31E-02
Chromium Compounds	1.32E-02	1.32E-02	1.32E-02	1.32E-02	5.28E-02
Lead Compounds	1.69E-02	1.69E-02	1.69E-02	1.69E-02	6.76E-02
Manganese Compounds	9.52E-01	9.52E-01	9.52E-01	9.52E-01	3.81E+00
Mercury Compounds	1.45E-03	1.45E-03	1.45E-03	1.45E-03	5.80E-03
Nickel Compounds	5.54E-03	5.54E-03	5.54E-03	5.54E-03	2.22E-02
Polycyclic Organic Matter	4.82E-02	4.82E-02	4.82E-02	4.82E-02	1.93E-01
Selenium Compounds	3.01E-02	3.01E-02	3.01E-02	3.01E-02	1.20E-01
Total	2.16	2.16	2.16	2.16	8.65

HAP	Emissions (TPY) – X1, X2, & SG-1			
	X1	X2	SG-1	Total
Acetaldehyde	1.57E-03	1.57E-03	2.40E-05	3.16E-03
Acrolein	4.92E-04	4.92E-04	7.49E-06	9.91E-04
1,3 Butadiene	2.00E-03	2.00E-03	1.52E-05	4.02E-03
Benzene	4.84E-02	4.84E-02	7.38E-04	9.75E-02
Formaldehyde	4.92E-03	4.92E-03	7.50E-05	9.92E-03
Naphthalene	8.11E-03	8.11E-03	1.24E-04	1.63E-02
Toluene	1.75E-02	1.75E-02	2.67E-04	3.50E-02
Xylene	1.20E-02	1.20E-02	1.84E-04	2.42E-02
Arsenic Compounds	6.87E-04	6.87E-04	1.05E-05	1.38E-03
Beryllium Compounds	1.93E-05	1.93E-05	2.95E-07	3.89E-05
Cadmium Compounds	3.00E-04	3.00E-04	4.56E-06	6.05E-04
Chromium Compounds	6.87E-04	6.87E-04	1.05E-05	1.38E-03
Lead Compounds	8.74E-04	8.74E-04	1.33E-05	1.76E-03
Manganese Compounds	4.93E-02	4.93E-02	7.51E-04	9.94E-02
Mercury Compounds	7.49E-05	7.49E-05	1.14E-06	1.51E-04
Nickel Compounds	2.87E-04	2.87E-04	4.37E-06	5.78E-04
Polycyclic Organic Matter	1.32E-02	1.32E-02	2.02E-04	2.66E-02
Selenium Compounds	1.56E-03	1.56E-03	2.38E-05	3.14E-03
Total	1.62E-01	1.62E-01	2.46E-03	3.26E-01

Maximum potential GHG emissions based on information from the permit applications for a significant modification to incorporate GHG emission caps are summarized as follows:

MAXIMUM POTENTIAL CO₂e EMISSIONS FOR MAALAEA GENERATING STATION

Description →	ΣGHG Mass-Based Emissions	GWP	CO ₂ e Emissions Rate	
Source Reference or Derivation →	(tons/year)	40 CFR §98 Table A-1	(a)*(b)	[(a)*(b)]/1.10231
Unit of Measure →		None	(tons/year)	(Metric tons/year)
GHG Pollutant ↓	(a)	(b)	(c)	(d)
Carbon Dioxide (CO ₂)	1,473,144	1	1,473,144	1,336,414
Methane (CH ₄)	59.72	25	1,493	1,354
Nitrous Oxide (N ₂ O)	11.95	298	3,562	3,231
Maximum Potential CO₂e Emissions			1,478,199	1,304,999

MECO is proposing an individual CO₂e emissions cap of 459,864 short tons (417,182 metric tons) per calendar year for Maalaea Generating Station for operating year 2020 and beyond. This individual cap is an approximate 25.8% decrease in GHG emissions from the baseline GHG level of 619,512 short tons (562,012 metric tons). While this individual limit may be exceeded, the proposed total combined GHG emissions limit is expected to reduce overall GHG emissions among partnering facilities by sixteen percent (16%) from the total combined baseline emissions.

Ambient Air Quality Assessment

An ambient air quality impact assessment was not performed since there are no increase in emissions for the significant permit modification to incorporate GHG emission caps.

Significant Permit Conditions

1. Maalaea Generating Station shall not emit or cause to be emitted CO₂e emissions in excess of 417,182 metric tons (460,864 short tons) per calendar year except as specified in, Attachment II – GHG, Special Condition No. C.1.c.iv of the permit. This CO₂e emissions limit will be specified in Attachment II – GHG, Special Condition No. C.1.a of CSP No. 0548-01-C for CIP Generating Station and referenced in Attachment II – GHG, Special Condition No. C.1.a of CSP No. 0067-01-C for Maalaea Generating Station.

For 2019, individual caps will be adjusted for Hamakua Energy, LLC, Kanoelehua-Hill Generating Station, Keahole Generating Station, and Puna Generating Station due to the PGV shutdown. The individual GHG emissions cap will remain the same for Maalaea Generating Station.

For 2020 and beyond, individual caps will be adjusted for Oahu Island facilities to distribute emissions from the AES individual cap adjustment to sixteen percent (16%) below its baseline level. The individual GHG emissions cap for 2020 will remain the same for the Maalaea Generating Station. Individual GHG emission caps for the Hawaii Island facilities will return to what was originally proposed for the facilities.

Reason: HAR §11-60.1-204(d)(6)(A) §11-60.1-204(h)(4), and §11-60.1-204(h)(5).

2. The following total combined CO₂e emissions caps will be specified in Attachment II – GHG Special Condition No. C.1.b of CSP No. 0548-01-C for CIP Generating Station and referenced in Attachment II – GHG, Special Condition No. C.1.b of CSP No. 0067-01-C for Maalaea Generating Station.
 - a. For 2019, all partnering facilities shall not emit or cause to be emitted total combined CO₂e emissions in excess of 7,208,661 short tons (6,539,587 metric tons) per calendar year.
 - b. For 2020 and beyond, all partnering facilities shall not emit or cause to be emitted total combined CO₂e emissions in excess of 7,023,257 short tons (6,371,392 metric tons) per calendar year, except as specified in the alternate operating scenario provisions.

Reason: HAR §11-60.1-204(d)(6)(A), §11-60.1-204(h)(4) and §11-60.1-204(h)(5).

3. For purposes of the CO₂e emission limits in Attachment II – GHG, Special Condition Nos. C.1.a and C.1.lb for Maalaea Generating Station:
 - a. The CO₂e emissions shall have the same meaning as that specified in HAR §11-60.1-1;
 - b. In accordance with HAR §11-60.1-204(d)(6)(B), biogenic carbon dioxide (CO₂) emissions are not included when determining compliance with the emissions limit;
 - c. The permittee shall be in compliance with the applicable emission limits by the end of 2019 and each calendar year thereafter;

- d. The permittee may exceed the emissions cap specified in Attachment II – GHG, Special Condition No. C.1.a, if the GHG emissions limit specified in Attachment II – GHG, Special Condition No. C.1.b. is met; and
- e. At no time shall the permittee exceed Attachment II – GHG, Special Condition Nos. C.1.a and C.1.b simultaneously over a calendar year. For incidences when Attachment II – GHG, Special Condition Nos. C.1.a and C.1.b of this permit are exceeded simultaneously, emissions in excess of the total combined cap shall be allocated according to the following equation for compliance purposes:

$$X = XG \frac{(A - C)}{\sum_{A_i > C_i} (A_i - C_i)}$$

Where:

- X = Adjusted portion in metric tons or short tons of GHG emissions that are in excess of total combined cap specified in Attachment II – GHG, Special Condition No.C.1.b. The equation applies to all affected facilities that do not meet the individual and total combined GHG emission caps specified in Attachment II – GHG, Special Condition Nos. C.1.a and C.1.b, respectively.
- XG = Total combined actual GHG emissions from affected facilities minus total combined GHG emissions cap. Total combined emissions cap cannot be less than sixteen percent (16%) of total combined baseline emission.
- A = Actual GHG emissions from the affected facility.
- C = GHG emissions cap for the affected facility.
- $\sum_{A_i > C_i} (A_i - C_i)$ = The sum of the difference between the actual emissions and cap emissions for all facilities that did not achieve the individual facility-wide GHG emissions cap.

Reason: Required by HAR §11-60.1-3, §11-60.1-5, §11-60.1-90, §11-60.1-204.

- 4. The alternate operating scenario for the PGV facility shutdown due to volcanic activity on the island of Hawaii in 2018, shall remain in effect until an additional net energy generation of 26,883 MWh per month from the PGV facility is reached in any month of the year. The following shall apply to the individual and total combined alternate operating scenario GHG emission cap adjustments starting January 1, 2020, and for any subsequent year until these alternate operating scenarios no longer apply:
 - a. Attachment II – GHG, Special Condition No. C.3 no longer applies when:

$$NG_{PGV-R} \geq NG_{PGV2017}$$

Where:

- $NG_{PGV2017}$ = 26,883 Net Generating capacity from the PGV facility in calendar year 2017 on an average monthly basis (MWh) preceding its shutdown.
- NG_{PGV-R} = Net Generation from the restored PGV facility (MWh per month)

- b. The alternate scenario individual GHG emission cap adjustment for calendar year 2019 is 97,524 short tons for Hamakua Energy, LLC, 17,132 short tons for Kanoelehua-Hill Generating Station, 31,213 short tons for Keahole Generating Station, and 39,535 short tons for Puna Generating Station. Starting on January 1, 2020, and for any subsequent year, the alternate scenario GHG emissions individual cap adjustment for each of the foregoing island of Hawaii partnering facilities shall be calculated by adding one-twelfth (1/12) of the 2019 annual adjustment for each facility's individual GHG emissions cap specified in Attachment II – GHG, Special Condition No. C.1.a.ii of CSP No. 0548-01-C for CIP Generating Station per month for the facilities from January 1 of that year. Monthly adjustments to the individual GHG emission caps shall be determined as specified in Attachment II – GHG, Special Condition No. C.3.d until this alternate operating scenario no longer applies as specified in Attachment II – GHG, Special Condition No. C.3.a. A full one-twelfth (1/12) of the annual cap adjustment shall apply per month until the criteria in Attachment II – GHG, Special Condition No. C.3.a are met and not thereafter.
- c. The PGV alternate scenario total combined cap adjustment for calendar year 2019 is 185,404 short tons. Starting on January 1, 2020, and for any subsequent year, the PGV alternate operating scenario total combined GHG emissions cap adjustment shall be calculated by adding one twelfth (1/12) of the 2019 annual adjustment of 15,450 short tons to the total combined cap specified in Attachment II – GHG, Special Condition No. C.1.b.ii of CSP No. 0548-01-C for CIP Generating Station per month from January 1 of that year. Monthly adjustments to the total combined GHG emissions cap shall be determined as specified in Attachment II – GHG, Special Condition No. C.3.d until this alternate operating scenario no longer applies as specified in Attachment II – GHG, Special Condition No. C.3.a. A full one-twelfth (1/12) of the annual cap adjustment shall apply per month until the criteria in Attachment II – GHG, Special Condition No. C.3.a are met and not thereafter.
- d. Monthly adjustments to the individual and total combined GHG emission caps shall be determined with the following equation:

$$AC = FAC/12$$

Where:

FAC =
AC =

Full Adjustment to CO_{2e} caps (short tons – refer to table below)
Monthly adjustment to GHG emissions caps

Generating Station	Full Adjustment to CO _{2e} Caps (Short Tons)	2020 CO _{2e} Cap (Short Tons)	FAC/12 (Short Tons) ^b
Hamakua Energy	97,524	153,699	8,127
Kanoelehua-Hill	17,132	172,456	1,428
Keahole	31,213	242,208	2,601
Puna	39,535	31,747	3,295
Combined	185,404	see note ^a	15,450

^aTotal combined CO_{2e} cap for all partnering facilities is 7,023,257 short tons.

^bMonthly full CO_{2e} cap adjustment.

- e. Individual GHG emission cap adjustments, affecting the total combined GHG emissions cap, shall only apply to partnering facilities on the island of Hawaii.
- f. The permittee may exceed the adjusted individual GHG emissions cap as determined in Attachment II – GHG, Special Condition No. C.3.b, if the adjusted total combined GHG emission cap as determined in Attachment II – GHG, Special Condition No. C.3.c is met.

- g. Alternate operating scenario records shall be maintained in accordance with Attachment II - GHG, Special Condition No. D.3.
- h. The terms and conditions under each operating scenario shall meet all applicable requirements, including the special conditions of this permit.

Reason HAR §11-60.1-3, §11-60.1-5, §11-60.1-204(h).

- 5. Semi-annual monitoring report submittals for the GHG emission caps and allocating excess emissions pursuant to Attachment II – GHG, Special Condition No. C.1.c.v are as follows:
 - a. The permittee shall complete and submit **semi-annual** monitoring reports to the Department. All reports 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), be signed and dated by a responsible official, except that biogenic CO₂ emissions shall be excluded from the total CO₂e emissions.
 - b. For calendar year 2019, the permittee shall report the CO₂e emissions **within sixty (60) days** after the issuance of this permit. The Monitoring Report Form: GHG Emissions, or equivalent form, for the 2019 calendar year shall be used for reporting and shall be signed and dated by a responsible official.
 - c. For calendar year 2020, the permittee shall report the CO₂e emissions **within sixty (60) days** after issuance of this permit or **within sixty (60) days** after the end of the semi-annual calendar period, whichever is later. The Monitoring Report Form: GHG Emissions, or equivalent form, for the 2020 calendar year shall be used for reporting and shall be signed and dated by a responsible official

Reason: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90.

Conclusion and Recommendation

MECO submitted an application for significant permit modification to incorporate GHG emission caps and significant permit conditions to implement GHG reduction measures established in the GHG emissions reduction plan.

The HECO, HELCO, MECO, and IPP plants are proposing a sixteen percent (16%) GHG emissions reduction from the total combined baseline GHG emissions for calendar year 2020 and beyond; and to use a total combined GHG emission cap by partnering pursuant to HAR §11-60.1-204(d)(6)(A).

MECO's GHG emissions reduction plan for Maalaea Generating Station was reviewed and determined to be in compliance with HAR §11-60.1-204. The proposed baseline emission rate and emission caps were evaluated using past fuel consumption data and determined to be reasonably representative as documented in Enclosures 1 through 3. Further review in Enclosure 4 shows total combined GHG emissions from partnering facilities following calendar year 2005 have steadily declined slightly below a 2010 baseline emissions level more than sixteen percent (16%) as of the end of calendar year 2016. Preliminary GHG emissions estimated for the partnership for calendar year 2019, however, are 7,103,530 tons per year which is less than a sixteen percent (16%) reduction from the 2010 GHG emissions level in Enclosure 4.

For calendar year 2019 and 2020, the overall partnership caps are adjusted in accordance with HAR §11-60.1-204(h) due to unforeseen events. The shutdown of the PGV geothermal plant towards the end of 2018 due to volcanic activity and delay in renewable energy projects until 2021 are beyond the control of the partnering facilities.

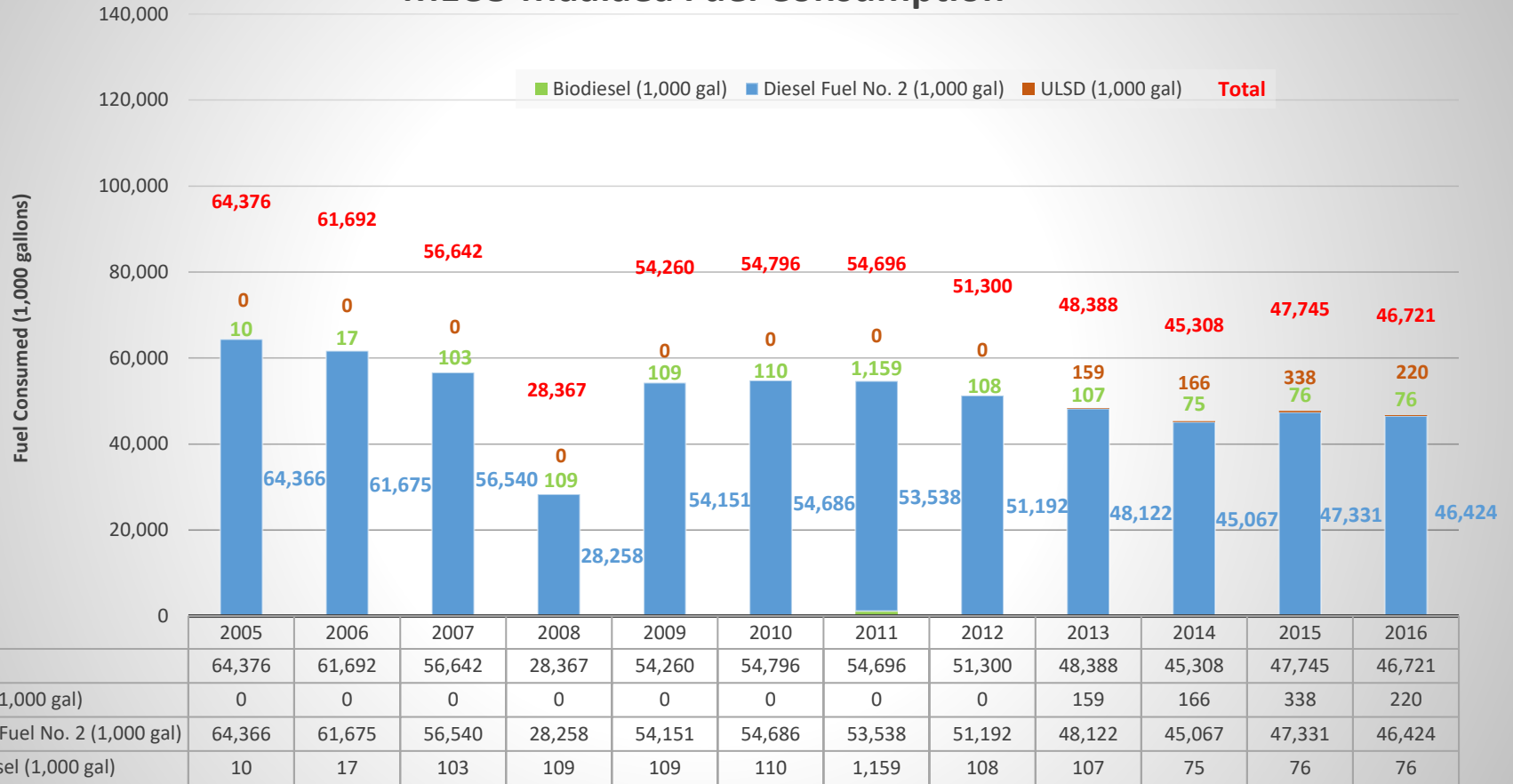
As specified in HAR §11-60.1-204(g), once a facility-wide GHG emission cap is established and incorporated in the CSP, the GHG emission reduction plan shall become part of the permit application process for renewals and any required modifications.

Recommend issuance of the significant modification to the CSP subject to thirty-day (30-day) public review and comment period in accordance with HAR §11-60.1-205, forty-five-day (45-day) EPA review period, and incorporation of the significant permit conditions.

Mike Madsen
July 9, 2020

DRAFT

MECO Maalaea Fuel Consumption



Enclosure 1: Bar chart showing fuel consumption for Maalaea Generating Station from 2005 to 2016. Fuel consumption data is provided in spreadsheet from Enclosure 2. The facility burns fuel oil No. 2 in blue as the primary fuel. Biodiesel in green and ULSD in dark orange are alternate fuels fired at the facility. Numbers in red provide the total combined fuel consumption in units of 1,000 gallons.

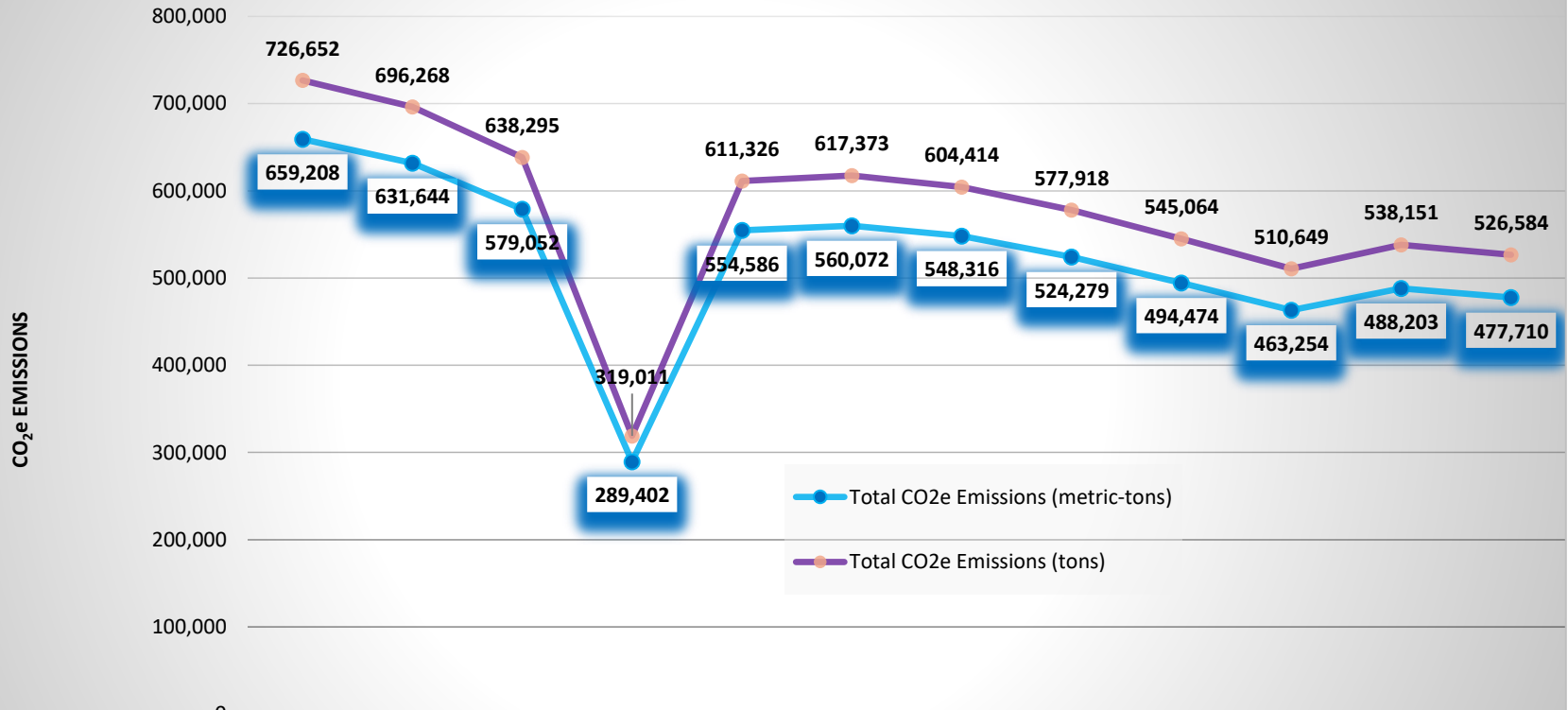
MECO MAALAEA														
FUEL CONSUMPTION DATA														
Ref	Source or Derivation	Calendar Year →	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
(a)	See Data Source	Biodiesel (1,000 gal)	10	17	103	109	109	110	1,159	108	107	75	76	76
(b)	See Data Source	Diesel Fuel No. 2 (1,000 gal)	64,366	61,675	56,540	28,258	54,151	54,686	53,538	51,192	48,122	45,067	47,331	46,424
(c)	See Data Source	ULSD (1,000 gal)	0	0	0	0	0	0	0	0	159	166	338	220
	(a) + (b) + (c)	Total	64,376	61,692	56,642	28,367	54,260	54,796	54,696	51,300	48,388	45,308	47,745	46,721
DATA SOURCE →			Emission Inventory Fuel Consumption Data						SLEIS					
PARAMETERS FOR DETERMINING CO ₂ e EMISSIONS														
(d)	40CFRP98 Table C-1 [Emission Factors]	Heating Value Biodiesel (MMBtu/gal)	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128	0.128
(e)		Heating Value FO#2 (MMBtu/gal)	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138
(f)		Heating Value ULSD (MMBtu/gal)	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138
(g)		CO ₂ EF Biodiesel (kg/MMBtu)	73.84	73.84	73.84	73.84	73.84	73.84	73.84	73.84	73.84	73.84	73.84	73.84
(h)		CO ₂ EF FO#2 (kg/MMBtu)	73.96	73.96	73.96	73.96	73.96	73.96	73.96	73.96	73.96	73.96	73.96	73.96
(i)		CO ₂ EF ULSD (kg/MMBtu)	73.96	73.96	73.96	73.96	73.96	73.96	73.96	73.96	73.96	73.96	73.96	73.96
(j)	40CFRP98 Table C-2 [Emission Factors]	CH ₄ EF Biodiesel (kg/MMBtu)	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011
(k)		CH ₄ EF FO#2 (kg/MMBtu)	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
(l)		CH ₄ EF ULSD (kg/MMBtu)	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
(m)		N ₂ O EF Biodiesel (kg/MMBtu)	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011
(n)		N ₂ O EF FO#2 (kg/MMBtu)	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006
(o)		N ₂ O EF ULSD (kg/MMBtu)	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006
(p)	40CFRP98 Table A-1 [Global Warming Potential]	GWP CO ₂	1	1	1	1	1	1	1	1	1	1	1	1
(q)		GWP CH ₄	25	25	25	25	25	25	25	25	25	25	25	25
(r)		GWP N ₂ O	298	298	298	298	298	298	298	298	298	298	298	298
CALCULATE FUEL CONSUMPTION IN MMBTU														
(s)	(a)*(d)*10 ³	Biodiesel (MMBtu)	1,293	2,172	13,122	13,948	13,966	14,026	148,296	13,885	13,709	9,552	9,779	9,765
(t)	(b)*(e)*10 ³	FO#2 (MMBtu)	8,882,557	8,511,140	7,802,474	3,899,560	7,472,805	7,546,727	7,388,206	7,064,430	6,640,876	6,219,270	6,531,747	6,406,519
(u)	(c)*(f)*10 ³	ULSD (MMBtu)	0	0	0	0	0	0	0	0	21,947	22,876	46,577	30,413
(v)	(s)+(t)+(u)	Total (MMBtu)	8,883,849	8,513,312	7,815,596	3,913,508	7,486,770	7,560,753	7,536,502	7,078,314	6,676,533	6,251,698	6,588,104	6,446,698
CALCULATE MASS EMISSIONS														
(w)	[(g)*(s) + (h)*(t) + (i)*(u)]	CO ₂ Mass Emissions (kg)	657,049,345	629,644,303	578,039,923	289,441,389	553,719,866	559,191,602	557,381,899	523,510,471	493,794,735	462,374,428	487,254,965	476,796,591
(x)	[(j)*(s) + (k)*(t) + (l)*(u)]	CH ₄ Mass Emissions (kg)	26,649	25,536	23,422	11,714	22,434	22,656	22,328	21,209	20,004	18,737	19,746	19,322
(y)	[(m)*(s) + (n)*(t) + (o)*(u)]	N ₂ O Mass Emissions (kg)	5,330	5,107	4,683	2,341	4,485	4,530	4,449	4,240	3,999	3,746	3,948	3,863
CALCULATE CO ₂ e EMISSIONS AND COMPARE WITH BASELINE IN GHG REDUCTION PLAN														
(z)	(w)*(p) + (x)*(q) + (y)*(r)	CO ₂ e Emissions (kg)	659,303,816	631,804,562	580,020,982	290,431,938	555,617,306	561,107,807	559,265,965	525,304,260	495,486,586	463,959,261	488,925,133	478,430,873
(aa)	(zz)/10 ³	CO ₂ e Emissions (metric-tons)	659,304	631,805	580,021	290,432	555,617	561,108	559,266	525,304	495,487	463,959	488,925	478,431
(bb)	(aa)-(ff)	CO ₂ e Emissions (metric-tons) Excluding Biogenic	659,208	631,644	579,052	289,402	554,586	560,072	548,316	524,279	494,474	463,254	488,203	477,710
(cc)	Maalaea GHG Plan	Maalaea CO₂e Emissions (metric-tons)						562,012						
(dd)		Deviation Lower (-) or Higher than CAB Estimate						0.346%						
(ee)	(bb)*1.10231	CO₂e Emissions (tpy) Excluding Biogenic CO₂	726,652	696,268	638,295	319,011	611,326	617,373	604,414	577,918	545,064	510,649	538,151	526,584
CALCULATE CO ₂ e CAP AND COMPARE WITH INDIVIDUAL CAP IN GHG REDUCTION PLAN														
(ff)		Biogenic CO ₂ e Emissions as CO ₂ (metric-tons)	95	160	969	1,030	1,031	1,036	10,950	1,025	1,012	705	722	721
(gg)	(ff)*1.10231	Biogenic CO ₂ e Emissions (tons)	105	177	1,068	1,135	1,137	1,142	12,070	1,130	1,116	777	796	795
(hh)	(bb)	CO ₂ e (metric tons) Excluding Biogenic	659,208	631,644	579,052	289,402	554,586	560,072	548,316	524,279	494,474	463,254	488,203	477,710
(ii)	(ee)	CO ₂ e (tons) Excluding Biogenic	726,652	696,268	638,295	319,011	611,326	617,373	604,414	577,918	545,064	510,649	538,151	526,584
(jj)	(1.00-0.256)*(ii)	2020 CO ₂ e Emissions Cap (tons)	540,629	518,023	474,891	237,344	454,826	459,326	449,684	429,971	405,528	379,923	400,384	391,779
(kk)	Maalaea GHG Plan	Maalaea CO₂e Emissions CAP (tons)						459,864						
(ll)	(mm)-(nn)	Lower (-) or Higher than CAB Estimate (tons)						-538						

1 metric-ton=1.10231 tons
1 metric-ton=1000 Kg

Enclosure 2: Fuel consumption data for bar chart shown in Enclosure 1 and spreadsheet calculations of GHG emissions for Maalaea Generating Station between years 2005 and 2016. This data was used to prepare GHG emission curves in Enclosure 3.

Data Source: CAB estimates based on reported fuel consumption

Total MECO Maalaea CO₂e Emissions

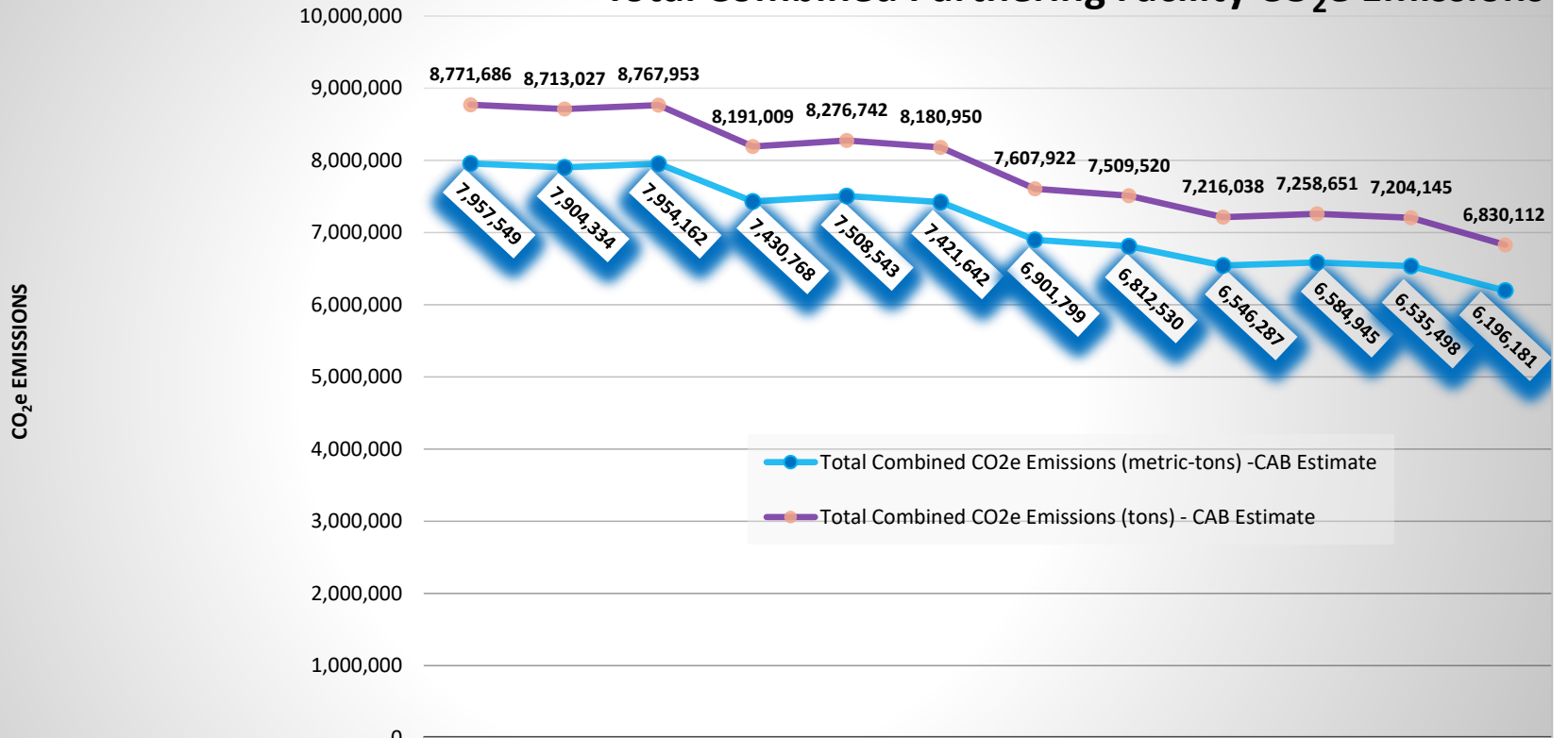


	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total CO ₂ e Emissions (metric-tons)	659,208	631,644	579,052	289,402	554,586	560,072	548,316	524,279	494,474	463,254	488,203	477,710
Total CO ₂ e Emissions (tons)	726,652	696,268	638,295	319,011	611,326	617,373	604,414	577,918	545,064	510,649	538,151	526,584

Enclosure 3: Curves showing GHG emissions for Maalaea Generating Station between years 2005 and 2016. Blue curve provides emissions in metric tons with numbers that are highlighted in blue. Purple curve shows GHG emissions in short tons with numbers that are not highlighted. The GHG emissions are based on a Tier 1 calculation methodology.

Data Source: CAB estimates based on reported fuel consumption

Total Combined Partnering Facility CO₂e Emissions



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total Combined CO ₂ e Emissions (metric-tons) -CAB Estimate	7,957,549	7,904,334	7,954,162	7,430,768	7,508,543	7,421,642	6,901,799	6,812,530	6,546,287	6,584,945	6,535,498	6,196,181
Total Combined CO ₂ e Emissions (tons) - CAB Estimate	8,771,686	8,713,027	8,767,953	8,191,009	8,276,742	8,180,950	7,607,922	7,509,520	7,216,038	7,258,651	7,204,145	6,830,112

Enclosure 4: Curves showing total combined GHG emissions from Shipman Generating Station and all partnering facilities that include three (3) IPPs and ten (10) facilities operated by the Hawaiian Electric Companies. Blue curve shows GHG emissions with numbers in metric tons that are outlined in blue. Purple curve shows GHG emissions with numbers in short tons that are not highlighted. The GHG emissions are based on a Tier 1 calculation methodology.

APPLICATION AND SUPPORTING INFORMATION

Re: Hawaiian Electric GHG ERP Draft Revision of Permit**Hamamoto, Dale**

Tue 6/9/2020 9:26 AM

To: Peterson, Sharon**Cc:** Madsen, Michael A; Takamoto, Clayton ; Tandi, Myrna; Kimura, Karin ; Smith, Lee

Hi Sharon,

With regards to your question, "Will the Partners have another opportunity to review the draft permit with DOH's revisions before it goes out for public comment?".

The answer to your question is yes. We are reviewing Hawaiian Electric comments and we plan to incorporate the final agreed upon changes into the draft permit modifications for all partnering facilities. Once completed, I'll be sending all the permits out for a final review.

In hindsight, I believe we need to clearly define the net generating capacity of the Puna Geothermal Venture facility that preceded its shutdown. I'll be doing further research and validation on this today.

Please let me know if you have further questions and/or comments.

Respectfully,

Dale

From: Peterson, Sharon**Sent:** Tuesday, June 9, 2020 8:59 AM**To:** Hamamoto, Dale**Cc:** Madsen, Michael A; Takamoto, Clayton; Tandi, Myrna; Kimura, Karin; Smith, Lee**Subject:** [EXTERNAL] RE: Hawaiian Electric GHG ERP Draft Revision of Permit

Hi Dale,

Hawaiian Electric circulated the draft CSP 0548-01-C you provided on May 29, 2020 to the Hawaiian Electric GHG ERP partners (Partners) for review and comment. Please see the attached documents with comments prepared by the Partners. The attached PDF includes proposed revisions to the *Calendar Year 2019* (renamed by the partners as ERP Partnership 2019 CSP Limits) and *Calendar Year 2020 and Beyond* (renamed by the partners as ERP Partnership Baseline CO2e Emissions) tables that are located in Attachment II – GHG, Section C.1. (GHG Emissions Caps) of the draft CSP. The attached Word document includes proposed revisions to Attachment II – GHG, Section C.3. (Alternate Operating Scenarios) of the draft CSP.

Will the Partners have another opportunity to review the draft permit with DOH's revisions before it goes out for public comment? Due to the number of redlines we would like a day to review for accuracy after the permit is revised.

Please let me know if you have any questions.

Thanks,

SHARON PETERSON

Principal Environmental Scientist, Air Quality & Noise

O: 808.543.4521 | M: 808.430.6885

Hawaiian Electric

PO Box 2750, Honolulu, HI 96840



From: Hamamoto, Dale **Sent:** Monday, June 08, 2020 8:45 AM
To: Peterson, Sharon
Cc: Madsen, Michael A; Takamoto, Clayton ; Tandi, Myrna
Subject: Re: Hawaiian Electric GHG ERP Draft Revision of Permit

Sharon,

OK Great!

Thanks,

Dale

From: Peterson, Sharon
Sent: Monday, June 8, 2020 8:43 AM
To: Hamamoto, Dale
Cc: Madsen, Michael A; Takamoto, Clayton; Tandi, Myrna
Subject: [EXTERNAL] RE: Hawaiian Electric GHG ERP Draft Revision of Permit

Hi Dale,

We are waiting for final review of the comments and revised charts from the partners. We should have the comments for you tomorrow, 6/9.

Thanks,
Sharon

From: Hamamoto, Dale
Sent: Monday, June 08, 2020 8:20 AM
To: Peterson, Sharon
Cc: Madsen, Michael A; Takamoto, Clayton; Tandi, Myrna
Subject: Re: Hawaiian Electric GHG ERP Draft Revision of Permit

Sharon,

Please let us know how much additional time you will need.

Dale

From: Peterson, Sharon
Sent: Monday, June 8, 2020 8:14 AM

To: Hamamoto, Dale
Cc: Madsen, Michael A; [Takamoto, Clayton](#); [Tandi, Myrna](#)
Subject: [EXTERNAL] RE: Hawaiian Electric GHG ERP Draft Revision of Permit

Hi Dale,

The draft permit was circulated to the partners for their review and comment and we are still working on the comments. I'll provide you with updates as I hear about the progress, but I think we are pretty close to having a response ready for you. I'm sorry, I thought you were aware of our need for additional time. Going forward I will communicate this with you directly.

Thanks,
Sharon

From: Hamamoto, Dale
Sent: Monday, June 08, 2020 7:35 AM
To: Peterson, Sharon
Cc: Madsen, Michael A; [Takamoto, Clayton](#); [Tandi, Myrna](#)
Subject: Re: Hawaiian Electric GHG ERP Draft Revision of Permit

Hi Sharon,

Please update us on the status of Hawaiian Electric's review of DOH's re-draft to CSP 0548-01-C?

Dale

From: Peterson, Sharon
Sent: Friday, May 29, 2020 3:26 PM
To: Hamamoto, Dale
Cc: Madsen, Michael A; [Takamoto, Clayton](#); [Tandi, Myrna](#)
Subject: [EXTERNAL] RE: Hawaiian Electric GHG ERP Draft Revision of Permit

Hi Dale,

We've received the draft permit. We will review and get back to you with any comments by June 5, 2020.

Have a great weekend!

Thanks,
Sharon

From: Hamamoto, Dale
Sent: Friday, May 29, 2020 3:17 PM
To: Peterson, Sharon
Cc: Madsen, Michael A; [Takamoto, Clayton](#); [Tandi, Myrna](#)
Subject: Hawaiian Electric GHG ERP Draft Revision of Permit

[This email is coming from an EXTERNAL source. Please use caution when opening attachments or links in suspicious email.]

Good Afternoon Sharon.

Hope your day has been pleasant.

In response to Hawaiian Electric's email response on May 22, 2020 and prior correspondence, the Department of Health Clean Air Branch (DOH) is sending another draft of CSP No. 0548-01-C for Hawaiian Electric's review and comment. Significant changes include the addition of alternate operating scenarios to allow for the approval of changes to the emission caps due to the shutdown and resurrection of Puna Geothermal Venture (PGV) facility and the reallocation of emission caps to the numbers that was submitted in your email response on May 22, 2020.

To expedite the process, the DOH is using the draft permit for Hawaiian Electric's Campbell Industrial Park as a template for the remaining partnering permits. The DOH requests for Hawaiian Electric's comments by April 5, 2020.

If you have any questions regarding this request, please feel free to contact me.

Very Respectfully,

Dale Hamamoto
Environmental Engineer
State of Hawaii, Department of Health
Clean Air Branch
Phone: (808) 586-4200

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ERP Partnership Baseline CO₂e Emissions

Company	Covered Source	CO ₂ e Emissions ^(1,2)		CSP Limits With AES Reductions ⁽⁴⁾		
		(metric tpy)	(tpy)	CO ₂ e Reduction (%)	CO ₂ e Reduction (tpy)	CO ₂ e Limit (tpy)
Hawaiian Electric (HE)	Kahe	2,518,411	2,776,073	20.6%	572,556	2,203,516
	Waiau	974,642	1,074,359	18.3%	196,309	878,050
	Honolulu	121,208	133,609	100.0%	133,609	0
	CIPGS ⁽³⁾	13,559	14,946	-726.3%	-108,558	123,504
HE Subtotal		3,627,821	3,998,988	19.9%	793,917	3,205,071
Maui Electric (ME)	Kahului	209,414	230,839	33.0%	76,206	154,633
	Maalaea	562,012	619,512	25.8%	159,648	459,864
	Palaau	25,615	28,236	6.3%	1,782	26,454
ME Subtotal		797,041	878,587	27.0%	237,636	640,951
Hawai'i Electric Light (HL)	Kanoelehua-Hill	202,106	222,784	22.6%	50,328	172,456
	Keahole	173,623	191,387	-26.6%	-50,821	242,208
	Puna	90,438	99,691	68.2%	67,944	31,747
	Shipman	9,246	10,192	100.0%	10,192	0
HL Subtotal		475,413	524,053	14.8%	77,642	446,411
Hawaiian Electric Companies		4,900,275	5,401,629	20.5%	1,109,195	4,292,433
AES Hawai'i		1,525,526	1,681,605	16.0%	269,057	1,412,548
Hamakua Energy Power		165,992	182,975	16.0%	29,276	153,699
Kalaeloa Partners, LP		993,198	1,094,813	-6.4%	-69,764	1,164,577
Partnership Total		7,584,991	8,361,022	16.00%	1,337,764	7,023,257⁽⁵⁾

Notes:

- (1) Excludes biogenic CO₂ emissions per HAR §11-60.1-204(d)(6)(B).
- (2) Selections of facility emissions baselines are described in the individual GHG Emission Reduction Plans for the Hawaiian Electric Companies, AES Hawai'i, Kalaeloa Partners, LP (KPLP), and Hamakua Energy Power (HEP).
- (3) CIPGS (Campbell Industrial Park Generating Station) is designated as the Main CSP for the Hawaiian Electric Companies' Emissions Reduction Plan.
- (4) Includes AES' voluntary reduction of 10,000 tons and 16% GHG emissions distributed to Oahu partners except AES and Honolulu.
- (5) Does not include additional requested PGV allowances per HAR 11-60.1-204(h)(5).

ERP Partnership 2019 CSP Limits

Company	Covered Source	PGV 100% Operation	With PGV allowance	
		CO ₂ e Emissions ^(1,2) (tpy)	CO ₂ e Limit Adjustment (tpy)	CO ₂ e Limit ⁽⁴⁾ (tpy)
Hawaiian Electric (HE)	Kahe	2,133,752	0	2,133,752
	Waiau	808,286	0	808,286
	Honolulu	0	0	0
	CIPGS ⁽³⁾	53,740	0	53,740
HE Subtotal		2,995,778	0	2,995,778
Maui Electric (ME)	Kahului	154,633	0	154,633
	Maalaea	459,864	0	459,864
	Palaau	26,454	0	26,454
ME Subtotal		640,951	0	640,951
Hawai'i Electric Light (HL)	Kanoelehua-Hill	172,456	17,132	189,588
	Keahole	242,208	31,213	273,421
	Puna	31,747	39,535	71,282
	Shipman	0	0	0
HL Subtotal		446,411	87,880	534,291
Hawaiian Electric Companies		4,083,140	87,880	4,171,020
AES Hawai'i		1,691,605	0	1,691,605
Hamakua Energy Power		153,699	97,524	251,223 ⁽⁶⁾
Kalaeloa Partners, LP		1,094,813	0	1,094,813
Partnership Total		7,023,257	185,404	7,208,661 ⁽⁵⁾

Notes:

(1) Excludes biogenic CO₂ emissions per HAR §11-60.1-204(d)(6)(B).

(2) Selections of facility emissions baselines are described in the individual GHG Emission Reduction Plans for the Hawaiian AES Hawai'i, Kalaeloa Partners, LP (KPLP), and Hamakua Energy Power (HEP).

(3) CIPGS (Campbell Industrial Park Generating Station) is designated as the Main CSP for the Hawaiian Electric Companies' Emissions Reduction Plan.

(4) Does not include AES' 2020 voluntary reductions of 10,000 tons and 16% GHG emissions. PGV allowance is distributed to Hawai'i Island partners, except Shipman.

(5) Includes requested PGV allowance of 185,404 tons. The GHG Partners reserve the right to request an additional allowance for delays in renewable energy projects that are beyond their reasonable control.

(6) Hamakua's position is that the emission cap must remain at this cap amount beyond 2019 until such time as PGV is able to generate and transmit power to Hawai'i Electric Light's grid at pre-eruption amount.



JUL 29 2019
JUL 26 2019

ANTHONY KOYAMATSU
Director
Environmental Division

Hawaiian Electric
Campbell Industrial Park

July 26, 2019

CERTIFIED MAIL NO. 7016 2710 0000 8739 2030
RETURN RECEIPT REQUESTED

Ms. Marianne Rossio, P.E.
Manager, Clean Air Branch
State of Hawaii Department of Health
2827 Waimano Home Road
Hale Ola Building, Room 130
Pearl City, Hawaii 96782

Dear Ms. Rossio:

**Subject: Updated Greenhouse Gas Emissions Reduction Plan
Second Revision to Significant Modification Applications
Covered Source Permit Nos. 0548-01-C, 0240-01-C, 0238-01-C, 0239-01-C,
0234-01-C, 0007-01-C, 0235-01-C, 0232-01-C, 0067-01-C, and 0031-04-C
Attachment II-GHG
Hawaiian Electric Company, Inc.
Hawai'i Electric Light Company, Inc.
Maui Electric Company, Ltd.**

Hawaiian Electric Company, Inc. (Hawaiian Electric), Hawai'i Electric Light Company, Inc. (Hawai'i Electric Light), and Maui Electric Company, Ltd. (Maui Electric), collectively referred to as "Companies", hereby submits an updated Greenhouse Gas Emissions Reduction Plan (GHG ERP) and the second revision to the significant modification applications dated March 28, 2018. These revisions reflect responses received from Department of Health to comments the Companies submitted on May 15, 2019 concerning the proposed CSPs.

The Companies request that DOH modify the partnership aggregate and Hawai'i Island site-specific emissions caps for calendar year 2019, as detailed in Attachment II – GHG, Special Condition C.1.b of the CIP CSP (Permit No. 0548-01-C), and cross-referenced in each of the GHG CSPs, to reflect the loss of renewable energy from Puna Geothermal Venture (PGV), which had previously been included in the calculations in the Companies' GHG ERP.

Table 1 attached shows the proposed cap adjustment as presented in Table A-2 of the enclosed GHG ERP. The derivation of the cap addition is explained in the enclosed GHG ERP Attachment F.

Revisions were also made to item I.E of Form S-6 for all the GHG ERP partnering facilities to update the reference to the corresponding GHG ERP. Enclosed is Form S-6 for each above reference facilities which are direct replacements for the Form S-6 in the applications previously submitted to the Department of Health. No other changes are proposed with this submittal.

Ms. Marianne Rossio, P.E.
Updated GHG ERP and Second Revision to CSP Significant Modification
July 26, 2019
Page 2 of 2

If you have any questions regarding this submittal, please contact Myrna Tandl at 543-4535 or myrna.tandl@hawaiianelectric.com.

Sincerely,



- Attachment: (1) Table 1: Proposed 2019 GHG Limits for PGV Outage
- Enclosures: (1) Updated Greenhouse Gas Emissions Reduction Plan dated July 26, 2019
(2) Revised Form S-6 for Kahe, Waiau, Honolulu, CIP, Kahului, Maalaea, Palaaau, Kanoelehua-Hill, Keahole, and Puna Generating Stations
- Ec (w/Encl.): Michael Madsen, Department of Health, michael.madsen@doh.hawaii.gov
- Cc (w/Encl.): **RETURN RECEIPT REQUESTED**
Mr. Gerardo Rios [Certified Mail No.7016 2710 0000 8739 2047]
Chief, Permits Office, Air Division
U.S. EPA Region 9
75 Hawthorne Street
Mail Code: AIR-3
San Francisco, CA 94105



Table 1
Proposed 2019 GHG Limits for PGV Outage

Company	Covered Source	PGV 100% Operation	Calendar Year 2019 GHG Limits	
		CO ₂ e Emissions Limit (tpy)	GHG Limit Adjustment (tpy)	CO ₂ e Emissions Limit (tpy)
HE	Kahe	2,133,752	0	2,133,752
	Waiau	808,286	0	808,286
	Honolulu	0	0	0
	CIPGS	53,740	0	53,740
HE Subtotal		2,995,778	0	2,995,778
ME	Kahului	154,633	0	154,633
	Maalaea	459,864	0	459,864
	Palaau	26,454	0	26,454
ME Subtotal		640,951	0	640,951
HE	Kanoelehua-Hill	172,456	17,132	189,588
	Keahole	242,208	31,213	273,421
	Puna	31,747	39,535	71,282
	Shipman	0	0	0
HL Subtotal		446,411	87,880	534,291
Hawaiian Electric Companies		4,083,140	87,880	4,171,020
AES Hawai'i		1,691,605	0	1,691,605
Hamakua Energy Power		153,699	97,524	251,223
Kalaeloa Partners, LP		1,094,813	0	1,094,813
Partnership Total		7,023,257	185,404	7,208,661

JUL 29 2019



**Hawaiian Electric
Maui Electric
Hawai'i Electric Light**

Certification

*This certification applies to the July 26, 2019 update of the **Greenhouse Gas Emissions Reduction Plan for the Hawaiian Electric Companies** that is being submitted to the Department of Health in accordance with HAR 11-60.1 Subchapter 11.*

I certify that I have knowledge of the facts set forth therein, 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.

Name: Robert C. Isler
Title: Vice President, Power Supply, Hawaiian Electric Company

Signature:  Date: 7/24/19



Hawaiian Electric
Maui Electric
Hawai'i Electric Light

JUL 29 2019
F. [unclear]
JUL 26 2019

Greenhouse Gas Emissions Reduction Plan for the Hawaiian Electric Companies

**Submitted to Hawai'i Department of Health
in accordance with HAR 11-60.1 Subchapter 11**

July 26, 2019 Update



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Record of Revisions

Revision No.	Date	Revisions
0	06/30/2015	Original submission to DOH
1	09/08/2017	Designate Campbell Industrial Park Generating Station (CIPGS) CSP No. 0548-01-C as the Main Permit for Partnership; update facility-specific GHG caps in Table A-1 based on latest forecasts; miscellaneous text updates.
2	02/28/2018	Add AES Hawai'i, Kalaeloa Partners LP (KPLP), and Hamakua Energy Power (HEP) as partners; revise GHG Partnership section; add Monitoring explanation.
3	10/15/2018	Change KPLP baseline and cap in Table A-1 to Tier 3 basis per agreement with DOH. Updates to Table 1 and text to address DOH comments rec'd 9/21/2018.
4	05/15/2019	Changes for consistency with CSP comments. Adjust 2019 Hawai'i Electric Light, HEP, and aggregate GHG caps for loss of PGV. Table A-2 added.
5	07/26/2019	Adjust 2019 Hawai'i Electric Light, HEP, and aggregate GHG caps for loss of PGV in accordance with response to comments received from DOH. Attachment F added.



Introduction

Hawaiian Electric Company, Inc. (Hawaiian Electric) and its subsidiaries, Hawai'i Electric Light Company, Inc. (Hawai'i Electric Light) and Maui Electric Company, Ltd. (Maui Electric), (collectively, "Hawaiian Electric Companies" or "Companies") support Hawai'i's goal established in Act 234 of lowering GHG emissions in the state to 1990 levels.

In accordance with Hawai'i Administrative Rules (HAR) under §11-60.1 Subchapter 11, which were adopted to implement Act 234, facilities that have the potential to emit more than 100,000 tons per year of CO₂e (carbon dioxide equivalent) emissions are designated as "Affected Sources." Affected Sources are required to reduce their GHG emissions at least 16% from their 2010 baseline levels by 2020 and thereafter unless the owner or operator can substantiate that a 16% reduction is unattainable and Hawai'i Department of Health (DOH) approves a lesser reduction.¹ The Act 234 regulations also allow Affected Sources to partner with one another to combine their facility-wide GHG emissions caps to leverage emission reductions among partnering facilities to meet the combined GHG emissions caps.²

The Hawaiian Electric Companies operated eleven generating facilities in 2010 that each had the potential to emit more than 100,000 tons per year of CO₂e and, thus, qualify as Affected Sources. Act 234 regulations require an Affected Source to prepare a GHG Emissions Reduction Plan (ERP) that is used by DOH to set the Affected Source's CO₂e emissions cap. The ERP also demonstrates how that cap will be met by 2020. The Hawaiian Electric Companies have prepared this ERP to satisfy that requirement.

The Hawaiian Electric Companies acquire power from Independent Power Producers (IPPs) and from renewable energy sources (e.g., rooftop solar panels, wind farms, utility scale solar installations) that are used to meet customer demand. In the event an IPP has unplanned outages or there is reduced energy output from renewable sources (e.g., due to cloudy or rainy weather, lack of wind, etc.), the Hawaiian Electric Companies must make up for the shortfall by increasing generation from other generating sources. Historically, the shortfall has been made up by the Companies' Affected Sources, thereby increasing their GHG emissions. In the future, the commissioning of new, rapid-response generators such as the Schofield Generating Station in 2018 as well as battery energy storage systems (BESS) charged by renewable energy sources will allow shifting some of that load to facilities that have lower GHG emissions.

¹ HAR 11-60.1-204(c)

² HAR 11-60.1-204(d)(6)(A)



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GHG Reduction Partnership

This section explains the partnership approach used by the Hawaiian Electric Companies and its Partners in preparing their GHG ERPs.

The power generation facilities operating on each of Hawai'i's islands are highly interdependent. If one or more of them cannot produce their scheduled power output, the other facilities on the island must generate more power than planned to make up for the shortfall. A scheduled or unscheduled outage that takes a major generating unit offline for an extended period can significantly shift GHG emissions from one facility to another. Assigning firm GHG emissions caps to individual facilities does not provide sufficient flexibility to accommodate those types of system upsets that are a natural part of system operation.

For these reasons, the Hawaiian Electric Companies and three major Independent Power Producers (IPPs) have elected to use the partnering provisions in Act 234 Regulations³ to create a Partnership involving all eleven of the Hawaiian Electric Companies' Affected Sources, the Hamakua Energy Power (HEP) facility, the AES Hawai'i facility, and the Kalaeloa Partners LP (KPLP) facility (collectively "Partnership Facilities" or "Partnership"). The Partnership has an overall GHG emissions cap that it commits to attain. Individual partnering facilities have site-specific GHG emissions reduction goals that are used to apportion penalties that may be assessed in the event the overall GHG emissions cap is exceeded. The DOH will include the site-specific goals as GHG emissions caps, along with implementing conditions, in each site's Covered Source Permit (CSP). Owing to the operating flexibility that partnering in this manner affords, the Partnership Facilities can commit to an aggregate 16% reduction of GHG emissions from their respective baselines for their facilities. The site-specific and overall GHG emissions reduction targets for the Partnership Facilities are listed in Tables A-1 and A-2 of Attachment A. The two tables present alternative operating scenarios with and without Puna Geothermal Venture (PGV) operating, as explained further in the next section. The Power Supply Improvement Plan (PSIP) for the Hawaiian Electric Companies that was approved by the Hawai'i Public Utilities Commission (PUC) on July 14, 2017⁴ is the blueprint for how that reduction will be accomplished.

The Hawaiian Electric Companies, HEP, AES Hawai'i, and KPLP are submitting separate ERPs for their facilities. The ERPs share the same GHG emissions reduction goals provided in Table A-1 and A-2, but the individual plans explain the GHG baselines, monitoring, and other plan requirements specific to each partner.

³ HAR 11-60.1-204(d)(6)(A).

⁴ *Hawaiian Electric Companies' PSIP Update Report*, PUC Docket 2014-0183. December 23, 2016.



2019 GHG Cap Adjustments for PGV Outage

PGV was forced to stop generating energy in early 2018 by volcanic activity, removing a substantial amount of renewable energy from the system and significantly increasing GHG emissions from the Hawai'i Electric Light and HEP units that have to offset that lost capacity. In 2017 PGV accounted for 33% of total energy generation on Hawai'i Island and is the largest single renewable energy generator in the State. PGV plans to return to operation but the timing is uncertain because of the significant infrastructure damage that occurred. PGV is not expected to return to operation until at least 2020. Loss of PGV qualifies as a reason for DOH to revise the GHG cap under HAR §11-60.1-204(4): "Renewable energy producers cease operations or fail to meet contractual obligations with the affected source, and there are no reasonable alternatives." There are no renewable alternatives to make up for 38 Megawatts (MW) of firm PGV capacity.

PGV's energy generation is equivalent to 185,404 tons of GHG emissions from the Hawai'i Electric Light and HEP fossil fuel units that must operate more to replace it, as detailed in Attachment F. That was calculated by comparing actual emissions in 2017, the last full year PGV operated, with the 12 months from July 2018 to June 2019 when PGV was offline. Table A-2 in Attachment A assigns those emissions to other generating units in proportion to their July 2018 to June 2019 operation. The Hawaiian Electric Companies propose that the caps in Table A-2 only apply for calendar year 2019 while more renewable energy is integrated into the system. For all succeeding years the caps in Table A-1 will apply.

It should be noted that the Companies have experienced delays beyond their direct control involving several new renewable energy projects anticipated in the PSIP that were counted on to lower GHG emissions. The Companies are not seeking an adjustment for these delays, but they have the effect of increasing GHG emissions more than 100,000 tons above what was expected in the earlier ERPs submitted to DOH.

Even with this cap adjustment the Partnering Facilities commit to doing what they can to hold emissions below the Table A-1 limits in 2019. That may include altering unit dispatch priorities to reduce GHG emissions to the extent practicable although large reductions cannot be expected by that means. Since changing dispatch order may be contrary to minimizing customer costs, some level of PUC approval may be required.



Emission Reduction Plan Required Elements

Hawai'i Administrative Rule (HAR) §11-60.1-204(d) states the GHG Emissions Reduction Plan required of Affected Sources shall at a minimum include the following elements:

- (1) **Facility-wide Baseline Annual Emission Rate (tpy CO₂e).** *Calendar year 2010 annual emissions shall be used as the baseline emissions to calculate the required facility-wide GHG emissions cap, unless another baseline year or period is approved by the director. Baseline emissions shall be determined in accordance with section 11-60.1-115, separated between biogenic and non-biogenic emissions, and exclude all emissions of noncompliance with an applicable requirement or permit limit. The owner or operator shall include the data and calculations used to determine the baseline emissions. If calendar year 2010 is deemed unrepresentative of normal operations, then the owner or operator may propose an alternate baseline annual emission rate...⁵*

Attachment A, Table A-1 lists the baseline GHG emissions for the Partnership Facilities. The Hawaiian Electric Companies' facilities all use 2010 calendar year emissions as their baselines. GHG emissions were calculated using the procedures specified in EPA's Mandatory GHG Reporting Rule (40 CFR Part 98, Subpart C). The Kahe, Waiiau, and Honolulu facilities used Tier 3 level calculations specified in §98.33 and the other facilities used Tier 2 level calculations. All baselines shown in Table A-1 for the Hawaiian Electric Companies' facilities are as reported via EPA's e-GGRT system for 2010 except for Campbell Industrial Park Generating Station (CIPGS) and Shipman. For calendar year 2010 CIPGS and Shipman GHG emissions were lower than the 25,000 metric ton reporting threshold under Part 98 so GHG emissions reporting was not required.

- (2) **2020 Facility-wide GHG Emissions Caps.** *Determine the facility-wide GHG emissions cap in accordance with subsection (c), using calendar year 2010 or the proposed GHG baseline emission rate determined by paragraph (1) above. If the required emissions cap requiring a sixteen percent (16%) emission reduction from baseline year emissions is deemed unattainable, the owner or operator shall provide [a justification and proposal for an alternative cap]...*

In determining whether or not the required GHG emissions cap is attainable, the owner or operator of an affected source shall first conduct the GHG control assessment described in paragraphs (3) to (5). Available EPA

⁵ HAR 60.1-204(d)(1)



guidelines for GHG Best Available Control Technology analysis and GHG control measures by source type shall be used as applicable for this assessment.⁶

Attachment A, Tables A-1 and A-2 list the overall and facility-specific GHG emissions caps the Partnership Facilities commit to achieving by 2020 to comply with the Rule with all their Affected Sources grouped into one Partnership. The overall GHG emissions cap in Table A-1 reflects a 16% reduction in GHG from their GHG emissions baselines.

Table A-1 shows that the overall GHG emissions reduction target for the Hawaiian Electric Companies is 24.4%, which exceeds the overall 16% GHG emissions reduction for the Partnering Facilities because IPPs will continue to be preferentially dispatched for contractual reasons and because they are the lowest-cost power producers. Most of the generation displaced by renewable energy will come from reduced operation of Hawaiian Electric's Affected Sources.

One of the important benefits of the Partnership for customers is that it allows the GHG emissions reduction goal of Act 234 to be met while maintaining the lowest energy cost to customers.

Monitoring and Reporting to Demonstrate GHG Emissions Reductions

The Hawaiian Electric Companies' facilities will use the same procedures used to establish their GHG baseline emissions, as described in paragraph (1), to calculate their annual GHG emissions and demonstrate the Partnership's compliance with the GHG emissions reduction requirement. GHG emissions for each facility will be reported annually on EPA's e-GGRT system and semi-annually to the DOH.

The Hawaiian Electric Companies' facilities use the GHG emissions calculation procedures specified in 40 CFR Part 98, Subpart C. They are not required to use Continuous Emissions Monitoring Systems (CEMS) for GHG emissions monitoring and do not have all the necessary instrumentation to be able to do so.

- (3) **Available Control Measures.** *Identify all available control measures with potential application for each source type, and all on-the-book control measures the facility is committed or will be required to implement affecting GHG emissions. At a minimum, the following shall be considered as applicable:*
- (A) *Available technologies for direct GHG capture and control;*
 - (B) *Fuel switching or co-fired fuels;*
 - (C) *Energy efficiency upgrades;*

⁶ HAR 60.1-204(d)(2)



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- (D) *Combustion or operational improvements;*
- (E) *Restrictive operations;*
- (F) *Planned upgrades, overhaul, or retirement of equipment;*
- (G) *Outstanding regulatory mandates, emission standards, and binding agreements; and*
- (H) *Other GHG reduction initiatives that may affect the facility's GHG emissions. Unless the owner or operator of the source has direct ownership or legal control over a GHG reduction initiative, that initiative cannot be relied upon as a proposed control strategy. Identification of GHG reduction initiatives, whether or not the owner or operator has ownership or legal control, will serve to highlight their potential importance for reducing GHG emissions in the state. The owner or operator of an affected source will only benefit from a GHG initiative if the initiative reduces or helps to reduce and maintain the source's GHG emissions below its permitted facility-wide GHG emissions cap.⁷*

Table 1 lists the potential GHG emissions control options cited above and their feasibility for the Hawaiian Electric Companies. ERP Attachments referenced in Table 1 further describe the GHG emissions control options and discuss their feasibility and costs.

⁷ HAR 11-60.1-204(d)(3)



TABLE 1 - EVALUATION OF GHG EMISSIONS CONTROL OPTIONS

GHG Control Option	Feasibility and Benefit
(A) Carbon Capture and Storage (CCS)	Not Economically Viable - See Attachment B for details.
(B) Fuel switching or co-firing fuels (Natural Gas)	Not Feasible – The Hawaiian Electric Companies explored importing liquefied natural gas. However, the PUC rejected that option as part of its decision to deny the merger of the Hawaiian Electric Companies with NextEra. See Attachment C for details about the potential GHG emissions benefits.
(C) Fuel switching or co-firing fuels (Biofuels)	Not Feasible to do on a large scale – The Hawaiian Electric Companies are currently permitted and are burning limited quantities of biodiesel. Attachment D contains a discussion of the availability and cost of biodiesel.
(D) Energy efficiency upgrades and combustion improvements	Attachment E summarizes the Hawaiian Electric Companies' evaluation of energy efficiency improvements available to their power generating units. No economically viable improvements were identified that would contribute significantly towards reducing GHG emissions.
(E) Restrictive operations	If one of the generating facilities in the Hawaiian Electric Companies' electrical grids restricts operation to limit its GHG emissions, other facilities must operate more to meet customer demand so the result is that emissions are redistributed rather than reduced or eliminated. The Partnership concept provides flexibility for lower GHG emitting facilities to operate more to lower overall GHG emissions and Hawaiian Electric intends to do this as much as possible within system and economic constraints. However, the GHG emissions reductions available through this route are limited because the more efficient units (e.g., combined cycle combustion turbines) already operate preferentially because they tend to be lower cost generators.



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As new renewable energy projects come online, the operation of existing fossil-fueled units can be reduced or ceased. The Hawaiian Electric Companies have deactivated or retired the following fossil-fuel units since the 2010 baseline year:

- (F) Planned upgrades, overhaul, or retirement of equipment
- Shipman S3 and S4. Permanently decommissioned and CSP closed December 31, 2015.
 - Honolulu H8 and H9. Deactivated January 2014.

Hawaii'i set a 100 percent Renewable Portfolio Standard (RPS) for electrical generation by 2045. The Hawaiian Electric Companies' December 2016 Power Supply Improvement Plan (PSIP) describes how the Companies intend to accomplish that goal.

(G) Outstanding regulatory mandates, emission standards, and binding agreements

EPA proposed the Affordable Clean Energy (ACE) Rule on August 31, 2018. It is not clear yet whether it will apply to the Hawaiian Electric Companies' oil-fired generating units. The emphasis of ACE Rule is to improve the efficiency of existing generators through measures to be adopted by the states.

The Hawaiian Electric Companies' main strategy for lowering GHG emissions is to continue replacing fossil-fueled generation with utility-scale and distributed (e.g., rooftop solar) renewable energy sources.

Other GHG emissions reduction initiatives:

The December 2016 PSIP includes additional utility scale RE coming online between 2017 and 2019:

Renewable Energy (RE) Projects:

- (H) Wind, Solar, and Battery Energy Storage Systems (BESS)
- Deployment of new flexible, rapid response generation to enable more integration of renewable energy sources.
 - Hawaiian Electric - 206.2 MW of new utility scale RE + 70MW BESS
 - Maui Electric - 8.74 MW of new RE + 9MW BESS
 - Hawaii'i Electric Light - 3 MW of new RE.

The December 2016 PSIP also describes new firm generation projects that provide the rapid response capability needed to work with the varying output from renewables. One of these is the Schofield Generating Station that came online in 2018.



- (4) **Technically Feasible Measures.** *For any new control measure identified for the facility, eliminate all technically infeasible options based on physical, chemical, or engineering principles that would preclude the successful operation of the control with the applicable emission unit or source. Document the basis of elimination, and generate the list of technically feasible control options for further evaluation. All committed and required on-the-book measures shall remain on the list.⁸*

As noted above, Table 1 lists the potential GHG emissions control options and their feasibility. Attachments referenced in Table 1 further describe the GHG emissions control options and discuss their feasibility and costs.

- (5) **Control Effectiveness and Cost Evaluation.** *List the technically feasible control options and identify the following for each control measure as applicable. All cost data shall be provided in present dollars.*
- (A) *Control effectiveness (percent pollutant removed);*
 - (B) *Expected emission rate (tons per year CO₂e, pounds CO₂e/kilowatt-hour);*
 - (C) *Expected emission reduction (tons per year CO₂e);*
 - (D) *Energy impacts (BTU, kilowatt-hour);*
 - (E) *Environmental impacts (other media and the emissions of other regulated air pollutants);*
 - (F) *Any secondary emissions or impacts resulting from the production or acquisition of the control measure; and*
 - (G) *Economic impact (cost effectiveness: annualized control cost, dollar/megawatt-hr, dollar/ton CO₂e removed, and incremental cost effectiveness between the control and status quo).*

For committed or required on-the-books control measures and any other GHG control initiatives, identify at a minimum, items (A) through (C) above. Considering the energy, environmental, and economic impact, determine the GHG control or suite of controls found to be feasible in achieving the maximum degree of GHG reductions for the facility. Determine whether the required GHG emissions cap, pursuant to subsection (c) will be met. If an alternate cap must be proposed for approval, declare the proposed percentage GHG reduction and the alternate GHG reduction cap. Provide the justification and associated support information (e.g., references,

⁸ HAR 11-60.1-204(d)(4)



assumptions, vendor quotes, sample calculations, etc.) to substantiate the control analysis and alternate GHG emissions cap.⁹

As noted above, Table 1 lists the potential GHG emissions control options and their feasibility. Attachments referenced in Table 1 further describe the GHG emissions control options and discuss their feasibility and costs.

- (6) **Proposed Control Strategy.** *Present the listing of control measures to be used for implementation in meeting the required or proposed alternate 2020 facility-wide GHG emissions cap. Include discussion of the control effectiveness, control implementation schedule, and the overall expected GHG CO₂e emission reductions (tpy) for the entire facility. Owners or operators shall also consider the following:*
- (A) *Affected sources may propose to combine their facility-wide GHG emissions caps to leverage emission reductions among partnering facilities in meeting the combined GHG emissions caps. If approved by the director, each partnering facility will be responsible for complying with its own adjusted GHG facility-wide emissions cap.*
 - (B) *Except for fee assessments and determining applicability to this section, biogenic CO₂ emissions will not be included when determining compliance with the facility-wide emissions cap until further guidance can be provided by EPA, or the director, through rulemaking.*
 - (C) *The approved facility-wide GHG emissions cap and the associated monitoring, recordkeeping, and reporting provisions will be made a part of the covered source permit, enforceable by the director.¹⁰*

The Hawaiian Electric Companies will collectively reduce their GHG emissions 16% from the 2010 baseline year, generally in accordance with the power generation forecasts described in their PSIP that was submitted in December 2016 and accepted by the PUC on July 14, 2017.¹¹ Although the PSIPs are not enforceable under Chapter 342B, HRS, Air Pollution Control, they do carry the weight of oversight by the PUC and public expectations.

The Hawaiian Electric Companies' GHG emissions reductions will result directly from increased state-wide reliance on renewable energy sources as detailed in the PSIP. The Hawaiian Electric Companies have consistently met, and exceeded, the Renewable Portfolio Standards (RPS) agreed to as part of the Hawai'i Clean Energy Initiative (HCEI). For instance, in 2015 23.2% of the Companies' overall power

⁹ HAR 11-60.1-204(d)(5)

¹⁰ HAR 11-60.1-204(d)(6)

¹¹ Public Utilities Commission of the State of Hawai'i Decision and Order No. 34696. July 14, 2017.



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generation was from renewable sources,¹² well ahead of the RPS goal of 15% by 2015.¹³ In 2017, 26.8% of the Companies' power generation was from renewable sources. The RPS goals have increased due to House Bill 623, signed into law by Governor David Ige on June 5, 2015, which establishes a new RPS goal of 100% renewables by 2045. In 2017, the GHG emissions from the combined Hawaiian Electric Companies were 20.0% lower than the 2010 baseline year. Continued progress towards the RPS and PSIP goals will assist GHG emissions from power generation to decline further.

As explained in Table 1 and the supporting attachments, the Hawaiian Electric Companies' evaluation of potential GHG emissions control measures identified no additional measures that are technically feasible and cost effective. Accordingly, the Companies do not propose to implement any GHG emissions controls.

As described earlier, the Hawaiian Electric Companies' eleven affected facilities are partnering with three IPPs to meet the GHG emissions reduction target. Table A-1 lists the overall GHG annual emissions limit for the Partnership Facilities along with site-specific GHG emissions limits for each of the Partnering Facilities.

The Hawaiian Electric Companies have designated Campbell Industrial Park Generating Station (CIPGS) as the Main Permit for their affected facilities. The CIPGS CSP will list the Total Partnership GHG emissions cap and the site-specific emissions caps for the Hawaiian Electric Companies' other facilities. The CSPs for the Hawaiian Electric Companies' other facilities will reference the CIPGS CSP for GHG emissions limits.

¹² 2017-2018 Corporate Sustainability Report. Hawaiian Electric Companies. Page 4.

¹³ HRS §269-92(2). It should be noted that the RPS allows affiliated electrical utilities to aggregate their renewable portfolios. HRS §269-93. Accordingly, all GHG emissions reductions referenced in this section represent the aggregate renewable portfolios for Hawaiian Electric, Hawai'i Electric Light, and Maui Electric.

Table A-1: ERP Partnership Baseline CO₂e Emissions and Proposed CSP Limits (1)

Company	Covered Source	Baseline		CSP Limits			CO ₂ e Limit (tpy)
		CO ₂ e Emissions (metric tpy)	(tpy)	CO ₂ e Reduction (%)	CO ₂ e Reduction (tpy)		
Hawaiian Electric (HE)	Kahe	2,518,411	2,776,073	23.1%	642,321	2,133,752	
	Waiau	974,642	1,074,359	24.8%	266,074	808,286	
	Honolulu	121,208	133,609	100.0%	133,609	0	
	CIPGS	13,559	14,946	-259.6%	-38,794	53,740	
HESubtotal		3,627,821	3,998,988	25.1%	1,003,210	2,995,778	
Maui Electric (ME)	Kahului	209,414	230,839	33.0%	76,206	154,633	
	Maalaea	562,012	619,512	25.8%	159,649	459,864	
	Palaau	25,615	28,236	6.3%	1,782	26,454	
ME Subtotal		797,041	878,587	27.0%	237,636	640,951	
Hawai'i Electric Light (HEL)	Kanoelehua-Hill	202,106	222,784	22.6%	50,328	172,456	
	Keahole	173,623	191,387	-26.6%	-50,821	242,208	
	Puna	90,438	99,691	68.2%	67,944	31,747	
	Shipman	9,246	10,192	100.0%	10,192	0	
HEL Subtotal		475,413	524,053	14.8%	77,642	446,411	
Hawaiian Electric Companies		4,900,275	5,401,629	24.4%	1,318,488	4,083,141	
AES Hawai'i		1,525,526	1,681,605	-0.6%	-10,000	1,691,605	
Hamakua Energy Power		165,992	182,975	16.0%	29,276	153,699	
Kalaeloa Partners, LP		993,198	1,094,813	0.0%	0	1,094,813	
Partnership Total		7,584,991	8,361,022	16.00%	1,337,764	7,023,258	

Notes:

- (1) Table A-2 applies for calendar year 2019 only due to loss of PGV renewable energy.
- (2) Selections of facility emissions baselines are described in the individual GHG Emission Reduction Plans for the Hawaiian Electric Companies, AES Hawai'i, Kalaeloa Partners, LP (KPLP), and Hamakua Energy Power (HEP).
- (3) CIPGS (Campbell Industrial Park Generating Station) is designated as the Main CSP for the Hawaiian Electric Companies' Emissions Reduction Plan.

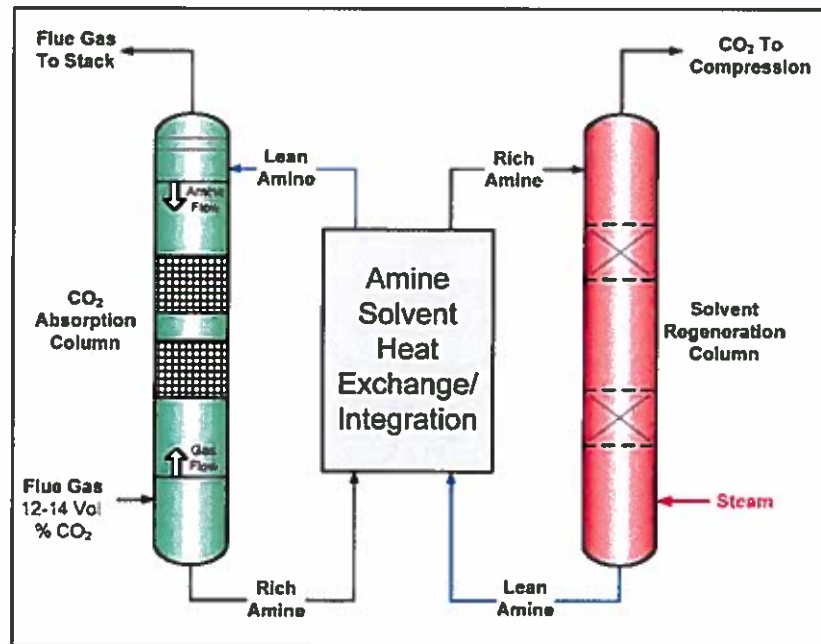
Table A-2: Substitute 2019 GHG Limits for PGV Outage

Company	Covered Source	PGV 100% Operation		Calendar Year 2019 GHG Limits	
		CO2e Emissions Limit (tpy)	GHG Limit Adjustment (tpy)	CO2e Emissions Limit (tpy)	CO2e Emissions Limit
HECO	Kahe	2,133,752	0	2,133,752	
	Waiau	808,286	0	808,286	
	Honolulu	0	0	0	
	CIPGS	53,740	0	53,740	
HE Subtotal		2,995,778	0	2,995,778	
MECO	Kahului	154,633	0	154,633	
	Maalaea	459,864	0	459,864	
	Palaaui	26,454	0	26,454	
ME Subtotal		640,951	0	640,951	
HELCO	Kanoehua-Hill	172,456	17,132	189,588	
	Keahole	242,208	31,213	273,421	
	Puna	31,747	39,535	71,282	
	Shipman	0	0	0	
HEL Subtotal		446,411	87,880	534,291	
Hawaiian Electric Companies		4,083,140	87,880	4,171,020	
AES Hawai'i		1,691,605	0	1,691,605	
Hamakua Energy Power		153,699	97,524	251,223	
Kalaeloa Partners, LP		1,094,813	0	1,094,813	
Partnership Total		7,023,257	185,404	7,208,661	

Carbon Capture and Storage

Carbon Capture and Storage (CCS) is composed of two major functions; CO₂ capture and CO₂ storage. A number of methods may potentially be used for separating the CO₂ from the exhaust gas stream, including adsorption, physical absorption, chemical absorption, cryogenic separation, and membrane separation (Wang et al., 2011). Many of these methods are either still in development or not suitable for treating power plant flue gas due to the characteristics of the exhaust stream (Wang, 2011; IPCC, 2005). Of the potentially applicable post-combustion CO₂ capture options, the use of an amine solvent such as monoethanolamine (MEA) is the most mature and well-documented technology (Kvamsdal et al., 2011). Figure B-1 illustrates the amine-based post-combustion capture process.

FIGURE B-1 SCHEMATIC DIAGRAM OF AMINE-BASED CO₂ CAPTURE PROCESS



Source: Interagency Task Force on Carbon Capture and Storage, 2010

EPA generally considers post-combustion CO₂ capture with an amine solvent to be technically feasible for natural gas fired combined cycle combustion turbines and coal fired power plants. However, this technology has not been demonstrated on simple cycle combustion turbines and reciprocating engines. Part of the reason is that the flue gas temperature from simple cycle turbines and reciprocating engines is much higher than from combined cycle turbines and boilers so the gases have to be cooled prior to scrubbing going to the CO₂ absorption column. While still feasible, that adds cost and makes it less economically practical. A more fundamental difficulty with using amine absorption for combustion turbines of either type as well as reciprocating engines is that the CO₂ concentration in the flue gas is

Attachment B – Carbon Capture and Storage

lower than 6 percent. That concentration is much lower than other types of power plants, such as coal fired power plants, where the CO₂ concentration may be as high as 12-15 percent by volume in the post combustion flue gas stream. As a result, the amine system equipment has to be more than twice as large for the same amount of CO₂ captured. That greatly increases the treatment cost. Although significant challenges exist, CCS cost estimates are provided in Tables B-1 and B-2. The data in the tables do not reflect the higher cost associated with treating low-CO₂ concentration flue gases from combustion turbines and reciprocating engines.

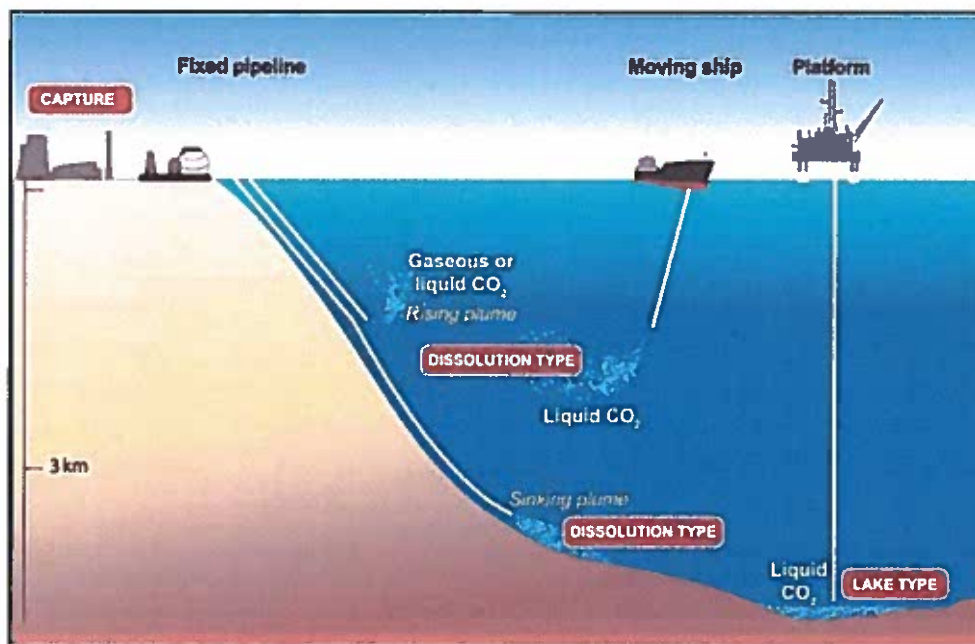
Hawai'i's remote location imposes many additional challenges implementing CO₂ storage that are not present for continental U.S. sources. Hawaiian Electric is not aware of any proven CO₂ geological storage sites on Hawai'i. Therefore, ocean storage, i.e., direct CO₂ release into the ocean water column or onto the deep seafloor, appears to be the most readily available CO₂ storage option.

As shown in Figure B-2, CO₂ ocean storage potentially could be implemented in two ways:

- By injecting and dissolving CO₂ into the water column (typically below 1,000 meters) via a fixed pipeline or a moving ship, or
- By depositing CO₂ via a fixed pipeline or an offshore platform onto the sea floor at depths below 3,000 m, where CO₂ is denser than water and is expected to form a "lake" that would delay dissolution of CO₂ into the surrounding environment.

Ocean storage and its ecological impacts are still in the research phase and the legal status of intentional ocean storage is unknown (Herzog, 2010; IPCC, 2005; Purdy, 2006).

FIGURE B-2 OVERVIEW OF OCEAN STORAGE CONCEPTS



Source: IPCC, 2005

Attachment B – Carbon Capture and Storage

The first step to costing CCS is calculating CO₂ emission rates. CO₂ emissions from power generation are a function of fuel type and the heat rate of the generating unit. Due to the large number of generating units and the various current and future fuel types, the costing is based on typical generating unit configurations.

Table B-1 lists the estimated total annual cost on a \$/million Btu (MBtu) basis to add CCS based on fuel type. The estimate includes the amine absorber system cost, the onshore CO₂ storage cost, and the ocean injection cost. The total annual estimated cost ranges from \$5.64 to \$7.99 per MBtu of heat input.

As noted earlier, due to the absence of suitable subterranean formations, geological storage does not appear to be a viable option in Hawai'i. Even if available, using geological storage instead of ocean storage would not lower the cost. The listed estimated total ocean CO₂ storage cost of \$13.80 per ton (\$2.00 + \$4.81 + \$6.99 = \$13.80) is actually lower than the estimated total cost for geological storage (\$8.53 to \$19.51 per ton)¹⁴.

Table B-2 lists the estimated total annual cost for CCS on a \$/kW basis for various fuel and generating unit types. These costs range from 7¢ to 10¢ per kWh based on maximum operation. These costs would be higher based on actual operating levels. That means that power cost to customers would have to increase 25% or more from 2016 rates, depending on location, to pay for CCS.

¹⁴ Table 9 of the National Energy Technology Laboratory report "Quality Guidelines for Energy System Studies: Estimating Carbon Dioxide Transport and Storage Costs" (DOE/NETL-2013/1614), dated March 14, 2013.

Attachment B – Carbon Capture and Storage

TABLE B-1 ESTIMATED TOTAL ANNUAL CCS COST (\$/MBTU)

Carbon Capture and Storage (CCS) Component	Cost (\$/ton CO ₂ Captured)	CO ₂ Emissions ¹ (lb/MMBtu)	% Captured ²	CO ₂ Emissions Captured (lb/MMBtu)	Total Annual Cost (\$/MMBtu)
No. 6 Fuel Oil					
CO ₂ Capture and Compression ³	93.44				\$6.96
Onshore CO ₂ Storage ⁴	2.00	165.6	90%	149	\$0.15
Ship transport to injection ship ⁴	4.81				\$0.36
Injection ship, pipe and nozzle ⁴	6.99				\$0.52
Total Cost (Biodiesel)	107.24				\$7.99
No. 2 Fuel Oil					
CO ₂ Capture and Compression ³	93.44				\$6.87
Onshore CO ₂ Storage ⁴	2.00	163.1	90%	147	\$0.15
Ship transport to injection ship ⁴	4.81				\$0.35
Injection ship, pipe and nozzle ⁴	6.99				\$0.51
Total Cost (Diesel)	107.24				\$7.88
Natural Gas					
CO ₂ Capture and Compression ³	93.44				\$4.91
Onshore CO ₂ Storage ⁴	2.00	117.0	90%	105	\$0.11
Ship transport to injection ship ⁴	4.81				\$0.25
Injection ship, pipe and nozzle ⁴	6.99				\$0.37
Total Cost (Natural Gas)	107.24				\$5.64

Notes:

1. Emission factors from the Mandatory Greenhouse Gas Reporting rule (40 CFR Part 98 Subpart C, Table C-1).
2. Typical value for amine absorber systems (Interagency Task Force on Carbon Capture and Storage, 2010; NETL, 2013).
3. The CO₂ capture and compression cost is based on information presented in Figure III-1 of the Report of the Interagency Task Force on CCS, dated August 2010. The listed dollar per ton of CO₂ captured is the cost of applying post-combustion CCS to an existing natural gas fired combined cycle power plant. The listed cost (\$103 per metric ton or \$93.44 per ton) is based on continuous operation (8,760 hrs per unit per year at base load for each fuel type).
4. Costs are from Table 6.6 of the IPCC Special Report on Carbon Dioxide Capture and Storage, dated 2005.

Attachment B – Carbon Capture and Storage

TABLE B-2 ESTIMATED TOTAL ANNUAL CCS COST (\$/KWH)

Unit Type	Typical Heat Rate (Btu/kWh)	Fuel Type	Total Annual Cost (\$/MMBtu)	CO ₂ Removal Cost (\$/kWh)
Boiler	12,000	No. 6 Fuel Oil	\$7.99	0.10
		No. 2 Fuel Oil	\$7.88	0.09
		Natural Gas	\$5.64	0.07
Simple Cycle Combustion Turbine	9,500	No. 2 Fuel Oil	\$7.88	0.09
		Natural Gas	\$5.64	0.07
Combined Cycle Combustion Turbine	7,500	No. 2 Fuel Oil	\$7.88	0.09
		Natural Gas	\$5.64	0.07
Reciprocating Engine	8,000	No. 2 Fuel Oil	\$7.88	0.09
		Natural Gas	\$5.64	0.07

Note - Costs are based on continuous operation at base load. Costs based on actual operating levels would be higher.

References

- Herzog, H.J., 2010. Scaling up carbon dioxide capture and storage: From megatons to gigatons, *Energy Econ.* doi:10.1016/j.eneco.2010.11.004
- Interagency Task Force on Carbon Capture and Storage, 2010. "Report of the Interagency Task Force on Carbon Capture and Storage," dated August 2010.
- Intergovernmental Panel on Climate Change, 2005. IPCC Special Report on Carbon Dioxide Capture and Storage. Prepared by Working Group III of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Kvamsdal, H., Chikukwa, A., Hillestad, M., Zakeri, A., & Einbu, A., 2011. A comparison of different parameter correlation models and the validation of an MEA-based absorber model. *Energy Procedia*, 4, 1526-1533.
- Purdy, Ray, 2006. The Legal Implications of Carbon Capture and Storage Under the Sea. *Sustainable Development Law and Policy*, Fall 2006, 22-26
- Wang, M., Lawal, A., Stephenson, P., Sidders, J., & Ramshaw, C., 2011. Post-combustion CO₂ capture with chemical absorption: A state-of-the-art review. *Chemical Engineering Research and Design*, 89, 1609-1624.

Natural Gas Conversion GHG Emissions Reduction

The Hawaiian Electric Companies pursued importation of liquefied natural gas (LNG) to lower fuel costs and air emissions, including GHG. However, after the PUC denied the merger of the Hawaiian Electric Companies with NextEra¹⁵ the Companies withdrew their application for approval of LNG Supply Agreements.

Substitution of natural gas fuel can significantly reduce GHG emissions from power generation. To the extent that LNG replaces no. 2 (diesel) fuel oil and no. 6 fuel oil, GHG emissions are 28 to 30 percent lower per million Btu (MMBtu) of fuel heat input as shown by the emissions factors in Table C-1. Net GHG emissions are reduced by a lesser amount, probably in the 25-28% range, because more heat input is typically required from gas than oil for the same amount of power generated. It is unlikely that LNG would make up 100% of the Companies' fuel consumption so the overall GHG reduction would be correspondingly lower.

TABLE C-1 NATURAL GAS CONVERSION CO₂ EMISSIONS REDUCTION CALCULATION

Fuel	GHG Pollutant ¹	Emission Factor ² (kg/MMBtu)	Global Warming Potential ³	Total GHG Emissions as CO ₂ e (lb/MMBtu)
No. 6 Fuel Oil	CO ₂	75.10	1	165.6
	N ₂ O	6.0E-04	298	0.3942
	CH ₄	3.0E-03	25	0.1653
Total CO₂e =				166.2
No. 2 Fuel Oil	CO ₂	73.96	1	163.1
	N ₂ O	6.0E-04	298	0.3942
	CH ₄	3.0E-03	25	0.1653
Total CO₂e =				163.7
Natural Gas	CO ₂	53.06	1	117.0
	N ₂ O	1.0E-04	298	0.0657
	CH ₄	1.0E-03	25	0.0551
Total CO₂e =				117.1
No. 6 Fuel Oil to Natural Gas Reduction = 29.5%				
No. 2 Fuel Oil to Natural Gas Reduction = 28.4%				

Notes:

1. Greenhouse Gas (GHG) pollutants from the Mandatory Greenhouse Gas Reporting rule (40 CFR §98.32).
2. Emission factors from the Mandatory Greenhouse Gas Reporting rule (40 CFR Part 98 Subpart C, Tables C-1 and C-2).
3. Global Warming Potentials from the Mandatory Greenhouse Gas Reporting rule (40 CFR Part 98 Subpart A, Table A-1).

¹⁵ Public Utilities Commission of the State of Hawai'i Decision and Order No. 33795. July 15, 2016.

Biofuel Conversion GHG Emissions Reduction

1. Availability

Biodiesel has been used as fuel for power generation on a limited scale but there is not enough supply to replace a significant portion of the fuel consumed by the Hawaiian Electric Companies. According to the U.S. Energy Information Administration (EIA) Biodiesel Production Report for July 2018, biodiesel (as B100) production capacity in Hawai'i was only about 6 million gallons per year (MGY). Campbell Industrial Park (CIPGS) alone burned 7.7 million gallons in 2017. U.S. production capacity was 2370 MGY but only 209 MGY of that was on the west coast where delivery to Hawai'i would be practical. By comparison, the Hawaiian Electric Companies used 370 million gallons of residual and distillate fuels in 2013.

In order for biodiesel to become sufficiently available to provide fuel for the State's electricity needs, dedicated energy crops would be required. But it is uncertain whether those crops would be adequate for the competing fuel needs throughout the State. Furthermore, biodiesel production is constrained by limited land availability and unpredictable financial incentives. A 2010 study on the potential for biofuel production in Hawai'i concluded that biodiesel produced from waste fats, oils, and greases would account for only one half of one percent of current diesel fuel usage (B&V, 2010). The same study estimated the theoretical biodiesel potential from waste oil as 2 to 2.5 million gallons per year (MGY).

Hawaiian Electric recently obtained a contract with Pacific Biodiesel to purchase approximately 3 MGY of biodiesel, primarily for CIPGS. At this time, Pacific Biodiesel is the only producer of biodiesel located in the State of Hawai'i. Another company, Imperium Renewables Hawai'i, announced plans to develop and build a biodiesel plant in Kapolei (O'ahu) several years ago but the project was unsuccessful due to financial reasons. Subsequently, the PUC rejected Hawaiian Electric's proposal to import biodiesel from Imperium's production plant in Washington State because of high costs. To the extent possible, Hawaiian Electric and the PUC would prefer to use locally-produced biofuels. But there simply is not enough biodiesel supply available to significantly lower Hawaiian Electric's greenhouse gas emissions without drastically increasing the cost.

2. Cost

Table D-1 summarizes Hawaiian Electric's April 2015 fuel price forecasts. Historically, biodiesel has not been economically competitive compared to petroleum diesel without some type of governmental incentive. Our forecast shows that through 2019, the price of biodiesel will be approximately double that of our current fuel mix.

In addition to fuel cost, capital cost would be necessary to provide the infrastructure for receiving and storing biodiesel. Indirect costs such as permitting, performance testing, and engineering would likely add to the overall cost of switching to biodiesel. From an energy standpoint, biodiesel is similar to traditional diesel but contains about 7-10% less energy per gallon. Thus, the cost of biodiesel compared to diesel is higher but the energy content is lower.

Attachment D – Biofuel Conversion GHG Emissions Reduction

Biodiesel prices are expected to continue to rise. Although current generation biodiesel production facilities are more efficient and benefit from economies of scale, feedstock costs have remained high (B&V, 2010). Generally, waste oils are the least expensive but are not always available in large quantities. Furthermore, the U.S. biodiesel industry is highly dependent on financial incentives such as the Federal blender tax credit. The unpredictability of the biofuel market does not align with Hawaiian Electric's priority to provide reliable and low cost electricity. Further, we believe that it is questionable whether the PUC will approve large-scale conversions to biodiesel because of the potential cost impact on the Companies' customers.

TABLE D-1 BIODIESEL FUEL COST COMPARISON

Hawaiian Electric's 2018 Fuel Price Forecast				
	\$/million Btu			
Year	No. 2 Diesel	LSFO	ULSD	Biodiesel
2018	15.82	13.08	16.88	31.84
2019	14.96	12.17	16.02	31.76
2020	15.86	12.99	16.96	32.93
2021	16.20	13.26	17.32	33.71

References

- EIA (U.S. Energy Information Administration), 2015. "Monthly Biodiesel Production Report," dated March 2015.
- B&V (Black and Veatch Corp.), 2010. "The Potential for Biofuels Production in Hawai'i," dated January 2010.
- Hawaiian Electric, 2018 Fuel Price Forecast. Received from C. Reyes 7/6/2018.

Attachment E – Potential Energy Efficiency Improvements

Potential Energy Efficiency Improvements

Improving the efficiency when fuel energy is converted to usable power output reduces the amount of fuel that has to be combusted to satisfy power demand, in turn decreasing the emissions of greenhouse gases and other air pollutants that are created in the combustion process. Additionally, improved energy efficiency reduces the cost of power generation because of the lower fuel requirement.

Energy efficiency of power generating units can be improved through changes to technology (equipment), processes, and practices. But most of the cost-effective improvements available to power generators have already been made to reduce fuel cost since fuel is such a large part of the total cost of power generation. That is especially true for Electrical Generating Units (EGU) like Hawaiian Electric's that burn oil, which is a relatively high cost fuel. Energy efficiency improvement is one of the four Building Blocks that EPA relied on to develop its proposed *Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units*.¹⁶ In the preamble to the proposed rule EPA stated that they decided not to include efficiency improvement by oil-fired EGUs as an element of their Best System for Emissions Reduction (BSER) evaluation for GHG emissions because the potential GHG reductions are small compared to the reductions available from other types of power generation.¹⁷

Nevertheless, potential energy efficiency improvements for the Hawaiian Electric Companies' boilers, combustion turbines, and diesel electric generator sets are discussed in this section.

Boilers

The major portion of the Hawaiian Electric Companies' power generation comes from boilers that power steam turbine electric generators. The Hawaiian Electric Companies operate their boilers as efficiently as practicable. An important incentive for doing so is that the PUC establishes efficiency standards that must be met for the Company to fully recover the cost of the fuel used in power generation. Hawaiian Electric assures that its boilers operate at optimal energy efficiency a number of ways. One is by daily tracking and reporting of Heat Rate (HR) for each unit. Heat Rate, a measure of overall power generation efficiency that is commonly used in the power generation industry, is the ratio of the total fuel energy input divided by the net amount of power exported to customers, usually reported as Btu of fuel energy consumed per Kilowatt-hour of power exported (Btu/KWh). The lower the Heat Rate, the more efficiently the unit is operating. Heat Rate trends are a sensitive indicator of efficiency changes somewhere in the system. The Hawaiian Electric Companies also have aggressive Heat Rate improvement programs that follow the guidelines developed by the Electric Power Research

¹⁶ 79 Fed. Reg. 34830, June 18, 2014.

¹⁷ *Ibid.* p. 34877.

Attachment E – Potential Energy Efficiency Improvements

Institute (EPRI).¹⁸ Those guidelines are based on the best practices used in the industry for improving and maintaining energy efficiency.

Maui Electric's four boilers and Hawai'i Electric Light's two boilers underwent energy assessments and tune-ups in 2014 that were required by 40 CFR Part 63 Subpart JJJJJ, NESHAP for Industrial, Commercial, and Institutional Boilers Area Sources. The assessments, performed by a certified independent combustion engineer, concluded that the overall condition of the boilers is good and that good efficiency practices are followed. All the Maui Electric and Hawai'i Electric Light boilers are tested annually to confirm their efficiency and tune-ups are required under Subpart JJJJJ once every five years.

Hawaiian Electric's boilers compare favorably for energy efficiency with other oil-fired EGUs in the U.S. The Energy Information Administration (EIA) collects and publishes Heat Rate data for several categories of EGUs. For the 2009 to 2013 period, EIA reported that the average HR for petroleum-fired EGUs was 10.9 MBtu/MWh.¹⁹ By comparison, Hawaiian Electric's fourteen boilers on O'ahu averaged lower than 10.6 MBtu/MWh Heat Rate in the first 6 months of 2015. That is very good performance given the Hawaiian Electric boilers' operating rates.

Traditional style power plants were designed to operate near full capacity, often termed base-loaded, where they are most efficient. Operating them at lower and varying loads reduces their efficiency. Hawaiian Electric's boilers operate below full capacity. During 2012 through 2014, for instance, their average operating load was less than 60% of online capacity. There are two reasons for the lower load. One is that, unlike utilities on the mainland, Hawaiian Electric operates an isolated system. It cannot draw power from neighboring utilities in the event of system upsets so it must be entirely self-sufficient. To protect against power outages, Hawaiian Electric keeps enough unused generation capacity online as spinning reserve to absorb unexpected loss of the largest generation facility that is operating at any time.

Another factor that keeps operating load lower than ideal is imposed by the increasing amount of renewable energy that has been integrated into Hawaiian Electric's system. The output for renewable energy sources such as solar and wind is variable and intermittent because clouds reduce solar panel output and variable wind speeds reduce windmill output. Consequently, Hawaiian Electric's boilers must vary their operation in order to match overall system output with demand. The result of those constraints on operating load is that Hawaiian Electric's boilers typically operate below their peak efficiencies. Despite these constraints, as noted above, their HRs are competitive with those of mainland utilities, which generally do not have the same constraints.

¹⁸ *Heat Rate Improvement Guidelines*. EPRI, Palo Alto, CA: 2012. Publication 1023913.

¹⁹ *Electric Power Annual*. U.S. EIA. March 23, 2015 release, Table 8.1.

Attachment E – Potential Energy Efficiency Improvements

Combustion Turbines

Combustion Turbines (CT) represent the Hawaiian Electric Companies' second-largest source of power generation. The Company operates three CTs on O'ahu, four on Maui, and five on Hawai'i Island.

The energy efficiency of CTs is highest when they operate in combined cycle mode rather than simple cycle. In simple cycle, the hot gases from the turbine are exhausted to the atmosphere, whereas in combined cycle hot exhaust gases pass through a heat recovery steam generator, where steam passes through a turbine to generate additional power.

All four of Maui's and two of Hawai'i Island's CTs are capable of operating in combined cycle mode. No other significant energy efficiency improvements have been identified.

The remaining three CTs on Hawai'i Island and three on O'ahu are simple cycle units. Although their energy efficiency could be improved by converting them to combined cycle, the Companies evaluated doing so and concluded that it would not be feasible given the function that the simple cycle CTs serve on the current system. These units operate less than 10 percent of the time and instead are used to provide fast response power in case of shortages on the system. Unlike boilers, which take a long time to start up, simple-cycle CTs can be started up quickly when needed. In contrast, it takes significantly longer to bring a combined-cycle CT fully online. Operating the current simple-cycle CTs in combined-cycle mode would defeat much of the reason they are used. Hawaiian Electric has not identified any energy efficiency improvements for its CTs that fit within the current design of its system. That does not rule out system design changes that could accommodate combined cycle combustion turbines; however, such changes could not be implemented before 2020, the compliance date for Act 234 units.

Diesel Electric Generators

Diesel electric generators (DEGs) have generally lower power output capability than boilers or combustion turbines and are mainly used to serve lower loads, typically in remote locations. DEGs also have the advantage that they can be brought online and ramped up quickly.

The Hawaiian Electric Companies operate DEGs that range in size from 1 MW to 12.5 MW each.

Hawaiian Electric received the following information from Valley Power Systems Northwest. Valley Power has supplied diesel generation equipment to the Hawaiian Electric Companies and is familiar with their DEGs.²⁰ Diesel electric generators are generally very efficient in converting fuel energy into electric power. There are few options available for improving their energy efficiency. One option is to install a turbocharger if a unit is not already equipped with one. However, all the DEGs covered by the Companies GHG Partnership already are equipped with

²⁰ Verbal communication between Dave Peterson of Valley Power Systems Northwest and Greg Narum of Hawaiian Electric, March 20, 2015.

Attachment E – Potential Energy Efficiency Improvements

turbochargers. Another option is to upgrade from 2-pass to 4-pass after-coolers, which can improve efficiency 1-3%. However, this may not be practical for Hawaiian Electric Companies' units because of their age and design. The benefit in terms of GHG emissions reduction would be small in any case, amounting to about 120 metric tons per year of CO₂e for a 2% efficiency improvement of a 1 MW generator.

An approach that would more substantially reduce GHG emissions would be to replace the existing diesel engine generators with newer, more efficient models. Hawaiian Electric estimates that heat rates could be improved 10% to 20%, depending on the unit, by replacing the Companies' larger DEGs with new units similar to those constructed at the Schofield Generating Station.²¹ According to data Hawaiian Electric submitted to the Public Utilities Commission, the 2015 installed cost for new DEG capacity up to 100MW is \$2970/KWh.²² Assuming a 15% heat rate improvement averaged over all the units, the fuel cost savings would be about \$280 per year per KW of capacity based on estimated 2015 fuel costs²³ and 8500 hours per year of operation. Therefore, it would require about 10 years for the energy savings to pay back the investment cost. That cost can only be justified if the existing unit is nearing the end of its useful life.

Summary of Potential Energy Efficiency Improvements

The Hawaiian Electric Companies operate their power generating units at energy efficiencies that are equivalent to or better than mainland averages for oil-fired generators despite constraints imposed by their isolated location. The Company has researched additional opportunities for improving efficiency beyond steps already taken but has not identified any that are operationally and economically justified given current system designs and needs.

²¹ Email from Robert Isler of Hawaiian Electric Generation Planning Department. June 22, 2015.

²² *Hawaiian Electric Power Supply Improvement Plan*. Table F-11. Docket 2011-0206. August 2014.

²³ *Ibid*, Table F-5.

Attachment F – Puna Geothermal Venture Equivalent GHG Emissions

The equivalent GHG emissions reduction from PGV’s energy generation was calculated by comparing the combined actual emissions from Hawai’i Electric Light and HEP in 2017, the last full year PGV operated, with the 12 months from July 2018 to June 2019 when PGV was offline. The difference, 185,404 tons, was distributed among the generating facilities in proportion to their July 2018 to June 2019 operation. The result is tabulated in Table A-2.

The derivation of PGV’s equivalent GHG emissions is summarized below.

Source	GHG Emissions, tons	
	PGV Online	PGV Offline
	2017	July 2018-June 2019
HELCO		
Keahole	193,103	260,090
Kaneolehua-Hill	243,346	180,345
Puna	26,400	67,806
HEP	98,962	238,974
HELCO-HEP Total	561,811	747,215
GHG Adjustment for PGV		185,404

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JUL 29 2019

FCST/PAK
JUL 26 2019

**Revised Form S-6
Campbell Industrial Park Generating Station
CSP No. 0548-01-C
July 2019**

S-6: Application for a Significant Modification to a Covered Source

In providing the required information, reference the corresponding letters and numbers listed below.

Provide a minimum of **two (2)** sets (1 original and 1 copy) of all application materials to the Hawaii Department of Health. Also, mail **one (1)** set directly to EPA at the following address:

Chief (Attention: AIR-3)
Permits Office, Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

I. In accordance with Hawaii Administrative Rules (HAR) §11-60.1-104, the following information is required:

A. Equipment Specifications:

1. Maximum design capacity. CIP1 is a Siemens Westinghouse Power Corporation SGT6-3000E (135 MW nominal) combustion turbine.
2. Fuel type. CIP1 is currently permitted to burn naphtha, fuel oil No. 2, biodiesel (B100 and B99), and blends of fuel oil No. 2 and biodiesel (B100 and B99) with a maximum sulfur content of 0.05% by weight.
3. Fuel use. CIP1 has a maximum hourly fuel consumption rate of 1,482.6 MMBtu/hr.
4. Production capacity. Does not apply.
5. Production rates. Does not apply.
6. Raw materials. Does not apply.
7. Provide any manufacturer's literature. This application does not change CIP1's manufacturer's specifications.

B. Provide detailed descriptions of all processes and products defined by Standard Industrial Classification Code (SICC). Also, provide any reasonably anticipated alternative operating scenarios, associated processes, and products, by SICC.

Electrical power generation (SIC code 4911) is the only product or process.

No additional changes to operating scenarios are proposed with this application.

1. Identify and describe in detail all air pollution control equipment and compliance monitoring devices or activities planned by the owner or operator, and to the extent of available information, an estimate of emissions before and after controls. Provide all calculations and assumptions.

NO_x emissions are controlled by water injection. SO₂ emissions are controlled by limiting the biodiesel fuel sulfur content to 50 ppm. Emissions of PM, PM₁₀, PM_{2.5}, CO, and VOC are controlled by combustion design and good combustion practices. Emissions of any hazardous air pollutants are controlled by the use of No. 2 diesel or biodiesel and combustion system design.

2. List all **new insignificant** activities in accordance with §11-60.1-82.

No additional changes/additions to insignificant activities are proposed with this application.

- C. Maximum Operating Schedule (to the extent needed to determine or regulate emissions):
1. Total hours per day, per week, and/or per month. Depending on future dispatch requirements, the plant may cycle off-line daily, or operate at reduced loads. While these expected operating levels are less than continuous, there may be times when a unit must be run continuously for extended periods of time. Thus, this application does not include any daily, weekly, or monthly operating limits.
 2. Total hours per year. Up to 8,760 hours per year.
 3. If operation is seasonal or irregular, describe. Refer to I.C.1 above.
- D. Cite and describe all applicable requirements as defined in HAR §11-60.1-81, including the following:
1. Description of or reference to any applicable test methods for determining compliance with each applicable requirement. See Form C-2.
 2. Explanation of all proposed exemptions from any applicable requirements. See Forms C-1 and C-2.
- E. Identify and describe current operational limitations or work practices the source plans to implement that affect emissions of any regulated or hazardous air pollutant. Provide all calculations and assumptions.
- See item I.B.1. above for current work practices that affect emissions of any regulated or hazardous air pollutant.
- Hawaiian Electric requests incorporation of the Greenhouse Gas emissions limitations into the Covered Source Permit CSP No. 0548-01-C, consistent with the Greenhouse Gas Emissions Reduction Plan (GHG ERP) submitted to the DOH on February 28, 2018, the subsequent updates submitted to the DOH on October 17, 2018 and May 15, 2019, and the latest update dated July 26, 2019, enclosed with this application.
- F. Provide a detailed schedule for construction or modification of the proposed source, including any major milestones, if applicable. Not applicable.
- G. Provide detailed information to define permit terms and conditions for any proposed **emissions trading** within the facility in accordance with HAR §11-60.1-96. No emissions trading is proposed.
- H. For **significant** modifications which increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted, an assessment of the ambient air quality impact of the covered source or significant modification, with the inclusion of any available background air quality data. The assessment shall include all supporting data, calculations and assumptions, and a comparison with the National Ambient Air Quality Standards and State Ambient Air Quality Standards. Do not apply. The proposed modification will not increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted.
- I. For **new** covered sources or **significant** modifications subject to the requirements of subchapter 7 of HAR Chapter 11-60.1, all analyses, assessments, monitoring, and other application requirements of subchapter 7. Do not apply. The proposed modification is not subject to Subchapter 7 of HAR Chapter 11-60.1.
- J. Provide the following for Compliance purposes:

1. A compliance plan, Form C-1.
 2. A compliance certification, Form C-2.
- II. Submit an application fee according to the Application Fees Schedule in the Instructions for Applying for an Air Pollution Control Permit.**
- III. Provide other information as follows:**
- A. As required by any applicable requirement or as requested and deemed necessary by the director to make a decision on the application.
 - B. As may be necessary to implement and enforce other applicable requirements of the Clean Air Act or of HAR Chapter 11-60.1 or to determine the applicability of such requirements.
- IV. The Director reserves the right to request the following information:**
- A. A risk assessment of the air quality related impacts caused by the covered source or significant modification to the surrounding environment.
 - B. Results of source emissions testing, ambient air quality monitoring, or both.
 - C. Information on other available control technologies.
- V. An application shall be determined to be complete only when all of the following have been complied with:**
- A. All information required or requested in numbers I, III, and IV has been submitted.
 - B. All documents requiring certification have been certified pursuant to HAR §11-60.1-4.
 - C. All applicable fees have been submitted.
 - D. The director has certified that the application is complete.
- VI. The Director shall not continue to act upon or consider an incomplete application.**
- A. The applicant shall be notified in writing whether the application is complete:
 1. For the requirements of subchapter 7, thirty days after receipt of the application.
 2. For the requirements of HAR subchapter 5, sixty days after receipt of the application. For purposes of this paragraph, the date of receipt of an application for a new covered source or significant modification subject to the requirements of subchapter 7 shall be the date the application is determined to be complete for the requirements of subchapter 7.
 3. Unless the Director requests additional information or notifies the applicant of incompleteness within sixty days after receipt of an application pursuant to VI.A.2 above, the application shall be deemed complete for the requirements of subchapter 5.
 - B. During the processing of an application that has been determined or deemed complete, if additional information is necessary to evaluate or take final action on the application, the Director may request such information in writing and set a reasonable deadline for a response.
- VII. After receipt of a complete application, the Director, in writing, shall approve, conditionally approve, or deny an application within eighteen months, except as provided in HAR §11-60.1-88 and (A) and (B) below.**
- A. Upon program approval, within nine months for an application containing an early reduction demonstration pursuant to section 112(i)(5) of the Clean Air Act.
 - B. Within twelve months for a new covered source or significant modification subject to the requirements of subchapter 7.

- VIII. **The Director shall provide reasonable procedures and resources to complete the review of the majority of the applications for a significant modification within nine months after receipt of a complete application. An application for significant modification shall be approved only if the Director determines that the significant modification will be in compliance with all applicable requirements.**
- IX. **The Director shall provide for public notice, including the method by which a public hearing can be requested, and an opportunity for public comment on the draft significant modification to the covered source in accordance with HAR §11-60.1-99.**
- X. **The Director shall provide a statement that sets forth the legal and factual bases for the draft permit conditions (including references to the applicable statutory or regulatory provisions) to EPA and any other person requesting it.**
- XI. **Each application for a significant modification, and the proposed Covered Source Permit reflecting the significant modification shall be subject to EPA oversight in accordance with HAR §11-60.1-95.**

**Revised Form S-6
Kahe Generating Station
CSP No. 0240-01-C
July 2019**

S-6: Application for a Significant Modification to a Covered Source

In providing the required information, reference the corresponding letters and numbers listed below.

Provide a minimum of **two (2)** sets (1 original and 1 copy) of all application materials to the Hawaii Department of Health. Also, mail **one (1)** set directly to EPA at the following address:

Chief (Attention: AIR-3)
Permits Office, Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

I. In accordance with Hawaii Administrative Rules (HAR) §11-60.1-104, the following information is required:

A. Equipment Specifications:

1. Maximum design capacity. Refer to the table below.
2. Fuel type.
 - Fuel oil No. 6 with maximum sulfur content of 0.5% by weight for Units K-1 through K6.
 - Fuel oil No. 2 with maximum sulfur content 0.5% by weight for Units A and B.
 - A maximum of 115,000 gal/yr of specification (spec) used oil for Units K-1 through K-4.
 - Propane as igniter fuel for K-1 and K-2.
 - Fuel oil No. 2 with maximum sulfur content of 0.5% by weight as igniter fuel for K-3 through K-6.
 - Fuel oil No. 2 (diesel) with maximum 0.5% by weight sulfur as an alternate fuel for Boilers K-1 through K-6 as approved by the DOH on June 7, 2013.
 - Natural gas as alternate fuel for boilers K-1 through K-6 as approved by DOH on January 5, 2015.
3. Fuel use. Refer to the table below.

Unit ID	Maximum Design Fuel Use per Unit		
	Nominal Capacity	Heat Input (MMBtu/hr)	Ignition Fuel
K-1	92 MW	903	Propane
K-2	90 MW	900	Propane
K-3	92 MW	892	Diesel
K-4	93 MW	918	Diesel
K-5	142 MW	1,468	Diesel
K-6	142 MW	1,516	Diesel
A	2.5 MW	30.5	Diesel
B	2.5 MW	30.5	Diesel

4. Production capacity. Does not apply.
5. Production rates. Does not apply.
6. Raw materials. Does not apply.
7. Provide any manufacturer's literature. This application does not change any of Kahe equipment's manufacturer's specifications.

- B. Provide detailed descriptions of all processes and products defined by Standard Industrial Classification Code (SICC). Also, provide any reasonably anticipated alternative operating scenarios, associated processes, and products, by SICC.

Electrical power generation (SIC code 4911) is the only product or process.

No additional changes to operating scenarios are proposed with this application.

1. Identify and describe in detail all air pollution control equipment and compliance monitoring devices or activities planned by the owner or operator, and to the extent of available information, an estimate of emissions before and after controls. Provide all calculations and assumptions.

Sulfur emissions are controlled by limiting the fuel sulfur content to 0.5 percent by weight. Emissions of NO_x, PM, PM₁₀, CO, and VOC are controlled by combustion design and good combustion practices. Emissions of other HAP's are controlled by the use of No. 2 and No. 6 fuel oil and combustion system design. Unit 6 is equipped with low NO_x burners to control NO_x emissions.

2. List all *new insignificant* activities in accordance with §11-60.1-82.

No additional changes/additions to insignificant activities are proposed with this application.

- C. Maximum Operating Schedule (to the extent needed to determine or regulate emissions):

1. Total hours per day, per week, and/or per month. Depending on future power dispatch requirements, specific boilers may cycle off-line daily, or operate at reduced loads. However, there may be times when a unit must be run continuously for extended periods of time. Thus, this application does not include any annual operating limits for Units K-1 through K-5. Unit K-6 is limited to a daily average fuel consumption of 8,610 gal/hr. Units A and B are limited to a combined annual operating hour limit of 300 hours.
2. Total hours per year. Up to 8,760 hours per year.
3. If operation is seasonal or irregular, describe. Refer to I.C.1 above.

- D. Cite and describe all applicable requirements as defined in HAR §11-60.1-81, including the following:

1. Description of or reference to any applicable test methods for determining compliance with each applicable requirement. See Form C-2.
2. Explanation of all proposed exemptions from any applicable requirements. See Forms C-1 and C-2.

- E. Identify and describe current operational limitations or work practices the source plans to implement that affect emissions of any regulated or hazardous air pollutant. Provide all calculations and assumptions.

See item I.B.1. above for current work practices that affect emissions of any regulated or hazardous air pollutant.

Hawaiian Electric requests incorporation of the Greenhouse Gas emissions limitations into the Covered Source Permit CSP No. 0240-01-C, consistent with the Greenhouse Gas Emissions Reduction Plan (GHG ERP) submitted to the DOH on February 28, 2018, the subsequent updates submitted to the DOH on October 17, 2018 and May 15, 2019, and the latest update dated July 26, 2019, enclosed with this application.

- F. Provide a detailed schedule for construction or modification of the proposed source, including any major milestones, if applicable. Not Applicable.
- G. Provide detailed information to define permit terms and conditions for any proposed **emissions trading** within the facility in accordance with HAR §11-60.1-96. No emissions trading is proposed.
- H. For **significant** modifications which increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted, an assessment of the ambient air quality impact of the covered source or significant modification, with the inclusion of any available background air quality data. The assessment shall include all supporting data, calculations and assumptions, and a comparison with the National Ambient Air Quality Standards and State Ambient Air Quality Standards. Do not apply. The proposed modification will not increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted.
- I. For **new** covered sources or **significant** modifications subject to the requirements of subchapter 7 of HAR Chapter 11-60.1, all analyses, assessments, monitoring, and other application requirements of subchapter 7. Do not apply. The proposed modification is not subject to Subchapter 7 of HAR Chapter 11-60.1.
- J. Provide the following for Compliance purposes:
1. A compliance plan, Form C-1.
 2. A compliance certification, Form C-2.
- II. **Submit an application fee according to the Application Fees Schedule in the Instructions for Applying for an Air Pollution Control Permit.**
- III. **Provide other information as follows:**
- A. As required by any applicable requirement or as requested and deemed necessary by the director to make a decision on the application.
 - B. As may be necessary to implement and enforce other applicable requirements of the Clean Air Act or of HAR Chapter 11-60.1 or to determine the applicability of such requirements.
- IV. **The Director reserves the right to request the following information:**
- A. A risk assessment of the air quality related impacts caused by the covered source or significant modification to the surrounding environment.
 - B. Results of source emissions testing, ambient air quality monitoring, or both.
 - C. Information on other available control technologies.
- V. **An application shall be determined to be complete only when all of the following have been complied with:**
- A. All information required or requested in numbers I, III, and IV has been submitted.
 - B. All documents requiring certification have been certified pursuant to HAR §11-60.1-4.
 - C. All applicable fees have been submitted.
 - D. The director has certified that the application is complete.
- VI. **The Director shall not continue to act upon or consider an incomplete application.**

- A. The applicant shall be notified in writing whether the application is complete:
 - 1. For the requirements of subchapter 7, thirty days after receipt of the application.
 - 2. For the requirements of HAR subchapter 5, sixty days after receipt of the application. For purposes of this paragraph, the date of receipt of an application for a new covered source or significant modification subject to the requirements of subchapter 7 shall be the date the application is determined to be complete for the requirements of subchapter 7.
 - 3. Unless the Director requests additional information or notifies the applicant of incompleteness within sixty days after receipt of an application pursuant to VI.A.2 above, the application shall be deemed complete for the requirements of subchapter 5.
 - B. During the processing of an application that has been determined or deemed complete, if additional information is necessary to evaluate or take final action on the application, the Director may request such information in writing and set a reasonable deadline for a response.
- VII. **After receipt of a complete application, the Director, in writing, shall approve, conditionally approve, or deny an application within eighteen months, except as provided in HAR §11-60.1-88 and (A) and (B) below.**
- A. Upon program approval, within nine months for an application containing an early reduction demonstration pursuant to section 112(i)(5) of the Clean Air Act.
 - B. Within twelve months for a new covered source or significant modification subject to the requirements of subchapter 7.
- VIII. **The Director shall provide reasonable procedures and resources to complete the review of the majority of the applications for a significant modification within nine months after receipt of a complete application. An application for significant modification shall be approved only if the Director determines that the significant modification will be in compliance with all applicable requirements.**
- IX. **The Director shall provide for public notice, including the method by which a public hearing can be requested, and an opportunity for public comment on the draft significant modification to the covered source in accordance with HAR §11-60.1-99.**
- X. **The Director shall provide a statement that sets forth the legal and factual bases for the draft permit conditions (including references to the applicable statutory or regulatory provisions) to EPA and any other person requesting it.**
- XI. **Each application for a significant modification, and the proposed Covered Source Permit reflecting the significant modification shall be subject to EPA oversight in accordance with HAR §11-60.1-95.**

**Revised Form S-6
Waiau Generating Station
CSP No. 0239-01-C
July 2019**

S-6: Application for a Significant Modification to a Covered Source

In providing the required information, reference the corresponding letters and numbers listed below.

Provide a minimum of **two (2)** sets (1 original and 1 copy) of all application materials to the Hawaii Department of Health. Also, mail **one (1)** set directly to EPA at the following address:

Chief (Attention: AIR-3)
Permits Office, Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

I. In accordance with Hawaii Administrative Rules (HAR) §11-60.1-104, the following information is required:

A. Equipment Specifications:

1. Maximum design capacity. Refer to the table below.
2. Fuel type. _____
 - Fuel oil No. 6 with a maximum sulfur content of 0.5% by weight for Units 3 through 8.
 - Natural gas with maximum sulfur content of 175 grains per 100 SCF for Units 5 through 8.
 - Specification used oil for Units 3 through 8 (no more than 50,000 gallons per any rolling 12-month period).
 - Fuel oil No. 2 with a maximum sulfur content of 0.5% by weight for Units 9 and 10.
3. Fuel use. Refer to the table below.

Maximum Capacity and Fuel Use Per Unit

Unit ID	Manufacturer	Model Number	Serial Number	Capacity (Nominal)	Fuel Rate (MMBtu/hr)	Ignition Fuel
3	Babcock and Wilcox		RB-43	49 MW	576	Propane
4	Babcock and Wilcox		RB-92	49 MW	585	Propane
5	Babcock and Wilcox		RB-324	57 MW	633	Propane
6	Babcock and Wilcox		RB-328	58 MW	637	Propane
7	Combustion Engineering		20694	92 MW	923	Diesel
8	Combustion Engineering		20177	92 MW	922	Diesel
9	General Electric	MS7000	217725	50	682	Diesel
10	General Electric	MS7000	217724	52	691	Diesel

4. Production capacity. Does not apply.
5. Production rates. Does not apply.
6. Raw materials. Does not apply.
7. Provide any manufacturer's literature. This application does not change any of Waiiau equipment's manufacturer's specifications.

- B. Provide detailed descriptions of all processes and products defined by Standard Industrial Classification Code (SICC). Also, provide any reasonably anticipated alternative operating scenarios, associated processes, and products, by SICC.

Electrical power generation (SIC code 4911) is the only product or process.

Several types of alternative operating scenarios apply to the generating station as described

below:

a. Unit operation during startup, shutdown, maintenance and testing of the combustion turbine generators and boilers. Boiler startup operations may range up to 7 hours and occur almost daily.

b. Alternate fuels. Hawaiian Electric may use alternate fuels and fuel additives with prior approval from the Department of Health.

c. Soot blowing is a necessary maintenance operation and may result in a temporary increase in opacity.

d. Use of a temporary replacement unit in the event of a failure or major overhaul of an installed unit. In the event that the projected down time of the unit increases the likelihood of an interruption in electrical service, the down unit may be replaced with an equivalent unit. Emissions from the replacement unit will comply with the original unit's permitted emission limits.

e. Operate the combustion turbines, W9 and W10, below minimum load to address system disturbances and frequency issues. This request was submitted in a minor modification application dated May 6, 2015.

No additional changes to operating scenarios are proposed with this application.

1. Identify and describe in detail all air pollution control equipment and compliance monitoring devices or activities planned by the owner or operator, and to the extent of available information, an estimate of emissions before and after controls. Provide all calculations and assumptions.

Sulfur emissions are controlled by limiting the fuel sulfur content to a maximum of 0.5% by weight. Emissions of NO_x, PM, PM₁₀, CO, and VOC are controlled by combustion design and good combustion practices. Emissions of any hazardous air pollutants are controlled by the use of fuel oil Nos. 6 and 2 and good combustion design.

2. List all *new insignificant* activities in accordance with §11-60.1-82.

No additional changes/additions to insignificant activities are proposed with this application.

C. Maximum Operating Schedule (to the extent needed to determine or regulate emissions):

1. Total hours per day, per week, and/or per month. Depending on future dispatch requirements, the plant may cycle off line daily, or operate at reduced loads. While these expected operating levels are less than continuous, there may be times when the units must be run continuously for extended periods of time. Thus, this application does not propose any annual operating limits.
2. Total hours per year. Up to 8,760 hours per year.
3. If operation is seasonal or irregular, describe. Refer to I.C.1 above.

D. Cite and describe all applicable requirements as defined in HAR §11-60.1-81, including the following:

1. Description of or reference to any applicable test methods for determining compliance with each applicable requirement. See Form C-2.
2. Explanation of all proposed exemptions from any applicable requirements. See Forms C-1 and C-2.

- E. Identify and describe current operational limitations or work practices the source plans to implement that affect emissions of any regulated or hazardous air pollutant. Provide all calculations and assumptions.

See item I.B.1. above for current work practices that affect emissions of any regulated or hazardous air pollutant.

Hawaiian Electric requests incorporation of the Greenhouse Gas Emissions Limitations into the Covered Source Permit CSP No. 0239-01-C, consistent with the Greenhouse Gas Emissions Reduction Plan submitted to the DOH on February 28, 2018, the subsequent updates submitted to the DOH on October 17, 2018 and May 15, 2019, and the latest update dated July 26, 2019, enclosed with this application.

- F. Provide a detailed schedule for construction or modification of the proposed source, including any major milestones, if applicable. Not applicable.

- G. Provide detailed information to define permit terms and conditions for any proposed *emissions trading* within the facility in accordance with HAR §11-60.1-96. No emissions trading is proposed.

- H. For *significant* modifications which increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted, an assessment of the ambient air quality impact of the covered source or significant modification, with the inclusion of any available background air quality data. The assessment shall include all supporting data, calculations and assumptions, and a comparison with the National Ambient Air Quality Standards and State Ambient Air Quality Standards. Do not apply. The proposed modification will not increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted.

- I. For *new* covered sources or *significant* modifications subject to the requirements of subchapter 7 of HAR Chapter 11-60.1, all analyses, assessments, monitoring, and other application requirements of subchapter 7. Do not apply. The proposed modification is not subject to Subchapter 7 of HAR Chapter 11-60.1.

- J. Provide the following for Compliance purposes:

1. A compliance plan, Form C-1.
2. A compliance certification, Form C-2.

II. Submit an application fee according to the Application Fees Schedule in the Instructions for Applying for an Air Pollution Control Permit.

III. Provide other information as follows:

- A. As required by any applicable requirement or as requested and deemed necessary by the director to make a decision on the application.
- B. As may be necessary to implement and enforce other applicable requirements of the Clean Air Act or of HAR Chapter 11-60.1 or to determine the applicability of such requirements.

IV. The Director reserves the right to request the following information:

- A. A risk assessment of the air quality related impacts caused by the covered source or significant modification to the surrounding environment.
- B. Results of source emissions testing, ambient air quality monitoring, or both.

- C. Information on other available control technologies.
- V. An application shall be determined to be complete only when all of the following have been complied with:**
- A. All information required or requested in numbers I, III, and IV has been submitted.
 - B. All documents requiring certification have been certified pursuant to HAR §11-60.1-4.
 - C. All applicable fees have been submitted.
 - D. The director has certified that the application is complete.
- VI. The Director shall not continue to act upon or consider an incomplete application.**
- A. The applicant shall be notified in writing whether the application is complete:
 - 1. For the requirements of subchapter 7, thirty days after receipt of the application.
 - 2. For the requirements of HAR subchapter 5, sixty days after receipt of the application. For purposes of this paragraph, the date of receipt of an application for a new covered source or significant modification subject to the requirements of subchapter 7 shall be the date the application is determined to be complete for the requirements of subchapter 7.
 - 3. Unless the Director requests additional information or notifies the applicant of incompleteness within sixty days after receipt of an application pursuant to VI.A.2 above, the application shall be deemed complete for the requirements of subchapter 5.
 - B. During the processing of an application that has been determined or deemed complete, if additional information is necessary to evaluate or take final action on the application, the Director may request such information in writing and set a reasonable deadline for a response.
- VII. After receipt of a complete application, the Director, in writing, shall approve, conditionally approve, or deny an application within eighteen months, except as provided in HAR §11-60.1-88 and (A) and (B) below.**
- A. Upon program approval, within nine months for an application containing an early reduction demonstration pursuant to section 112(i)(5) of the Clean Air Act.
 - B. Within twelve months for a new covered source or significant modification subject to the requirements of subchapter 7.
- VIII. The Director shall provide reasonable procedures and resources to complete the review of the majority of the applications for a significant modification within nine months after receipt of a complete application. An application for significant modification shall be approved only if the Director determines that the significant modification will be in compliance with all applicable requirements.**
- IX. The Director shall provide for public notice, including the method by which a public hearing can be requested, and an opportunity for public comment on the draft significant modification to the covered source in accordance with HAR §11-60.1-99.**
- X. The Director shall provide a statement that sets forth the legal and factual bases for the draft permit conditions (including references to the applicable statutory or regulatory provisions) to EPA and any other person requesting it.**
- XI. Each application for a significant modification, and the proposed Covered Source Permit reflecting the significant modification shall be subject to EPA oversight in accordance with HAR §11-60.1-95.**

**Revised Form S-6
Honolulu Generating Station
CSP No. 0238-01-C
July 2019**

S-6: Application for a Significant Modification to a Covered Source

In providing the required information, reference the corresponding letters and numbers listed below.

Provide a minimum of **two (2)** sets (1 original and 1 copy) of all application materials to the Hawaii Department of Health. Also, mail **one (1)** set directly to EPA at the following address:

Chief (Attention: AIR-3)
 Permits Office, Air Division
 U.S. Environmental Protection Agency
 Region 9
 75 Hawthorne Street
 San Francisco, CA 94105

I. In accordance with Hawaii Administrative Rules (HAR) §11-60.1-104, the following information is required:

A. Equipment Specifications:

1. Maximum design capacity. Units 8 and 9 are Babcock & Wilcox boilers with steam turbines. See response to I.A.3 for additional information.
2. Fuel type. No. 6 and No. 2 fuel oil with 0.5% (max) by weight sulfur content for Units 8 and 9. The boilers also burn small quantities of spec used oil (less than 15,000 gal/yr).
3. Fuel use. Refer to the table below.

Maximum Design Fuel Use per Unit			
Unit ID	Nominal Capacity	Fuel Rate	Ignition Fuel
Unit 8	56 MW	589.0 MMBtu/hr	Propane
Unit 9	57 MW	631.5 MMBtu/hr	Propane

4. Production capacity. Does not apply.
5. Production rates. Does not apply.
6. Raw materials. Does not apply.
7. Provide any manufacturer's literature. This application does not change any of Honolulu equipment's manufacturer's specifications.

B. Provide detailed descriptions of all processes and products defined by Standard Industrial Classification Code (SICC). Also, provide any reasonably anticipated alternative operating scenarios, associated processes, and products, by SICC.

Electrical power generation through combustion of fossil fuels (SICC 4911) is the only product or process.

The alternative scenario is the ability to switch fuels. Should cheaper fuels become available, or the supply of No. 2 or No. 6 fuel becomes limited, Hawaiian Electric may propose an alternate scenario that would allow the fuel switch, provided that all permit conditions are met.

No additional changes to operating scenarios are proposed with this application.

1. Identify and describe in detail all air pollution control equipment and compliance monitoring devices or activities planned by the owner or operator, and to the extent of available information, an estimate of emissions before and after controls. Provide all calculations and assumptions.
Sulfur emissions are controlled by limiting the fuel sulfur content to 0.5 percent by weight. Emissions of NO_x, PM, PM₁₀, CO, and VOC are controlled by combustion design and good combustion practices. Emissions of any hazardous pollutants are controlled by the use of No. 2 and No. 6 fuel oils and combustion system design.
 2. List all **new insignificant** activities in accordance with §11-60.1-82.
No additional changes/additions to insignificant activities are proposed with this application.
- C. Maximum Operating Schedule (to the extent needed to determine or regulate emissions):
1. Total hours per day, per week, and/or per month. The planned operation of Units 8 and 9 is 24 hours per day 7 days a week. Depending on future dispatch requirements, the plant may cycle off-line daily, or operate at reduced loads. Unit 8 and 9 are currently deactivated.
 2. Total hours per year. Up to 8,760 hours per year.
 3. If operation is seasonal or irregular, describe. Unit 8 and 9 are currently deactivated.
- D. Cite and describe all applicable requirements as defined in HAR §11-60.1-81, including the following:
1. Description of or reference to any applicable test methods for determining compliance with each applicable requirement. See Form C-2.
 2. Explanation of all proposed exemptions from any applicable requirements. See Forms C-1 and C-2.
- E. Identify and describe current operational limitations or work practices the source plans to implement that affect emissions of any regulated or hazardous air pollutant. Provide all calculations and assumptions.
See item I.B.1. above for current work practices that affect emissions of any regulated or hazardous air pollutant.
Hawaiian Electric requests incorporation of the Greenhouse Gas Emissions Limitations into the Covered Source Permit CSP No. 0238-01-C, consistent with the Greenhouse Gas Emissions Reduction Plan submitted to the DOH on February 28, 2018, the subsequent updates submitted to the DOH on October 17, 2018 and May 15, 2019, and the latest update dated July 26, 2019, enclosed with this application.
- F. Provide a detailed schedule for construction or modification of the proposed source, including any major milestones, if applicable. Not applicable.
- G. Provide detailed information to define permit terms and conditions for any proposed **emissions trading** within the facility in accordance with HAR §11-60.1-96. No emissions trading is proposed.
- H. For **significant** modifications which increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted, an assessment of the ambient air quality impact of the covered source or significant modification, with the inclusion of any available

background air quality data. The assessment shall include all supporting data, calculations and assumptions, and a comparison with the National Ambient Air Quality Standards and State Ambient Air Quality Standards. Do not apply. The proposed modification will not increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted.

- I. For *new* covered sources or *significant* modifications subject to the requirements of subchapter 7 of HAR Chapter 11-60.1, all analyses, assessments, monitoring, and other application requirements of subchapter 7. Do not apply. The proposed modification is not subject to Subchapter 7 of HAR Chapter 11-60.1.
- J. Provide the following for Compliance purposes:
 1. A compliance plan, Form C-1.
 2. A compliance certification, Form C-2.
- II. **Submit an application fee according to the Application Fees Schedule in the Instructions for Applying for an Air Pollution Control Permit.**
- III. **Provide other information as follows:**
 - A. As required by any applicable requirement or as requested and deemed necessary by the director to make a decision on the application.
 - B. As may be necessary to implement and enforce other applicable requirements of the Clean Air Act or of HAR Chapter 11-60.1 or to determine the applicability of such requirements.
- IV. **The Director reserves the right to request the following information:**
 - A. A risk assessment of the air quality related impacts caused by the covered source or significant modification to the surrounding environment.
 - B. Results of source emissions testing, ambient air quality monitoring, or both.
 - C. Information on other available control technologies.
- V. **An application shall be determined to be complete only when all of the following have been complied with:**
 - A. All information required or requested in numbers I, III, and IV has been submitted.
 - B. All documents requiring certification have been certified pursuant to HAR §11-60.1-4.
 - C. All applicable fees have been submitted.
 - D. The director has certified that the application is complete.
- VI. **The Director shall not continue to act upon or consider an incomplete application.**
 - A. The applicant shall be notified in writing whether the application is complete:
 1. For the requirements of subchapter 7, thirty days after receipt of the application.
 2. For the requirements of HAR subchapter 5, sixty days after receipt of the application. For purposes of this paragraph, the date of receipt of an application for a new covered source or significant modification subject to the requirements of subchapter 7 shall be the date the application is determined to be complete for the requirements of subchapter 7.
 3. Unless the Director requests additional information or notifies the applicant of incompleteness within sixty days after receipt of an application pursuant to VI.A.2 above, the application shall be deemed complete for the requirements of subchapter 5.

- B. During the processing of an application that has been determined or deemed complete, if additional information is necessary to evaluate or take final action on the application, the Director may request such information in writing and set a reasonable deadline for a response.
- VII. **After receipt of a complete application, the Director, in writing, shall approve, conditionally approve, or deny an application within eighteen months, except as provided in HAR §11-60.1-88 and (A) and (B) below.**
- A. Upon program approval, within nine months for an application containing an early reduction demonstration pursuant to section 112(i)(5) of the Clean Air Act.
 - B. Within twelve months for a new covered source or significant modification subject to the requirements of subchapter 7.
- VIII. **The Director shall provide reasonable procedures and resources to complete the review of the majority of the applications for a significant modification within nine months after receipt of a complete application. An application for significant modification shall be approved only if the Director determines that the significant modification will be in compliance with all applicable requirements.**
- IX. **The Director shall provide for public notice, including the method by which a public hearing can be requested, and an opportunity for public comment on the draft significant modification to the covered source in accordance with HAR §11-60.1-99.**
- X. **The Director shall provide a statement that sets forth the legal and factual bases for the draft permit conditions (including references to the applicable statutory or regulatory provisions) to EPA and any other person requesting it.**
- XI. **Each application for a significant modification, and the proposed Covered Source Permit reflecting the significant modification shall be subject to EPA oversight in accordance with HAR §11-60.1-95.**

**Revised Form S-6
Kanoelehua-Hill Generating Station
CSP No. 0234-01-C
July 2019**

S-6: Application for a Significant Modification to a Covered Source

In providing the required information, reference the corresponding letters and numbers listed below.

Provide a minimum of **two (2)** sets (1 original and 1 copy) of all application materials to the Hawaii Department of Health. Also, mail **one (1)** set directly to EPA at the following address:

Chief (Attention: AIR-3)
Permits Office, Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

I. In accordance with Hawaii Administrative Rules (HAR) §11-60.1-104, the following information is required:

A. Equipment Specifications:

1. Maximum design capacity. Refer to the table below.
2. Fuel type.
 - Hill 5 and 6 utilize fuel oils No. 6 and No. 2.
 - Hill 5 uses propane as an ignition fuel.
 - CT-1 utilizes fuel oil No. 2 with a maximum sulfur content of 0.4 percent by weight.
 - D-11, D-15, D-16, and D-17 utilize fuel oil No. 2 with a maximum sulfur content of 0.0015 percent by weight and a minimum Cetane index of 40 or a maximum aromatic content of 35 volume percent.
 - Hill 5 and Hill 6 may consume up to 36,500 gal/rolling 12-month period of specification used oil. On November 22, 2017, the DOH approved consumption of specification used oil from Hawaii Petroleum.
 - Hawai'i Electric Light requested the addition of biodiesel and biodiesel/diesel blends in D-11, D-15, D-16, and D-17 in a permit renewal application dated August 31, 2012.
3. Fuel use. Refer to the table below.

ID	Maximum Design Fuel Use per Unit		
	Capacity (Nominal)	Fuel Flow (MMBtu/hr)	Ignition Fuel
Hill 5	14 MW	197	Diesel/ Propane
Hill 6	23 MW	249	Diesel
CT-1	11.6 MW	177.2	Diesel
D-11	2.0 MW	20.2	Diesel
D-15	2.5 MW	29.1	Diesel
D-16	2.5 MW	29.1	Diesel
D-17	2.5 MW	29.1	Diesel

4. Production capacity. Does not apply.
5. Production rates. Does not apply.
6. Raw materials. Does not apply.
7. Provide any manufacturer's literature. This application does not change any of Kanoiehua-Hill equipment's manufacturer's specifications.

- B. Provide detailed descriptions of all processes and products defined by Standard Industrial Classification Code (SICC). Also, provide any reasonably anticipated alternative operating scenarios, associated processes, and products, by SICC.

Electrical power generation (SIC code 4911) is the only product or process.

Several types of alternative operating scenarios apply to the plant. The first includes the use of permanent and temporary replacement units in the event of a failure or major overhaul of an installed unit. In the event that the projected downtime of the installed unit increases the likelihood of an interruption in electrical service, the installed unit would be replaced with an equivalent unit. Emissions from the replacement unit will comply with the original unit's emission limits.

The second alternative operating scenario is unit operation during start-up, shutdown, maintenance and testing. Boiler startup operations may range up to 7 hours. Maintenance activities include soot blowing. The time period of this maintenance operation will not exceed 1.5-hours in duration two times per day. These maintenance activities are required to maximize generation efficiency and minimizing fuel usage.

A third alternate scenario is the ability to switch fuels. Should cheaper fuels become available, or the supply of normal fuel become limited, Hawai'i Electric Light proposes an alternate scenario that would allow the fuel switch provided that all permit conditions are met.

A fourth alternative scenario occurs during emergency load conditions. Certain equipment malfunctions (such as sudden loss of a unit) may necessitate the operation of Hill 5 and 6, CT-1 and D-11, D-15, D-16, and D-17, at loads as high as 110% of peak load. The time period of this operation will be limited to no more than 30 minutes in duration. This operation will not result in a 3-hr average emission rate that exceeds the maximum emission limits proposed in this application.

A fifth alternative involves the use of fuel additives to reduce corrosion, control biological growth, and enhance combustion, etc. Emissions during this scenario will not affect emission estimates.

No additional changes to operating scenarios are proposed with this application.

1. Identify and describe in detail all air pollution control equipment and compliance monitoring devices or activities planned by the owner or operator, and to the extent of available information, an estimate of emissions before and after controls. Provide all calculations and assumptions.

Sulfur emissions are controlled by limiting the fuel sulfur content to 0.4% by weight for CT-1, 0.0015% for the diesels, and 2% for the boilers. Emissions of PM₁₀, CO, and VOC are controlled by combustion design. CO emissions from D-11, D-15, D-16, and D-17 are controlled by the Diesel Oxidation Catalyst (DOC). The DOC will reduce CO emissions by at least 70 percent or limit CO emissions to 23 ppmvd at 15 percent O₂. Emissions of any hazardous pollutants are controlled by the use of No. 2 diesel oil for CT-1, D-11, D-15, D-16, and D-17 and No. 6 fuel oil used for the boilers and combustion system design for all units.

Compliance monitoring devices and activities are discussed in Form C-2.

2. List all *new insignificant* activities in accordance with §11-60.1-82.

No additional changes/additions to insignificant activities are proposed with this application.

- C. Maximum Operating Schedule (to the extent needed to determine or regulate emissions):
1. Total hours per day, per week, and/or per month. The planned operation of each unit is 24 hours per day, 365 days per year. Depending on future dispatch requirements, some units may cycle off-line daily, or operate at reduced loads. While these expected operating levels are less than continuous, there may be times when the units must be run continuously for extended periods of time. Thus, this application does not propose any annual operating limits.
 2. Total hours per year. Up to 8,760 hours per year.
 3. If operation is seasonal or irregular, describe. Operation is not seasonal or irregular.
- D. Cite and describe all applicable requirements as defined in HAR §11-60.1-81, including the following:
1. Description of or reference to any applicable test methods for determining compliance with each applicable requirement. See Form C-2.
 2. Explanation of all proposed exemptions from any applicable requirements. See Forms C-1 and C-2.
- E. Identify and describe current operational limitations or work practices the source plans to implement that affect emissions of any regulated or hazardous air pollutant. Provide all calculations and assumptions.
- See item I.B.1. above for current work practices that affect emissions of any regulated or hazardous air pollutant.
- With this application, Hawai'i Electric Light requests incorporation of the Greenhouse Gas Emissions Limitations into the Covered Source Permit CSP No. 0234-01-C, consistent with the Greenhouse Gas Emissions Reduction Plan submitted to the DOH on February 28, 2018, the subsequent updates submitted to the DOH on October 17, 2018 and May 15, 2019, and the latest update dated July 26, 2019, enclosed with this application.
- F. Provide a detailed schedule for construction or modification of the proposed source, including any major milestones, if applicable. Not Applicable.
- G. Provide detailed information to define permit terms and conditions for any proposed **emissions trading** within the facility in accordance with HAR §11-60.1-96. No emissions trading is proposed.
- H. For **significant** modifications which increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted, an assessment of the ambient air quality impact of the covered source or significant modification, with the inclusion of any available background air quality data. The assessment shall include all supporting data, calculations and assumptions, and a comparison with the National Ambient Air Quality Standards and State Ambient Air Quality Standards. Does not apply. The proposed modification will not increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted.
- I. For **new** covered sources or **significant** modifications subject to the requirements of subchapter 7 of HAR Chapter 11-60.1, all analyses, assessments, monitoring, and other

application requirements of subchapter 7. Does not apply. The proposed modification is not subject to Subchapter 7 of HAR Chapter 11-60.1.

- J. Provide the following for Compliance purposes:
 - 1. A compliance plan, Form C-1.
 - 2. A compliance certification, Form C-2.

- II. **Submit an application fee according to the Application Fees Schedule in the Instructions for Applying for an Air Pollution Control Permit.**

- III. **Provide other information as follows:**
 - A. As required by any applicable requirement or as requested and deemed necessary by the director to make a decision on the application.
 - B. As may be necessary to implement and enforce other applicable requirements of the Clean Air Act or of HAR Chapter 11-60.1 or to determine the applicability of such requirements.

- IV. **The Director reserves the right to request the following information:**
 - A. A risk assessment of the air quality related impacts caused by the covered source or significant modification to the surrounding environment.
 - B. Results of source emissions testing, ambient air quality monitoring, or both.
 - C. Information on other available control technologies.

- V. **An application shall be determined to be complete only when all of the following have been complied with:**
 - A. All information required or requested in numbers I, III, and IV has been submitted.
 - B. All documents requiring certification have been certified pursuant to HAR §11-60.1-4.
 - C. All applicable fees have been submitted.
 - D. The director has certified that the application is complete.

- VI. **The Director shall not continue to act upon or consider an incomplete application.**
 - A. The applicant shall be notified in writing whether the application is complete:
 - 1. For the requirements of subchapter 7, thirty days after receipt of the application.
 - 2. For the requirements of HAR subchapter 5, sixty days after receipt of the application. For purposes of this paragraph, the date of receipt of an application for a new covered source or significant modification subject to the requirements of subchapter 7 shall be the date the application is determined to be complete for the requirements of subchapter 7.
 - 3. Unless the Director requests additional information or notifies the applicant of incompleteness within sixty days after receipt of an application pursuant to VI.A.2 above, the application shall be deemed complete for the requirements of subchapter 5.
 - B. During the processing of an application that has been determined or deemed complete, if additional information is necessary to evaluate or take final action on the application, the Director may request such information in writing and set a reasonable deadline for a response.

- VII. **After receipt of a complete application, the Director, in writing, shall approve, conditionally approve, or deny an application within eighteen months, except as provided in HAR §11-60.1-88 and (A) and (B) below.**

- A. Upon program approval, within nine months for an application containing an early reduction demonstration pursuant to section 112(i)(5) of the Clean Air Act.
 - B. Within twelve months for a new covered source or significant modification subject to the requirements of subchapter 7.
- VIII. The Director shall provide reasonable procedures and resources to complete the review of the majority of the applications for a significant modification within nine months after receipt of a complete application. An application for significant modification shall be approved only if the Director determines that the significant modification will be in compliance with all applicable requirements.
- IX. The Director shall provide for public notice, including the method by which a public hearing can be requested, and an opportunity for public comment on the draft significant modification to the covered source in accordance with HAR §11-60.1-99.
- X. The Director shall provide a statement that sets forth the legal and factual bases for the draft permit conditions (including references to the applicable statutory or regulatory provisions) to EPA and any other person requesting it.
- XI. Each application for a significant modification, and the proposed Covered Source Permit reflecting the significant modification shall be subject to EPA oversight in accordance with HAR §11-60.1-95.

**Revised Form S-6
Keahole Generating Station
CSP No. 0007-01-C
July 2019**

S-6: Application for a Significant Modification to a Covered Source

In providing the required information, reference the corresponding letters and numbers listed below.

Provide a minimum of **two (2)** sets (1 original and 1 copy) of all application materials to the Hawaii Department of Health. Also, mail **one (1)** set directly to EPA at the following address:

Chief (Attention: AIR-3)
Permits Office, Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

I. In accordance with Hawaii Administrative Rules (HAR) §11-60.1-104, the following information is required:

A. Equipment Specifications:

1. Maximum design capacity. Refer to the table below.
2. Fuel type.
 - No. 2 diesel fuel with 0.4 percent by weight maximum sulfur content for units CT-4, CT-5, and BS-1.
 - Starting May 3, 2013, No. 2 diesel with 0.0015 percent by weight sulfur content, minimum Cetane index of 40 or maximum aromatic content of 35% volume, for units D-21, D-22, and D-23.
 - Biodiesel (B100) and biodiesel/diesel blends with up to 1% diesel (B99) as alternate fuels for CT-4 and CT-5 were approved by the DOH on December 16, 2013.
3. Fuel use. Refer to the table below.

Maximum Capacity and Fuel Use Per Unit

Unit ID	Manufacturer	Model Number	Serial Number	Capacity (Nominal)	Fuel Flow Rate
D-21	General Motors	20-645F4B	74-B1-1078	2.5 MW	28.1 MMBtu/hr
D-22	General Motors	20-645F4B	66-K1-1062	2.5 MW	28.1 MMBtu/hr
D-23	General Motors	20-645E4	69-H1-1057	2.5 MW	28.1 MMBtu/hr
BS-1	Caterpillar	3412	81Z07275	500 kW	5.57 MMBtu/hr
CT-4	General Electric	LM2500	481-688	20 MW	275 MMBtu/hr
CT-5	General Electric	LM2500	481-692	20 MW	275 MMBtu/hr
ST-7				16 MW	NA
CT-2	Jupiter	GT-35	JF88702	18 MW	198 MMBtu/hr

4. Production capacity. Does not apply.
5. Production rates. Does not apply.
6. Raw materials. Does not apply.
7. Provide any manufacturer's literature. This application does not change any of Keahole equipment's manufacturer's specifications.

B. Provide detailed descriptions of all processes and products defined by Standard Industrial Classification Code (SICC). Also, provide any reasonably anticipated alternative operating scenarios, associated processes, and products, by SICC.

Electrical power generation (SIC code 4911) is the only product or process.

Several types of alternative operating scenarios apply to the generating station as described below:

a. Use of a temporary replacement unit in the event of a failure or major overhaul of an installed unit. In the event that the projected down time of the unit increases the likelihood of an interruption in electrical service, the down unit would be replaced with an equivalent unit. Emissions from the replacement unit will comply with the original unit's permitted emission limits.

b. CT-4 and CT-5 may operate below 25% of peak load during testing of the heat recovery steam generators and steam turbine and steam blows needed to clean the steam tubes prior to initial operation.

c. Should less expensive fuels become available, or the supply of No. 2 diesel become limited, Hawai'i Electric Light may use alternative fuels with prior approval from the Department of Health.

d. In the event of emergency load conditions such as the sudden loss of a unit, CT-2, CT-4 and CT-5 may operate up to 110 percent of peak load for up to 30 minutes. Such operation will not exceed the permitted 3-hour average emission rates.

e. Fuel additives to reduce corrosion, control biological growth, and enhance combustion may be used in CT-4 and CT-5.

f. Hawai'i Electric Light, with the approval from the Department of Health, may use alternate means and methods to improve combustion and/or reduce emissions for CT-4 and CT-5.

g. Hawai'i Electric Light requested to operate the combustion turbine generators, CT-2, CT-4 and CT-5, below minimum load with water injection to address system disturbances and frequency issues in a minor modification application dated 12/10/2015.

No additional changes to operating scenarios are proposed with this application.

1. Identify and describe in detail all air pollution control equipment and compliance monitoring devices or activities planned by the owner or operator, and to the extent of available information, an estimate of emissions before and after controls. Provide all calculations and assumptions.

Fuel injection timing retard (FITR) is used on D-21, D-22, and D-23 to control NO_x emissions. When CT-4 and CT-5 are operating in combined cycle mode at loads less than 50% of peak load and simple cycle mode, water injection is used on CT-4 and CT-5 to reduce NO_x emissions to 42 ppmvd at 15 percent O₂, with a fuel-bound nitrogen content of 0.0015 percent or less. When CT-4 and CT-5 are operating in combined cycle mode at 50% or more of peak load, water injection in combination with selective catalytic reduction (SCR) is used to reduce NO_x emissions to 15 ppmvd at 15 percent O₂, with a fuel-bound nitrogen content of 0.015 percent or less. The design of the SCR system will limit ammonia slip to 10 ppmvd at 15 percent O₂. Water injection is used on CT-2 reduce NO_x emissions to 47 ppmvd at 15 percent O₂, with a fuel-bound nitrogen content of 0.015 percent or less. SO₂ emissions are controlled by limiting the fuel sulfur content to 0.4 percent by weight for CT-4, CT-5, and BS-1 and 0.0015 percent by weight for D-21, D-22, and D-23. Emissions of PM, PM₁₀, CO, and VOC are controlled by combustion design and good combustion practices. CO emissions for D-21, D-22, and D-23 will be controlled by a DOC. The DOC will reduce CO emissions by at least 70 percent or limit CO to 23 ppmvd at 15% O₂. Emissions of hazardous air pollutants are controlled by the use of No. 2 fuel oil and combustion system design. Refer to Attachment S-1d for emission rate calculations.

Compliance monitoring devices and activities are discussed in Form C-2.

2. List all **new insignificant** activities in accordance with §11-60.1-82.
No additional changes/additions to insignificant activities are proposed with this application.

C. Maximum Operating Schedule (to the extent needed to determine or regulate emissions):

1. Total hours per day, per week, and/or per month. The planned operation of units D-22, D-23, CT-4, and CT-5 is up to 24 hours per day, seven days per week. Units BS-1 and unit D-21 are operated as needed. Depending on future dispatch requirements, the plant may cycle off-line daily, or operate at reduced loads. While expected operating levels are less than continuous, there may be times when the units must be run continuously for extended periods of time. Fuel consumption is limited on a rolling 12-month basis to 12,301,254 gallons (292,887 barrels) for CT-2.
2. Total hours per year. Units D-22, D-23, CT-4, and CT-5 will operate 8760 hours per year. Fuel consumption is limited on a rolling 12-month basis to 70,000 gallons in D-21. Operation of BS-1 is limited to 300 hours on a rolling 12-month basis. Fuel consumption is limited on a rolling 12-month basis to 12,301,254 gallons (292,887 barrels) for CT-2.
3. If operation is seasonal or irregular, describe. Refer to D.1 and 2 above.

D. Cite and describe all applicable requirements as defined in HAR §11-60.1-81, including the following:

1. Description of or reference to any applicable test methods for determining compliance with each applicable requirement. See Form C-2.
2. Explanation of all proposed exemptions from any applicable requirements. See Forms C-1 and C-2.

E. Identify and describe current operational limitations or work practices the source plans to implement that affect emissions of any regulated or hazardous air pollutant. Provide all calculations and assumptions.

See item I.B.1. above for current work practices that affect emissions of any regulated or hazardous air pollutant.

Hawai'i Electric Light requests incorporation of the Greenhouse Gas Emissions Limitations into the Keahole Covered Source Permit CSP No. 0007-01-C consistent with the Greenhouse Gas Emissions Reduction Plan submitted to the DOH on February 28, 2018, the subsequent updates submitted to the DOH on October 17, 2018 and May 15, 2019, and the latest update dated July 26, 2019, enclosed with this application.

F. Provide a detailed schedule for construction or modification of the proposed source, including any major milestones, if applicable. Not applicable.

G. Provide detailed information to define permit terms and conditions for any proposed **emissions trading** within the facility in accordance with HAR §11-60.1-96. No emissions trading is proposed.

H. For **significant** modifications which increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted, an assessment of the ambient air quality impact of the covered source or significant modification, with the inclusion of any available background air quality data. The assessment shall include all supporting data, calculations

and assumptions, and a comparison with the National Ambient Air Quality Standards and State Ambient Air Quality Standards. Do not apply. The proposed modification will not increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted.

- I. For *new* covered sources or *significant* modifications subject to the requirements of subchapter 7 of HAR Chapter 11-60.1, all analyses, assessments, monitoring, and other application requirements of subchapter 7. Do not apply. The proposed modification is not subject to Subchapter 7 of HAR Chapter 11-60.1.
- J. Provide the following for Compliance purposes:
 1. A compliance plan, Form C-1.
 2. A compliance certification, Form C-2.
- II. **Submit an application fee according to the Application Fees Schedule in the Instructions for Applying for an Air Pollution Control Permit.**
- III. **Provide other information as follows:**
 - A. As required by any applicable requirement or as requested and deemed necessary by the director to make a decision on the application.
 - B. As may be necessary to implement and enforce other applicable requirements of the Clean Air Act or of HAR Chapter 11-60.1 or to determine the applicability of such requirements.
- IV. **The Director reserves the right to request the following information:**
 - A. A risk assessment of the air quality related impacts caused by the covered source or significant modification to the surrounding environment.
 - B. Results of source emissions testing, ambient air quality monitoring, or both.
 - C. Information on other available control technologies.
- V. **An application shall be determined to be complete only when all of the following have been complied with:**
 - A. All information required or requested in numbers I, III, and IV has been submitted.
 - B. All documents requiring certification have been certified pursuant to HAR §11-60.1-4.
 - C. All applicable fees have been submitted.
 - D. The director has certified that the application is complete.
- VI. **The Director shall not continue to act upon or consider an incomplete application.**
 - A. The applicant shall be notified in writing whether the application is complete:
 1. For the requirements of subchapter 7, thirty days after receipt of the application.
 2. For the requirements of HAR subchapter 5, sixty days after receipt of the application. For purposes of this paragraph, the date of receipt of an application for a new covered source or significant modification subject to the requirements of subchapter 7 shall be the date the application is determined to be complete for the requirements of subchapter 7.
 3. Unless the Director requests additional information or notifies the applicant of incompleteness within sixty days after receipt of an application pursuant to VI.A.2 above, the application shall be deemed complete for the requirements of subchapter 5.

- B. During the processing of an application that has been determined or deemed complete, if additional information is necessary to evaluate or take final action on the application, the Director may request such information in writing and set a reasonable deadline for a response.
- VII. After receipt of a complete application, the Director, in writing, shall approve, conditionally approve, or deny an application within eighteen months, except as provided in HAR §11-60.1-88 and (A) and (B) below.**
- A. Upon program approval, within nine months for an application containing an early reduction demonstration pursuant to section 112(i)(5) of the Clean Air Act.
 - B. Within twelve months for a new covered source or significant modification subject to the requirements of subchapter 7.
- VIII. The Director shall provide reasonable procedures and resources to complete the review of the majority of the applications for a significant modification within nine months after receipt of a complete application. An application for significant modification shall be approved only if the Director determines that the significant modification will be in compliance with all applicable requirements.**
- IX. The Director shall provide for public notice, including the method by which a public hearing can be requested, and an opportunity for public comment on the draft significant modification to the covered source in accordance with HAR §11-60.1-99.**
- X. The Director shall provide a statement that sets forth the legal and factual bases for the draft permit conditions (including references to the applicable statutory or regulatory provisions) to EPA and any other person requesting it.**
- XI. Each application for a significant modification, and the proposed Covered Source Permit reflecting the significant modification shall be subject to EPA oversight in accordance with HAR §11-60.1-95.**

**Revised Form S-6
Puna Generating Station
CSP No. 0235-01-C
July 2019**

S-6: Application for a Significant Modification to a Covered Source

In providing the required information, reference the corresponding letters and numbers listed below.

Provide a minimum of **two (2)** sets (1 original and 1 copy) of all application materials to the Hawaii Department of Health. Also, mail **one (1)** set directly to EPA at the following address:

Chief (Attention: AIR-3)
Permits Office, Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

I. In accordance with Hawaii Administrative Rules (HAR) §11-60.1-104, the following information is required:

A. Equipment Specifications:

1. Maximum design capacity. Refer to the table below.
2. Fuel type. CT-3 and PBSG1 burn No. 2 diesel fuel with a 0.4% maximum sulfur content. The boiler burns No. 2 and No. 6 fuel oil with a 2.0% maximum sulfur content. In addition the boiler burns a maximum of 200,000 gal/yr of specification used oil. On November 22, 2017, the DOH approved consumption of specification used oil from Hawaii Petroleum.
3. Fuel use. Refer to the table below.

Maximum Design Fuel Use per Unit		
Unit ID	Nominal Capacity	Heat Input (MMBtu/hr)
Boiler	15.5 MW	249
CT-3	20 MW	275
PBSG1	600 kW	6.34

4. Production capacity. Does not apply.
5. Production rates. Does not apply.
6. Raw materials. Does not apply.
7. Provide any manufacturer's literature. This application does not change any of Puna's equipment's manufacturer's specifications.

B. Provide detailed descriptions of all processes and products defined by Standard Industrial Classification Code (SICC). Also, provide any reasonably anticipated alternative operating scenarios, associated processes, and products, by SICC.

Electrical power generation (SIC code 4911) is the only product or process.

Several types of alternative operating scenarios apply to the plant. The first includes the use of a temporary replacement unit in the event of a failure or major overhaul of CT-3 or the boiler. In the event that the projected downtime increases the likelihood of an interruption in electrical service, CT-3 or the boiler would be temporarily replaced. Emissions from the replacement unit will comply with the original unit's operating restrictions and emission limits.

The second alternative operating scenario is unit operation during start-up, shut-down, maintenance, and testing of all units. Boiler start-up operations may range up to 8 hours. Maintenance activities include soot blowing. The time period of this maintenance operation

will not exceed 1-hour in duration two times per day. These maintenance activities are required to maximize generation efficiency and minimize fuel usage.

A third alternate scenario is the ability to switch fuels. Should cheaper fuels become available, or the supply of No. 2 or No. 6 fuel oil becomes limited, Hawai'i Electric Light proposes an alternate scenario that would allow the fuel switch provided that all emission limits and regulatory requirements are met.

A fourth alternative scenario occurs during emergency load conditions. Certain equipment malfunctions (such as sudden loss of a unit) may necessitate the operation of CT-3 at loads as high as 110% of peak load. The time period of this operation will be limited to no more than 30 minutes in duration. This operation will not result in a 3-hr average emission rate that exceeds the maximum emission limits.

A fifth alternative scenario occurs during unpredictable periods of equipment failure, upsets, or emergency conditions. During any emergency condition, Hawai'i Electric Light will operate the subject equipment in such a manner as to minimize emissions. Hawai'i Electric Light will comply with the Emergency Provisions (§11-60.1-16.5).

A sixth alternative scenario involves the burning of a maximum total of 200,000 gal/yr, 90 gal/hr, of specification (spec) used oil. The spec used oil consists of collected used oil, such as waste oil, lubricating oil, and waste diesel oil, crankcase oil, transformer oil (dielectric fluid), solvents and kerosene obtained from the equipment operating at the Hawai'i Electric Light facilities.

A seventh alternative scenario involves the use of fuel additives to reduce corrosion, control biological growth, enhance combustion, or other reasons. Additives used during this scenario shall not affect emission estimates.

Hawai'i Electric Light requested to operate the CT-3 below minimum load to address system disturbances and frequency issues in a minor modification application dated October 16, 2015.

No additional changes to operating scenarios are proposed with this application.

1. Identify and describe in detail all air pollution control equipment and compliance monitoring devices or activities planned by the owner or operator, and to the extent of available information, an estimate of emissions before and after controls. Provide all calculations and assumptions.

Water injection is used on CT-3 to reduce NO_x emissions to 42 ppmv at 15 percent O₂ dry with a fuel-bound nitrogen content of 0.015 percent or less. Fuel sulfur content is limited to 0.4 percent by weight for CT-3 and PBSG1 and 2.0% by weight for the boiler. Emissions of PM, PM₁₀, CO, and VOC are controlled by combustion design and good combustion practices. Emissions of any hazardous air pollutants are controlled by the use of No. 2 fuel oil for CT-3 and PBSG1, by the use of No. 6 fuel oil for the boiler, and combustion system design. Compliance monitoring devices and activities are discussed in form C-2.

2. List all ***new insignificant*** activities in accordance with §11-60.1-82.

No additional changes/additions to insignificant activities are proposed with this application.

- C. Maximum Operating Schedule (to the extent needed to determine or regulate emissions):
1. Total hours per day, per week, and/or per month. Depending on future power dispatch requirements, some units may cycle off-line daily, or operate at reduced loads. However, there may be times when a unit must be run continuously for extended periods of time. Thus, this application does not propose any annual operating limits. Units PBSG1 is limited to an annual operating hour limit of 300 hours.
 2. Total hours per year. Up to 8,760 hours per year each for CT-3 and the boiler. Units PBSG1 is limited to an annual operating hour limit of 300 hours.
 3. If operation is seasonal or irregular, describe. Refer to I.C.1 above.
- D. Cite and describe all applicable requirements as defined in HAR §11-60.1-81, including the following:
1. Description of or reference to any applicable test methods for determining compliance with each applicable requirement. See Form C-2.
 2. Explanation of all proposed exemptions from any applicable requirements. See Forms C-1 and C-2.
- E. Identify and describe current operational limitations or work practices the source plans to implement that affect emissions of any regulated or hazardous air pollutant. Provide all calculations and assumptions.
- See item I.B.1. above for current work practices that affect emissions of any regulated or hazardous air pollutant.
- With this application, Hawai'i Electric Light requests incorporation of the Greenhouse Gas Emissions Limitations into the Covered Source Permit CSP No. 0235-01-C, consistent with the Greenhouse Gas Emissions Reduction Plan submitted to the DOH on February 28, 2018, the subsequent updates submitted to the DOH on October 17, 2018 and May 15, 2019, and the latest update dated July 26, 2019, enclosed with this application.
- F. Provide a detailed schedule for construction or modification of the proposed source, including any major milestones, if applicable. Not applicable.
- G. Provide detailed information to define permit terms and conditions for any proposed **emissions trading** within the facility in accordance with HAR §11-60.1-96. No emissions trading is proposed.
- H. For **significant** modifications which increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted, an assessment of the ambient air quality impact of the covered source or significant modification, with the inclusion of any available background air quality data. The assessment shall include all supporting data, calculations and assumptions, and a comparison with the National Ambient Air Quality Standards and State Ambient Air Quality Standards. Do not apply. The proposed modification will not increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted.
- I. For **new** covered sources or **significant** modifications subject to the requirements of subchapter 7 of HAR Chapter 11-60.1, all analyses, assessments, monitoring, and other application requirements of subchapter 7. Do not apply. The proposed modification is not subject to Subchapter 7 of HAR Chapter 11-60.1.

- J. Provide the following for Compliance purposes:
 - 1. A compliance plan, Form C-1.
 - 2. A compliance certification, Form C-2.

- II. **Submit an application fee according to the Application Fees Schedule in the Instructions for Applying for an Air Pollution Control Permit.**

- III. **Provide other information as follows:**
 - A. As required by any applicable requirement or as requested and deemed necessary by the director to make a decision on the application.
 - B. As may be necessary to implement and enforce other applicable requirements of the Clean Air Act or of HAR Chapter 11-60.1 or to determine the applicability of such requirements.

- IV. **The Director reserves the right to request the following information:**
 - A. A risk assessment of the air quality related impacts caused by the covered source or significant modification to the surrounding environment.
 - B. Results of source emissions testing, ambient air quality monitoring, or both.
 - C. Information on other available control technologies.

- V. **An application shall be determined to be complete only when all of the following have been complied with:**
 - A. All information required or requested in numbers I, III, and IV has been submitted.
 - B. All documents requiring certification have been certified pursuant to HAR §11-60.1-4.
 - C. All applicable fees have been submitted.
 - D. The director has certified that the application is complete.

- VI. **The Director shall not continue to act upon or consider an incomplete application.**
 - A. The applicant shall be notified in writing whether the application is complete:
 - 1. For the requirements of subchapter 7, thirty days after receipt of the application.
 - 2. For the requirements of HAR subchapter 5, sixty days after receipt of the application. For purposes of this paragraph, the date of receipt of an application for a new covered source or significant modification subject to the requirements of subchapter 7 shall be the date the application is determined to be complete for the requirements of subchapter 7.
 - 3. Unless the Director requests additional information or notifies the applicant of incompleteness within sixty days after receipt of an application pursuant to VI.A.2 above, the application shall be deemed complete for the requirements of subchapter 5.
 - B. During the processing of an application that has been determined or deemed complete, if additional information is necessary to evaluate or take final action on the application, the Director may request such information in writing and set a reasonable deadline for a response.

- VII. **After receipt of a complete application, the Director, in writing, shall approve, conditionally approve, or deny an application within eighteen months, except as provided in HAR §11-60.1-88 and (A) and (B) below.**
 - A. Upon program approval, within nine months for an application containing an early reduction demonstration pursuant to section 112(i)(5) of the Clean Air Act.

- B. Within twelve months for a new covered source or significant modification subject to the requirements of subchapter 7.
- VIII. **The Director shall provide reasonable procedures and resources to complete the review of the majority of the applications for a significant modification within nine months after receipt of a complete application. An application for significant modification shall be approved only if the Director determines that the significant modification will be in compliance with all applicable requirements.**
- IX. **The Director shall provide for public notice, including the method by which a public hearing can be requested, and an opportunity for public comment on the draft significant modification to the covered source in accordance with HAR §11-60.1-99.**
- X. **The Director shall provide a statement that sets forth the legal and factual bases for the draft permit conditions (including references to the applicable statutory or regulatory provisions) to EPA and any other person requesting it.**
- XI. **Each application for a significant modification, and the proposed Covered Source Permit reflecting the significant modification shall be subject to EPA oversight in accordance with HAR §11-60.1-95.**

**Revised Form S-6
Kahului Generating Station
CSP No. 0232-01-C
July 2019**

S-6: Application for a Significant Modification to a Covered Source

In providing the required information, reference the corresponding letters and numbers listed below.

Provide a minimum of **two (2)** sets (1 original and 1 copy) of all application materials to the Hawaii Department of Health. Also, mail **one (1)** set directly to EPA at the following address:

Chief (Attention: AIR-3)
Permits Office, Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

I. In accordance with Hawaii Administrative Rules (HAR) §11-60.1-104, the following information is required:

A. Equipment Specifications:

1. Maximum design capacity. Refer to the table below.
2. Fuel type.
 - No. 6 fuel oil with 2.0% (max) by weight sulfur content, and in emergencies, No. 2 fuel oil with 0.5% (max) sulfur by weight.
 - No more than 300,000 gal/yr of specification (spec) used oil. On December 13, 2017, the DOH approved consumption of specification used oil from Maui Petroleum.
3. Fuel use. Refer to the table below.

Maximum Capacity and Fuel Use Per Unit

Unit ID	Manufacturer	Model Number	Serial Number	Capacity (Nominal)	Fuel Flow Rate	Ignition Fuel
K-1	Combustion Engineering	None	13413	5.0 MW	94.0 MMBtu/hr	Electric
K-2	Combustion Engineering	None	15345	5.0 MW	94.0 MMBtu/hr	Propane
K-3	Combustion Engineering	None	17343	11.5 MW	172.0 MMBtu/hr	Propane
K-4	Babcock & Wilcox	None	PFI3030	12.5 MW	181.0 MMBtu/hr	Propane

4. Production capacity. Does not apply.
5. Production rates. Does not apply.
6. Raw materials. Does not apply.
7. Provide any manufacturer's literature. This application does not change any of Kahului equipment's manufacturer's specifications.

B. Provide detailed descriptions of all processes and products defined by Standard Industrial Classification Code (SICC). Also, provide any reasonably anticipated alternative operating scenarios, associated processes, and products, by SICC.

Electrical power generation (SIC code 4911) is the only product or process.

Several types of alternative operating scenarios apply to the plant. The first alternative operating scenario is unit operation during start-up, shut-down, maintenance, and testing. Boiler start-up operations may occur up to 225 times per year per boiler and occasionally range up to 6 hours.

A second alternate scenario is the ability to switch fuels. Should cheaper fuels become available or the supply of No. 6 fuel oil become limited, MECO may propose an alternate scenario that would allow the fuel switch, provided that all emission limits and regulatory requirements of the DOH rules are met.

A third alternative scenario involves boiler soot-blowing. This is a necessary maintenance operation and may result in a temporary increase in opacity.

A fourth alternative scenario is the use of fuel additives and other products which may be used to control algae, inhibit corrosion, enhance combustion, etc. Emissions during this scenario will comply with all permit conditions.

No additional changes to operating scenarios are proposed with this application.

1. Identify and describe in detail all air pollution control equipment and compliance monitoring devices or activities planned by the owner or operator, and to the extent of available information, an estimate of emissions before and after controls. Provide all calculations and assumptions.

Sulfur emissions are controlled by limiting the fuel sulfur content to 2 percent for No. 6 fuel oil and 0.5 percent for No. 2 fuel oil. Emissions of NO_x, PM, PM₁₀, CO, and VOC are controlled by combustion design and good combustion practices. Emissions of any hazardous air pollutants are controlled by the use of No. 6 fuel oil or No. 2 fuel oil and combustion system design.

Compliance monitoring devices and activities are discussed in Form C-2.

2. List all *new insignificant* activities in accordance with §11-60.1-82.

No additional changes/additions to insignificant activities are proposed with this application.

C. Maximum Operating Schedule (to the extent needed to determine or regulate emissions):

1. Total hours per day, per week, and/or per month. The planned operation of units K-1 through K-4 is 24 hours per day, seven days per week. Depending on future dispatch requirements, the plant may cycle off-line daily, or operate at reduced loads. While these expected operating levels are less than continuous, there may be times when the units must be run continuously for extended periods of time.
2. Total hours per year. Up to 8,760 hours per year.
3. If operation is seasonal or irregular, describe. Operation is not seasonal or irregular.

D. Cite and describe all applicable requirements as defined in HAR §11-60.1-81, including the following:

1. Description of or reference to any applicable test methods for determining compliance with each applicable requirement. See Form C-2.
2. Explanation of all proposed exemptions from any applicable requirements. See Forms C-1 and C-2.

- E. Identify and describe current operational limitations or work practices the source plans to implement that affect emissions of any regulated or hazardous air pollutant. Provide all calculations and assumptions.

See item I.B.1. above for current work practices that affect emissions of any regulated or hazardous air pollutant.

With this application, Maui Electric requests incorporation of the Greenhouse Gas Emissions Limitations into the Covered Source Permit CSP No. 0232-01-C, consistent with the Greenhouse Gas Emissions Reduction Plan submitted to the DOH on February 28, 2018, the subsequent updates submitted to the DOH on October 17, 2018 and May 15, 2019, and the latest update dated July 26, 2019, enclosed with this application.

- F. Provide a detailed schedule for construction or modification of the proposed source, including any major milestones, if applicable. Not applicable.

- G. Provide detailed information to define permit terms and conditions for any proposed **emissions trading** within the facility in accordance with HAR §11-60.1-96. No emissions trading is proposed.

- H. For **significant** modifications which increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted, an assessment of the ambient air quality impact of the covered source or significant modification, with the inclusion of any available background air quality data. The assessment shall include all supporting data, calculations and assumptions, and a comparison with the National Ambient Air Quality Standards and State Ambient Air Quality Standards. Do not apply. The proposed modification will not increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted.

- I. For **new** covered sources or **significant** modifications subject to the requirements of subchapter 7 of HAR Chapter 11-60.1, all analyses, assessments, monitoring, and other application requirements of subchapter 7. Do not apply. The proposed modification is not subject to Subchapter 7 of HAR Chapter 11-60.1.

- J. Provide the following for Compliance purposes:

1. A compliance plan, Form C-1.
2. A compliance certification, Form C-2.

II. Submit an application fee according to the Application Fees Schedule in the Instructions for Applying for an Air Pollution Control Permit.

III. Provide other information as follows:

- A. As required by any applicable requirement or as requested and deemed necessary by the director to make a decision on the application.
- B. As may be necessary to implement and enforce other applicable requirements of the Clean Air Act or of HAR Chapter 11-60.1 or to determine the applicability of such requirements.

IV. The Director reserves the right to request the following information:

- A. A risk assessment of the air quality related impacts caused by the covered source or significant modification to the surrounding environment.
- B. Results of source emissions testing, ambient air quality monitoring, or both.

- C. Information on other available control technologies.
- V. **An application shall be determined to be complete only when all of the following have been complied with:**
 - A. All information required or requested in numbers I, III, and IV has been submitted.
 - B. All documents requiring certification have been certified pursuant to HAR §11-60.1-4.
 - C. All applicable fees have been submitted.
 - D. The director has certified that the application is complete.
- VI. **The Director shall not continue to act upon or consider an incomplete application.**
 - A. The applicant shall be notified in writing whether the application is complete:
 - 1. For the requirements of subchapter 7, thirty days after receipt of the application.
 - 2. For the requirements of HAR subchapter 5, sixty days after receipt of the application. For purposes of this paragraph, the date of receipt of an application for a new covered source or significant modification subject to the requirements of subchapter 7 shall be the date the application is determined to be complete for the requirements of subchapter 7.
 - 3. Unless the Director requests additional information or notifies the applicant of incompleteness within sixty days after receipt of an application pursuant to VI.A.2 above, the application shall be deemed complete for the requirements of subchapter 5.
 - B. During the processing of an application that has been determined or deemed complete, if additional information is necessary to evaluate or take final action on the application, the Director may request such information in writing and set a reasonable deadline for a response.
- VII. **After receipt of a complete application, the Director, in writing, shall approve, conditionally approve, or deny an application within eighteen months, except as provided in HAR §11-60.1-88 and (A) and (B) below.**
 - A. Upon program approval, within nine months for an application containing an early reduction demonstration pursuant to section 112(i)(5) of the Clean Air Act.
 - B. Within twelve months for a new covered source or significant modification subject to the requirements of subchapter 7.
- VIII. **The Director shall provide reasonable procedures and resources to complete the review of the majority of the applications for a significant modification within nine months after receipt of a complete application. An application for significant modification shall be approved only if the Director determines that the significant modification will be in compliance with all applicable requirements.**
- IX. **The Director shall provide for public notice, including the method by which a public hearing can be requested, and an opportunity for public comment on the draft significant modification to the covered source in accordance with HAR §11-60.1-99.**
- X. **The Director shall provide a statement that sets forth the legal and factual bases for the draft permit conditions (including references to the applicable statutory or regulatory provisions) to EPA and any other person requesting it.**
- XI. **Each application for a significant modification, and the proposed Covered Source Permit reflecting the significant modification shall be subject to EPA oversight in accordance with HAR §11-60.1-95.**

**Revised Form S-6
Maalaea Generating Station
CSP No. 0067-01-C
July 2019**

S-6: Application for a Significant Modification to a Covered Source

In providing the required information, reference the corresponding letters and numbers listed below.

Provide a minimum of **two (2)** sets (1 original and 1 copy) of all application materials to the Hawaii Department of Health. Also, mail **one (1)** set directly to EPA at the following address:

Chief (Attention: AIR-3)
Permits Office, Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

I. In accordance with Hawaii Administrative Rules (HAR) §11-60.1-104, the following information is required:

A. Equipment Specifications:

1. Maximum design capacity. Refer to the table below.
2. Fuel type.
 - Fuel oil No. 2 diesel with 0.4% maximum sulfur content and biodiesel.
 - Spec used oil (not to exceed 150,000 gal/yr).
 - Fuel oil No. 2 with a maximum sulfur content of 0.0015 percent by weight and a minimum Cetane index of 40 or a maximum aromatic content of 35 volume percent.
3. Fuel use. Refer to the table below.

Maximum Design Fuel Use per Unit

Unit ID	Make	Model Number	Unit Type	Nominal Output	Nominal Heat Input
M1-M3	General Motors	20-645E4	Diesel Engine	2.5 MW	29.2 MMBtu/hr
M4 & M6	Cooper Bessemer	LSV-20-T	Diesel Engine	5.6 MW	58.8 MMBtu/hr
M5 & M7	Cooper Bessemer	LSV-20-T	Diesel Engine	5.6 MW	58.8 MMBtu/hr
M8-M9	Colt Industries	C-P PC2V	Diesel Engine	5.6 MW	60.2 MMBtu/hr
M10-M13	Mitsubishi Hvy. Ind.	185V52/55A	Diesel Engine	12.5 MW	122.7 MMBtu/hr
X1-X2	General Motors	20-645E4	Diesel Engine	2.5 MW	28.5 MMBtu/hr
SG1	General Motors / Detroit	12V92TAB/8 123-7416	Diesel Engine	600 kW	6.34 MMBtu/hr
M14 & M16	General Electric	LM2500	Combustion Turbine	20 MW	275 MMBtu/hr
M17 & M19	General Electric	LM2500	Combustion Turbine	20 MW	275 MMBtu/hr

4. Production capacity. Does not apply.
 5. Production rates. Does not apply.
 6. Raw materials. Does not apply.
 7. Provide any manufacturer's literature. This application does not change any of Maalaea equipment's manufacturer's specifications.
- B. Provide detailed descriptions of all processes and products defined by Standard Industrial Classification Code (SICC). Also, provide any reasonably anticipated alternative operating scenarios, associated processes, and products, by SICC.

Electrical power generation (SIC code 4911) is the only product or process.

Several types of alternative operating scenarios apply to the plant. The first alternative operating scenario is the ability to conduct steam blows activity.

The second alternative operating scenario includes the use of a temporary replacement unit for the diesel engine generators and combustion turbines, in the event of a failure or major overhaul of an installed unit. In the event that the projected down-time of the installed unit increases the likelihood of an interruption in electrical service, the installed unit would be temporarily replaced. Emissions from the temporary replacement unit will comply with the original unit's emission and operating limits.

A third alternative scenario is the ability to operate below the 25% load for maintenance and testing, provided that all emission limits and regulatory requirements of the DOH rules are met.

A fourth alternative scenario is the ability to burn alternative fuels. Should cheaper fuels become available or the supply of No. 6 fuel oil become limited, Maui Electric proposes an alternate scenario that would allow the fuel switch, provided that all emission limits and regulatory requirements of the DOH rules are met.

A fifth alternative operating scenario is the use of fuel additives and other products which may be used to control algae, inhibit corrosion, enhance combustion, etc. Emissions during this scenario will comply with all permit conditions.

A sixth alternative operating scenario is the ability to operate the combustion turbines up to 110% above peak load if equipment malfunction such as a sudden loss of a unit occurs, provided conditions specified in CSP No. 0067-01-C are met.

No additional changes to operating scenarios are proposed with this application.

1. Identify and describe in detail all air pollution control equipment and compliance monitoring devices or activities planned by the owner or operator, and to the extent of available information, an estimate of emissions before and after controls. Provide all calculations and assumptions.

Fuel Injection Timing Retard (FITR) is used on diesel engine generating units M12, M13, X1, and X2 to control NOx emissions. Water injection is used on M14, M16, M17, and M19 to limit NOx emissions to 42 ppmvd at 15 percent O₂, dry with a fuel-bound nitrogen content of 0.015 percent by weight or less. Sulfur emissions are controlled by limiting the fuel sulfur content to 0.4 percent for units M4 through M13, M14, M16, M17, and M19 and 0.0015% for units M1 through M3, X1, and X2. CO emissions from units M1 through M13, X1, and X2 are controlled by the Diesel Oxidation Catalyst (DOC). The DOC will reduce CO emissions by at least 70 percent or limit CO emissions to 23 ppmvd or less at 15 percent O₂. Emissions of PM, PM10, CO and VOC are controlled by combustion design and good combustion practices. Emissions of hazardous air pollutants are controlled by the use of No. 2 fuel oil and combustion system design.

Compliance monitoring devices and activities are discussed in Form C-2.

2. List all ***new insignificant*** activities in accordance with §11-60.1-82.
No additional changes/additions to insignificant activities are proposed with this application.
- C. Maximum Operating Schedule (to the extent needed to determine or regulate emissions):
1. Total hours per day, per week, and/or per month. The planned operation is full load the majority of the time. Depending on future dispatch requirements, the plant may cycle off-line daily, or operate at reduced loads. While these expected operating levels are less than continuous, there may be times when the units must be run continuously for extended periods of time.
 2. Total hours per year. Up to 8,760 hours per year. Units X1 and X2 are limited by PSD Permit HI 86-02 to 4,380 hours per year, per unit. Unit SG1 is limited by PSD Permit HI 90-02 to 300 hours per year.
 3. If operation is seasonal or irregular, describe. Operation is not seasonal or irregular.
- D. Cite and describe all applicable requirements as defined in HAR §11-60.1-81, including the following:
1. Description of or reference to any applicable test methods for determining compliance with each applicable requirement. See Form C-2.
 2. Explanation of all proposed exemptions from any applicable requirements. See Forms C-1 and C-2.
- E. Identify and describe current operational limitations or work practices the source plans to implement that affect emissions of any regulated or hazardous air pollutant. Provide all calculations and assumptions.
See item I.B.1. above for current work practices that affect emissions of any regulated or hazardous air pollutant.
Maui Electric requests incorporation of the Greenhouse Gas Emissions Limitations into the Covered Source Permit CSP No. 0067-01-C, consistent with the Greenhouse Gas Emissions Reduction Plan submitted to the DOH on February 28, 2018, the subsequent updates submitted to the DOH on October 17, 2018 and May 15, 2019, and the latest update dated July 26, 2019, enclosed with this application.
- F. Provide a detailed schedule for construction or modification of the proposed source, including any major milestones, if applicable. Not applicable.
- G. Provide detailed information to define permit terms and conditions for any proposed ***emissions trading*** within the facility in accordance with HAR §11-60.1-96. No emissions trading is proposed.
- H. For ***significant*** modifications which increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted, an assessment of the ambient air quality impact of the covered source or significant modification, with the inclusion of any available background air quality data. The assessment shall include all supporting data, calculations and assumptions, and a comparison with the National Ambient Air Quality Standards and State Ambient Air Quality Standards. Do not apply. The proposed modification will not increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted.

- I. For *new* covered sources or *significant* modifications subject to the requirements of subchapter 7 of HAR Chapter 11-60.1, all analyses, assessments, monitoring, and other application requirements of subchapter 7. Do not apply. The proposed modification is not subject to Subchapter 7 of HAR Chapter 11-60.1.
- J. Provide the following for Compliance purposes:
 1. A compliance plan, Form C-1.
 2. A compliance certification, Form C-2.
- II. **Submit an application fee according to the Application Fees Schedule in the Instructions for Applying for an Air Pollution Control Permit.**
- III. **Provide other information as follows:**
 - A. As required by any applicable requirement or as requested and deemed necessary by the director to make a decision on the application.
 - B. As may be necessary to implement and enforce other applicable requirements of the Clean Air Act or of HAR Chapter 11-60.1 or to determine the applicability of such requirements.
- IV. **The Director reserves the right to request the following information:**
 - A. A risk assessment of the air quality related impacts caused by the covered source or significant modification to the surrounding environment.
 - B. Results of source emissions testing, ambient air quality monitoring, or both.
 - C. Information on other available control technologies.
- V. **An application shall be determined to be complete only when all of the following have been complied with:**
 - A. All information required or requested in numbers I, III, and IV has been submitted.
 - B. All documents requiring certification have been certified pursuant to HAR §11-60.1-4.
 - C. All applicable fees have been submitted.
 - D. The director has certified that the application is complete.
- VI. **The Director shall not continue to act upon or consider an incomplete application.**
 - A. The applicant shall be notified in writing whether the application is complete:
 1. For the requirements of subchapter 7, thirty days after receipt of the application.
 2. For the requirements of HAR subchapter 5, sixty days after receipt of the application. For purposes of this paragraph, the date of receipt of an application for a new covered source or significant modification subject to the requirements of subchapter 7 shall be the date the application is determined to be complete for the requirements of subchapter 7.
 3. Unless the Director requests additional information or notifies the applicant of incompleteness within sixty days after receipt of an application pursuant to VI.A.2 above, the application shall be deemed complete for the requirements of subchapter 5.
 - B. During the processing of an application that has been determined or deemed complete, if additional information is necessary to evaluate or take final action on the application, the Director may request such information in writing and set a reasonable deadline for a response.

- VII. **After receipt of a complete application, the Director, in writing, shall approve, conditionally approve, or deny an application within eighteen months, except as provided in HAR §11-60.1-88 and (A) and (B) below.**
- A. Upon program approval, within nine months for an application containing an early reduction demonstration pursuant to section 112(i)(5) of the Clean Air Act.
 - B. Within twelve months for a new covered source or significant modification subject to the requirements of subchapter 7.
- VIII. **The Director shall provide reasonable procedures and resources to complete the review of the majority of the applications for a significant modification within nine months after receipt of a complete application. An application for significant modification shall be approved only if the Director determines that the significant modification will be in compliance with all applicable requirements.**
- IX. **The Director shall provide for public notice, including the method by which a public hearing can be requested, and an opportunity for public comment on the draft significant modification to the covered source in accordance with HAR §11-60.1-99.**
- X. **The Director shall provide a statement that sets forth the legal and factual bases for the draft permit conditions (including references to the applicable statutory or regulatory provisions) to EPA and any other person requesting it.**
- XI. **Each application for a significant modification, and the proposed Covered Source Permit reflecting the significant modification shall be subject to EPA oversight in accordance with HAR §11-60.1-95.**

**Revised Form S-6
Palaau Generating Station
CSP No. 0031-04-C
July 2019**

S-6: Application for a Significant Modification to a Covered Source

In providing the required information, reference the corresponding letters and numbers listed below.

Provide a minimum of **two (2)** sets (1 original and 1 copy) of all application materials to the Hawaii Department of Health. Also, mail **one (1)** set directly to EPA at the following address:

Chief (Attention: AIR-3)
Permits Office, Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

I. In accordance with Hawaii Administrative Rules (HAR) §11-60.1-104, the following information is required:

A. Equipment Specifications:

1. Maximum design capacity. Refer to the table below.
2. Fuel type.
 - No. 2 fuel oil with maximum sulfur content of 0.4 percent by weight for CT1.
 - No. 2 diesel with maximum 0.0015 percent by weight sulfur content, minimum Cetane index of 40 or maximum aromatic content of 35% volume for Units CAT1 and CAT2, CUM3 through CUM6, CAT7 through CAT9.
 - Specification used oil for Units CUM3 through CUM6 and CAT7 through CAT9.
3. Fuel use.
 - The total combined fuel consumption of CUM3-CUM6 shall not exceed 1,650,000 gallons in any rolling twelve-month (12-month) period.
 - The total combined specification used oil consumption of CUM3-CUM6 and CAT7-CAT9 shall not exceed 10,000 gallons in any rolling twelve-month (12-month) period.
 - The total fuel consumption of CT1 shall not exceed 1,230,000 gallons in any rolling twelve-month (12-month) period.

Maximum Design Fuel Use per Unit						
Unit ID	Make	Model Number	Unit Type	Nominal Rating (MW)	Nominal Heat Input (MMBtu/hr)	Fuel (gal/hr)
CUM3, CUM4, or CUM6	Cummins	KTA50	Diesel Engine	1.0	9.09	64.9
CUM5	Cummins	KTTA50	Diesel Engine	1.0	9.52	68.0
CAT7, CAT8, or CAT9	Caterpillar	3608	Diesel Engine	2.2	23.38	167.0
CAT1 or CAT2	Caterpillar	3516	Diesel Engine	1.25	12.62	90.63
CT1	Solar International	Centaur T4001	Combustion Turbine	2.0	34.0	240.0

4. Production capacity. Does not apply.
5. Production rates. Does not apply.
6. Raw materials. Does not apply.
7. Provide any manufacturer's literature. This application does not change any of Palaa equipment's manufacturer's specifications.

- B. Provide detailed descriptions of all processes and products defined by Standard Industrial Classification Code (SICC). Also, provide any reasonably anticipated alternative operating scenarios, associated processes, and products, by SICC.

Electrical power generation through combustion of fossil fuels (SICC 4911) is the only product or process.

Several types of alternative operating scenarios apply to the plant. A first alternate scenario includes the use of a temporary replacement unit in the event of a failure or major overhaul of an installed unit, provided the requirements in Attachment IIA Section C.7.a are met.

A second alternative scenario is the ability to switch fuels. Should cheaper fuels become available, Maui Electric may propose an alternate scenario that would allow the fuel switch, provided that all emission limits and regulatory requirements of the DOH rules are met.

No additional changes to operating scenarios are proposed with this application.

1. Identify and describe in detail all air pollution control equipment and compliance monitoring devices or activities planned by the owner or operator, and to the extent of available information, an estimate of emissions before and after controls. Provide all calculations and assumptions.

NO_x emissions from Units CUM3 through CUM6, CAT1, and CAT2 are controlled by fuel injection timing retard (FTR). NO_x emissions from Units CAT7 through CAT9 are controlled by FTR and intake air cooling. Emissions of PM/PM₁₀, CO, and VOC are controlled by combustion design. SO₂ emissions are controlled by limiting the fuel sulfur content to 0.4 percent by weight for Unit CT1 and 0.0015 percent by weight for units CUM3 through CUM6, CAT7 through CAT9, CAT1, and CAT2. CO emissions will be controlled by the DOC for units CUM3 through CUM6, CAT7 through CAT9, CAT1, and CAT2. The DOC will reduce CO emissions by at least 70 percent or limit CO to 23 ppmvd at 15% O₂. Emissions of any hazardous pollutants are controlled by the use of No. 2 fuel oil and combustion system design.

2. List all *new insignificant* activities in accordance with §11-60.1-82.

No additional changes/additions to insignificant activities are proposed with this application.

- C. Maximum Operating Schedule (to the extent needed to determine or regulate emissions):

1. Total hours per day, per week, and/or per month. The planned operation of the facility is 24 hours per day, seven days per week. Depending on future dispatch requirements, the plant may cycle off-line daily, or operate at reduced loads. While these expected operating levels are less than continuous, there may be times when the units must be run continuously for extended periods of time. Thus, this application does not propose any annual operating limits.

2. Total hours per year. Up to 8,760 hours per year.

3. If operation is seasonal or irregular, describe. Refer to I.C.1 above.

- D. Cite and describe all applicable requirements as defined in HAR §11-60.1-81, including the following:
1. Description of or reference to any applicable test methods for determining compliance with each applicable requirement. See Form C-2.
 2. Explanation of all proposed exemptions from any applicable requirements. See Forms C-1 and C-2.
- E. Identify and describe current operational limitations or work practices the source plans to implement that affect emissions of any regulated or hazardous air pollutant. Provide all calculations and assumptions.
- Pollution controls include a fuel sulfur content limit, good combustion practices, and FITR.
- Maui Electric requests incorporation of the Greenhouse Gas Emissions Limitations into the Covered Source Permit CSP No. 0031-04-C consistent with the Greenhouse Gas Emissions Reduction Plan submitted to the DOH on February 28, 2018, the subsequent updates submitted to the DOH on October 17, 2018 and May 15, 2019, and the latest update dated July 26, 2019, enclosed with this application.
- F. Provide a detailed schedule for construction or modification of the proposed source, including any major milestones, if applicable. Not applicable.
- G. Provide detailed information to define permit terms and conditions for any proposed **emissions trading** within the facility in accordance with HAR §11-60.1-96. No emissions trading is proposed.
- H. For **significant** modifications which increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted, an assessment of the ambient air quality impact of the covered source or significant modification, with the inclusion of any available background air quality data. The assessment shall include all supporting data, calculations and assumptions, and a comparison with the National Ambient Air Quality Standards and State Ambient Air Quality Standards. Do not apply. The proposed modification will not increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted.
- I. For **new** covered sources or **significant** modifications subject to the requirements of subchapter 7 of HAR Chapter 11-60.1, all analyses, assessments, monitoring, and other application requirements of subchapter 7. Do not apply. The proposed modification is not subject to Subchapter 7 of HAR Chapter 11-60.1.
- J. Provide the following for Compliance purposes:
1. A compliance plan, Form C-1.
 2. A compliance certification, Form C-2.

II. **Submit an application fee according to the Application Fees Schedule in the Instructions for Applying for an Air Pollution Control Permit.**

III. Provide other information as follows:

- A. As required by any applicable requirement or as requested and deemed necessary by the director to make a decision on the application.
- B. As may be necessary to implement and enforce other applicable requirements of the Clean Air Act or of HAR Chapter 11-60.1 or to determine the applicability of such requirements.

IV. The Director reserves the right to request the following information:

- A. A risk assessment of the air quality related impacts caused by the covered source or significant modification to the surrounding environment.
- B. Results of source emissions testing, ambient air quality monitoring, or both.
- C. Information on other available control technologies.

V. An application shall be determined to be complete only when all of the following have been complied with:

- A. All information required or requested in numbers I, III, and IV has been submitted.
- B. All documents requiring certification have been certified pursuant to HAR §11-60.1-4.
- C. All applicable fees have been submitted.
- D. The director has certified that the application is complete.

VI. The Director shall not continue to act upon or consider an incomplete application.

- A. The applicant shall be notified in writing whether the application is complete:
 - 1. For the requirements of subchapter 7, thirty days after receipt of the application.
 - 2. For the requirements of HAR subchapter 5, sixty days after receipt of the application. For purposes of this paragraph, the date of receipt of an application for a new covered source or significant modification subject to the requirements of subchapter 7 shall be the date the application is determined to be complete for the requirements of subchapter 7.
 - 3. Unless the Director requests additional information or notifies the applicant of incompleteness within sixty days after receipt of an application pursuant to VI.A.2 above, the application shall be deemed complete for the requirements of subchapter 5.
- B. During the processing of an application that has been determined or deemed complete, if additional information is necessary to evaluate or take final action on the application, the Director may request such information in writing and set a reasonable deadline for a response.

VII. After receipt of a complete application, the Director, in writing, shall approve, conditionally approve, or deny an application within eighteen months, except as provided in HAR §11-60.1-88 and (A) and (B) below.

- A. Upon program approval, within nine months for an application containing an early reduction demonstration pursuant to section 112(i)(5) of the Clean Air Act.
- B. Within twelve months for a new covered source or significant modification subject to the requirements of subchapter 7.

VIII. The Director shall provide reasonable procedures and resources to complete the review of the majority of the applications for a significant modification within nine months after receipt of a complete application. An application for significant modification shall be approved only if the Director determines that the significant modification will be in compliance with all applicable requirements.

- IX. The Director shall provide for public notice, including the method by which a public hearing can be requested, and an opportunity for public comment on the draft significant modification to the covered source in accordance with HAR §11-60.1-99.**
- X. The Director shall provide a statement that sets forth the legal and factual bases for the draft permit conditions (including references to the applicable statutory or regulatory provisions) to EPA and any other person requesting it.**
- XI. Each application for a significant modification, and the proposed Covered Source Permit reflecting the significant modification shall be subject to EPA oversight in accordance with HAR §11-60.1-95.**

JK
HAND DELIVERED
MAR 28 2018



Anthony H. Koyamatsu, P.E., PMP
Manager
Environmental Department

Maui Electric
Maalaea

March 28, 2018

HAND DELIVERY

Ms. Marianne Rossio, P.E.
Manager, Clean Air Branch
State of Hawaii Department of Health
2827 Waimano Home Road
Hale Ola Building, Room 130
Pearl City, Hawaii 96782

Dear Ms. Rossio:

**Subject: Application for a Significant Modification to a Covered Source
CSP No. 0067-01-C and CSP No. 0067-02-C
Maalaea Generating Station
Maui Electric Company, Ltd. (Maui Electric)**

Enclosed are applications for Significant Modification to the Covered Source Permits No. 0067-01-C and No. 0067-02-C for the Maalaea Generating Station.

Maui Electric proposes to combine Maalaea CSP Nos. 0067-01-C and 0067-02-C, by incorporating CSP No. 0067-02-C into CSP No. 0067-01-C. Maui Electric also requests incorporation of the Greenhouse Gas (GHG) Emissions Reduction Plan, submitted to the Department of Health on February 28, 2018, along with conditions implementing GHG reduction regulations under HAR Title 11 Chapter 60.1 Subchapter 11 into the Maalaea Generating Station's Covered Source Permit No. 0067-01-C.

Certifications in accordance with HAR 11-60.1-4 are included on Forms S-1, C-1, and C-2. Also enclosed is a check no. 548977 and no. 548978 in the amount of \$1,000.00 each for the significant modification application fees.

If you have any questions regarding this submittal, please contact Myrna Tandj at 543-4535 or myrna.tandj@hawaiianelectric.com.

Sincerely,

Karin Kimura, Principal Environmental Scientist
for Anthony Koyamatsu

Enclosures: (1) Application for a Significant Modification to Covered Source Permit No. 0067-01-C,
one original and one copy
(2) Application fee (check no. 548977)
(3) Application for a Significant Modification to Covered Source Permit No. 0067-02-C,
one original and one copy
(4) Application fee (check no. 548978)

Ms. Marianne Rossio
Application for a Significant Modification to a Covered Source
CSP No. 0067-01-C and 0067-02-C
March 28, 2018
Page 2 of 2

cc w/ Encl.: **CERTIFIED MAIL RETURN RECEIPT REQUESTED**
Mr. Gerardo Rios [Article No.7015 1660 0000 1839 2870]
Chief, Permits Office, Air Division
U.S. EPA Region 9
75 Hawthorne Street
Mail Code: AIR-3
San Francisco, CA 94105

S-1: Standard Air Pollution Control Permit Application Form
(Covered Source Permit and Noncovered Source Permit)

State of Hawaii
Department of Health
Environmental Management Division
Clean Air Branch
P. O. Box 3378 • Honolulu, HI 96801-3378 • Phone: (808) 586-4200

1. Company Name: Maui Electric Company, Ltd.

2. Facility Name (if different from the Company): Maalaea Generating Station

3. Mailing Address: P.O. Box 398
 City: Kahului State: HI Zip Code: 96733
 Phone Number: (808) 871-8461

4. Name of Owner/Owner's Agent: Anthony H. Koyamatsu (Owner's Agent)
 Title: Manager, Environmental Department Phone: (808) 543-4500
 Mailing Address: Hawaiian Electric Company, Inc. PO Box 2750
 City: Honolulu State: HI Zip Code: 96840-0001

5. Plant Site Manager/Other Contact: Mathew McNeff
 Title: Manager, Power Supply Phone: (808) 872-3245
 Mailing Address: P.O. Box 398
 City: Kahului State: HI Zip Code: 96733

6. Permit Application Basis: (Check appropriate boxes)

<input type="checkbox"/> Initial Permit for a New Source	<input type="checkbox"/> Initial Permit for an Existing Source			
<input type="checkbox"/> Renewal of Existing Permit	<input type="checkbox"/> General Permit			
<input type="checkbox"/> Temporary Source	<input type="checkbox"/> Transfer of Permit			
<input checked="" type="checkbox"/> Modification to a Covered Source: → Is modification? <table border="0" style="display: inline-table; vertical-align: middle;"> <tr> <td><input checked="" type="checkbox"/> Significant</td> <td><input type="checkbox"/> Minor</td> <td><input type="checkbox"/> Uncertain</td> </tr> </table>		<input checked="" type="checkbox"/> Significant	<input type="checkbox"/> Minor	<input type="checkbox"/> Uncertain
<input checked="" type="checkbox"/> Significant	<input type="checkbox"/> Minor	<input type="checkbox"/> Uncertain		
<input type="checkbox"/> Modification to a Noncovered Source				

7. If renewal or modification, include existing permit number: CSP No. 0067-01-C

8. Does the Proposed Source require a County Special Management Area Permit? Yes No

9. Type of Source (Check One): Covered Source Covered & PSD Source
 Noncovered Source Uncertain

10. Standard Industrial Classification Code (SICC), if known: 4911

11. Proposed Equipment/Plant Location (e.g. street address): North Kihei Road

City: Kihei State: HI Zip Code: 96753

UTM Coordinates (meters): East: 760,700 North: 2,302,400

UTM Zone: 4 UTM Horizontal Datum: Old Hawaiian NAD-27 NAD-83

12. General Nature of Business: Electrical Generation

13. Date of Planned Commencement of Installation or Modification: Not Applicable.

14. Is **any** of the equipment to be leased to another individual or entity? Yes No

15. Type of Organization: Corporation Individual Owner Partnership

Government Agency (Government Facility Code: _____)

Other: _____

Any applicant for a permit who fails to submit any relevant facts or who has submitted incorrect information in any permit application shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information. In addition, an applicant shall provide additional information as necessary to address any requirements that become applicable to the source after the date it filed a complete application, but prior to the issuance of the noncovered source permit or release of a draft covered source permit. (HAR § 11-60.1-64 & 11-60.1-84)

RESPONSIBLE OFFICIAL (as defined in §11-60.1-1):

Name (Last): McNeff (First): Mathew (MI): _____

Title: Manager, Power Supply Phone: (808) 872-3245

Mailing Address: P.O. Box 398

City: Kahului State: HI Zip Code: 96733

CERTIFICATION by Responsible Official (pursuant to §11-60.1-4):

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 further state that I will assume responsibility for the construction, modification, or operation of the source in accordance with the Hawaii Administrative Rules (HAR), Title 11, Chapter 60.1, Air Pollution Control, and any permit issued thereof.

NAME (Print/Type): Mathew McNeff

(Signature):  Date: 3/26/18

FOR AGENCY USE ONLY:
File/Application No: _____
Island: _____
Date Received: _____

Submit the following documents as part of your application:

- A. The **Emissions Units Table**, filled in as completely as possible. Use separate sheets of paper as needed. General instructions include the following:
1. Identify each **emission point** with a unique number for this plant site, consistent with emission point identification used on the location drawing and previous permits; if known, provide the SICC number. Emission points shall be identified and described in sufficient detail to establish the basis for fees and applicability of requirements of HAR, Chapter 11-60.1. Examples of emission point names are: heater, vent, boiler, tank, baghouse, fugitive, etc. Abbreviations may be used.
 - a. For each emission point use as many lines as necessary to list regulated and hazardous air pollutant data. For hazardous air pollutants, also list the Chemical Abstracts Service number (CAS#).
 - b. Indicate the emission points that discharge together for any length of time.
 - c. The **Equipment Date** is the date of equipment construction, reconstruction, or modification. Provide supporting documentation.
 2. State the **maximum emission rates** in terms sufficient to establish compliance with the applicable requirements and standard reference test methods. Provide all supporting emission calculations and assumptions:
 - a. Include all regulated and hazardous air pollutants and air pollutants for which the source is major, as defined in HAR §11-60.1-1. Examples of regulated pollutant names are: Carbon Monoxide (CO), Nitrogen Oxides (NO_x), Sulfur Dioxide (SO₂), Volatile Organic Compounds (VOC), particulate matter (PM), and particulate less than 10 microns (PM₁₀). Abbreviations may be used.
 - b. Include fugitive emissions.
 - c. **Pounds per hour (#/HR)** is the maximum potential emission rate expected by applicant.
Tons per year is the annual maximum potential emissions expected by the applicant, taking into account the typical operating schedule.
 3. Describe **Stack Source Parameters**:
 - a. **Stack Height** is the height above the ground.
 - b. **Direction** refers to the exit direction of stack emissions: up, down or horizontal.
 - c. **Flow Rate** is the actual, not the calculated, flow rate.
 4. Provide any additional information, if applicable, as follows:
 - a. If combinations of different fuels are used that cause any of the stack source parameters to differ, complete one row for each possible set of stack parameters and identify each fuel in the **Equipment Description**.
 - b. For a rectangular stack, indicate the length and width.
 - c. Provide any information on stack parameters or any stack height limitations developed pursuant to Section 123 of the Clean Air Act.
- B. A **process flow diagram** identifying all equipment used in the process, including the following:
1. Identify and describe each emission point.
 2. Identify the locations of safety valves, bypasses, and other such devices which when activated may release air pollutants to the atmosphere.
- C. A **facility location map**, drawn to a reasonable scale and showing the following:
1. The property involved and all structures on it. Identify property/fence lines plainly.
 2. Layout of the facility.
 3. Location and identification of the proposed emissions unit on the property.
 4. Location of the property and equipment with respect to streets and all adjacent property. Show the location of all structures within 325 meters of the applicant's emissions unit. Provide the building dimensions (height, length, and width) of all structures that have heights greater than 40% of the stack height of the emissions unit.
- D. Provide a description of any proposed modifications or permit revisions. Include any justification or supporting information for the proposed modifications or permit revisions.

Attachment S-1a
Responses to Emissions Units Table Instructions for Form S-1

A.1. Emission Point Identification and Description	Refer to Form S-1 Emissions Units Tables. The proposed changes do not impact emission point identification and description.
A.2. Maximum Emission Rates	Refer to Forms S-1 Emissions Units Tables and Attachments S-1b, S-1c, S-1d, S-1e, and S-1f. The proposed changes do not impact maximum emission rates.
A.3. Stack Parameters	Refer to Form S-1 Emissions Units Tables. The proposed changes do not impact stack parameters.
A.4. Additional Information	
B. Process Flow Diagram	Refer to Figures S-1.1 and S-1.2.
C. Facility Location Map	Refer to Figures S-1.3 and S-1.4.
D. Proposed Revisions	See Attachment S-6a.

FIGURE S-1.1

PROCESS FLOW DIAGRAM FOR UNITS M17 OR M19

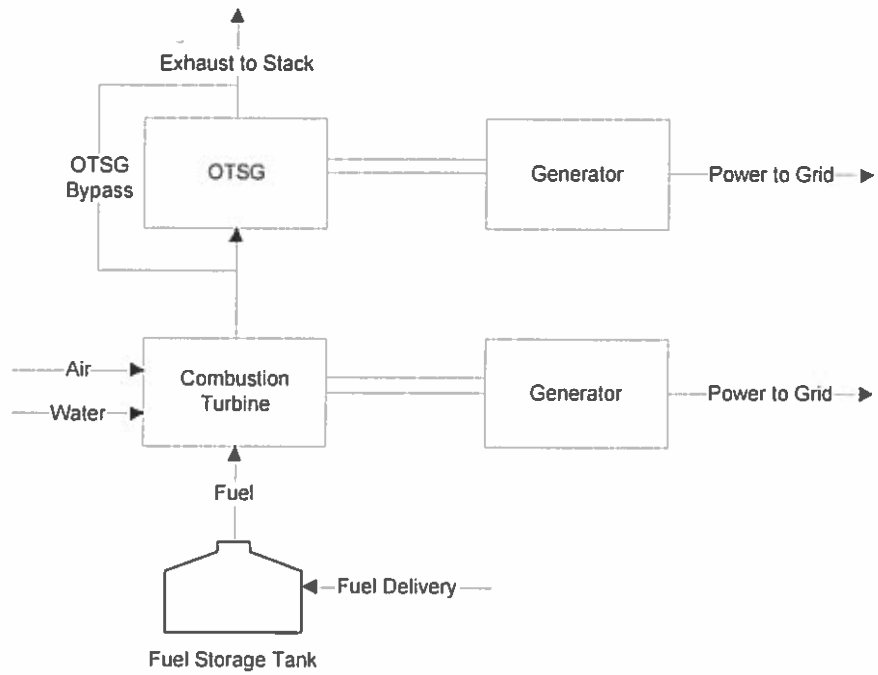


FIGURE S-1.2

PROCESS FLOW DIAGRAM FOR DIESEL UNITS, M5 OR M7

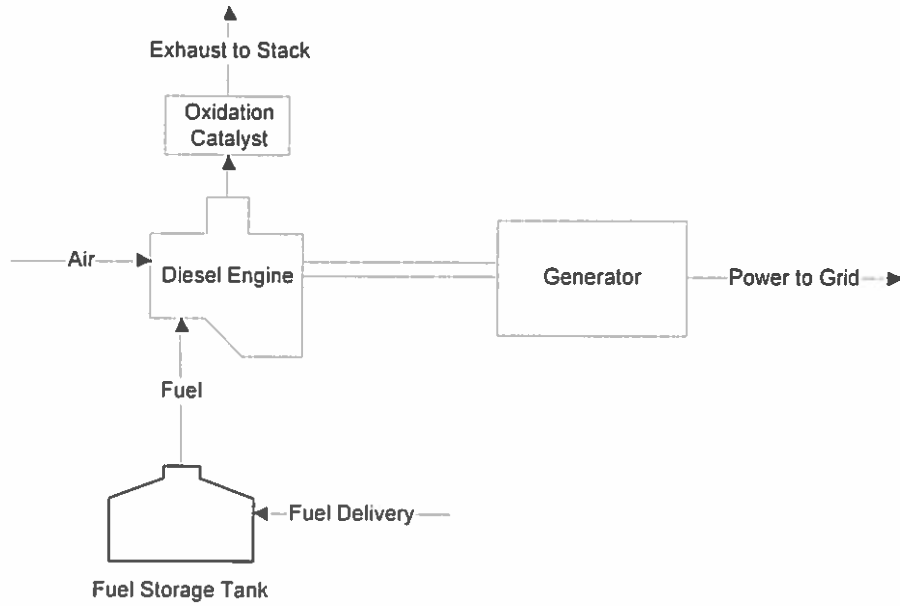


FIGURE S-1.3 LOCATION MAP

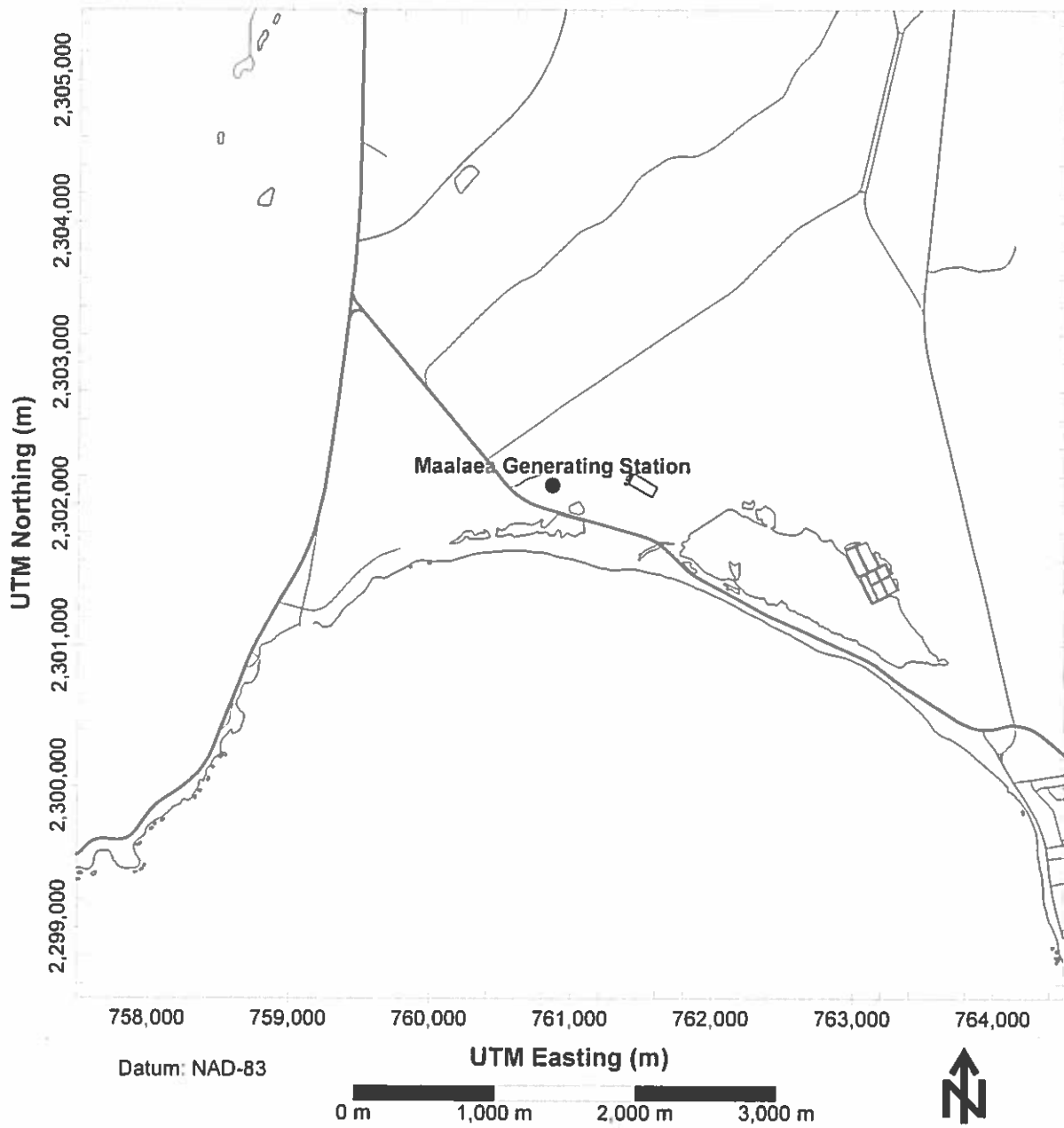
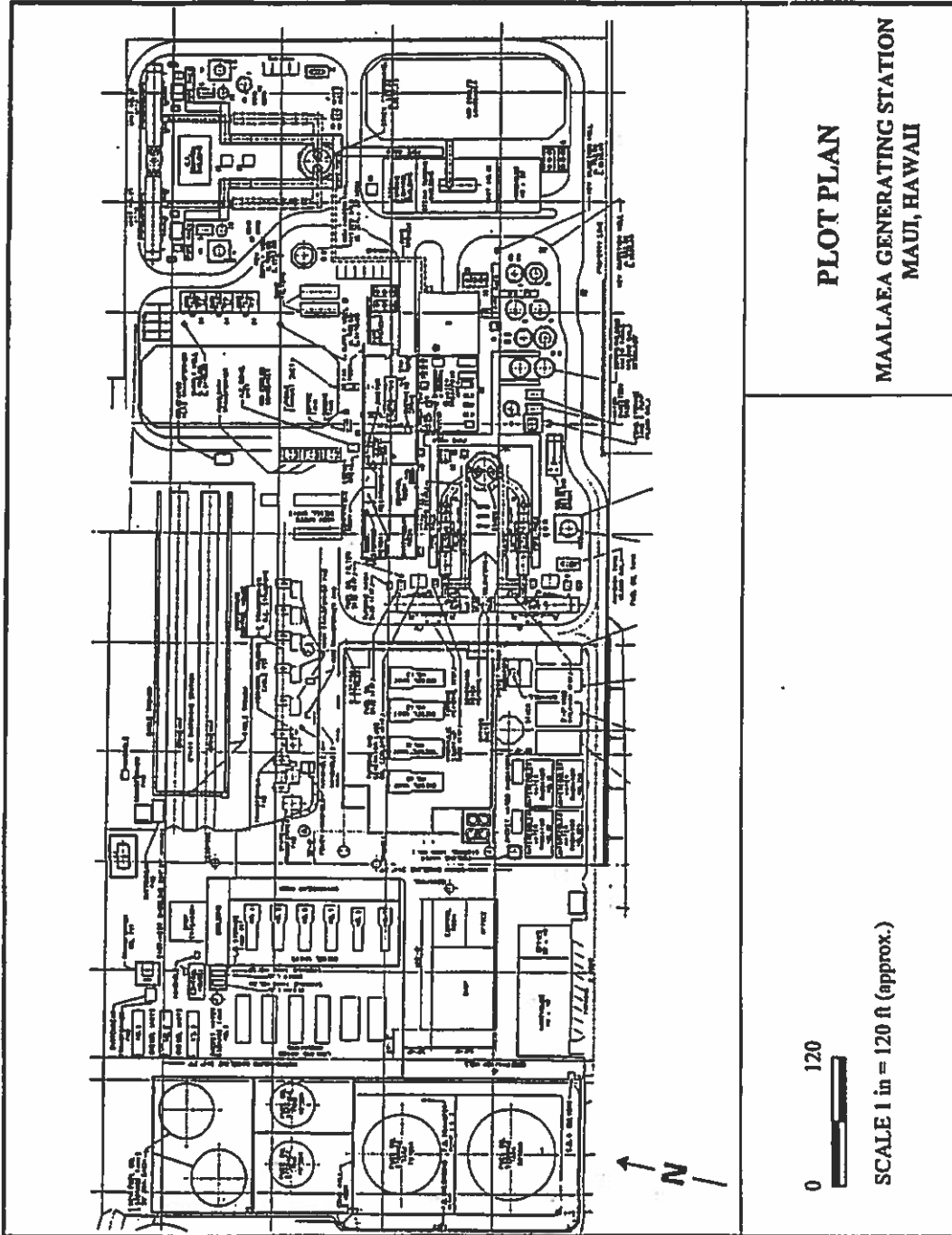


FIGURE S-1.4 PLOT PLAN



EMISSIONS UNITS TABLE

Review of applications and issuance of permits will be expedited by supplying all necessary information on this table

AIR POLLUTANT DATA - EMISSION POINTS				AIR POLLUTANT		AIR POLLUTANT EMISSION RATE		UTM		STACK SOURCE PARAMETERS						
Stack No	Unit No	EQUIPMENT NAME/DESCRIPTION & SIC number	Equipment Date	Regulated/Hazardous Air Pollutant Name & CAS#	#HR.	Tons/Year	Coordinates	Horizontal Datum*	Stack Height (mtrs)	Direction (up/down)	Inside Diameter (mtrs)	Velocity (m/s)	Flow Rate (m ³ /s)	Temp (°K)	Capped (Y/N)	
5	M5	5.6 MW Cooper-Bessemer Model LSV-20T Diesel Engine Generator (SIC Code 4911)	Dec. 1973	SO ₂	24.28	106.35	East North	760,797 2,302,151	14.6	u	0.81	44.20	22.78	711.95	N	
				NO _x	252.84	See Attachment S-1e	East North	760,797 2,302,151	14.6	u	0.81	44.20	22.78	711.95	N	
				CO	23.72	103.87	East North	760,797 2,302,151	14.6	u	0.81	44.20	22.78	711.95	N	
				VOC	13.99	61.28	East North	760,797 2,302,151	14.6	u	0.81	44.20	22.78	711.95	N	
				PM ₁₀	6.59	28.86	East North	760,797 2,302,151	14.6	u	0.81	44.20	22.78	711.95	N	
				H ₂ SO ₄ Mist	3.36	14.70	East North	760,797 2,302,151	14.6	u	0.81	44.20	22.78	711.95	N	
				Pb	See Attachment S-1b		East North	760,797 2,302,151	14.6	u	0.81	44.20	22.78	711.95	N	
				Fluorides	5.92E-04	2.59E-03	East North	760,797 2,302,151	14.6	u	0.81	44.20	22.78	711.95	N	
				TRS	Not Expected		East North	760,797 2,302,151	14.6	u	0.81	44.20	22.78	711.95	N	
				CFC	Not Expected		East North	760,797 2,302,151	14.6	u	0.81	44.20	22.78	711.95	N	
				HAP	See Attachment S-1b		East North	760,797 2,302,151	14.6	u	0.81	44.20	22.78	711.95	N	
				GHG (CO ₂ e)	See Attachment S-1f		East North	760,797 2,302,151	14.6	u	0.81	44.20	22.78	711.95	N	

* Specify UTM Horizontal Datum as Old Hawaiian, NAD-83, or NAD-27

o Specify the direction of the stack exhaust as u=upward, d=downward, h=horizontal

Notes:

1. Emission rates for SO₂, NO_x, CO, VOC, and PM₁₀ are based on an evaluation of AP-42 calculations and stack test data. See Attachment S-1d for emission calculations.
2. Emission rates for NO_x were established by CSP No. 0067-01-C.
3. Emission rate for CO includes a 70% reduction to account for a CO emission rate reduction in accordance with 40 CFR Part 63 Subpart ZZZZ.
4. H₂SO₄ emission rate based on 13.83% of the SO₂ emission rate (0.73 lb/hr / 5.28 lb/hr). This ratio is derived from the August 19, 1994 SCEC report of Maui Electric Company, Ltd. Maalaea Generating Station M3 source tests.
5. Emission rate for Fluorides based on Maui Electric Company, Ltd. fuel test results of 0.2 ppm dated 04/11/05.
6. The equipment date is date of commercial operation.

Company Name: Maui Electric Company, Ltd.

File No _____

Location: Maalaea Generating Station

(Make as many copies of this page as necessary)

Page 2

EMISSIONS UNITS TABLE

Review of applications and issuance of permits will be expedited by supplying all necessary information on this table

AIR POLLUTANT DATA EMISSION POINTS				AIR POLLUTANT		AIR POLLUTANT EMISSION RATE		UTM		STACK SOURCE PARAMETERS						
Stack No.	Unit No.	EQUIPMENT NAME/DESCRIPTION & SIC number	Equipment Date	Regulated/Hazardous Air Pollutant Name & CAS#	#HR	Tons/Year	Coordinates	Horizontal Datum*	Stack Height (mtrs)	Direction (u/d/h)*	Inside Diameter (mtrs)	Velocity (m/s)	Flow Rate (m ³ /s)	Temp. (°K)	Capped (Y/N)	
7	M7	5.6 MW Cooper-Bessemer Model LSV-20T Diesel Engine Generator (SIC Code 4911)	Aug 1975	SO ₂	24 28	106.35	East North	760,802 2,302,137	14.6	u	0.81	44.20	22.78	711.95	N	
				NO _x	335 16	See Attachment S-1e	East North	760,802 2,302,137	14.6	u	0.81	44.20	22.78	711.95	N	
				CO	23 72	103.87	East North	760,802 2,302,137	14.6	u	0.81	44.20	22.78	711.95	N	
				VOC	13 99	61.28	East North	760,802 2,302,137	14.6	u	0.81	44.20	22.78	711.95	N	
				PM ₁₀	6 59	28.86	East North	760,802 2,302,137	14.6	u	0.81	44.20	22.78	711.95	N	
				H ₂ SO ₄ Mist	3 36	14.70	East North	760,802 2,302,137	14.6	u	0.81	44.20	22.78	711.95	N	
				Pb	See Attachment S-1b		East North	760,802 2,302,137	14.6	u	0.81	44.20	22.78	711.95	N	
				Fluorides	5 92E-04	2 595E-03	East North	760,802 2,302,137	14.6	u	0.81	44.20	22.78	711.95	N	
				TRS	Not Expected		East North	760,802 2,302,137	14.6	u	0.81	44.20	22.78	711.95	N	
				CFCs	Not Expected		East North	760,802 2,302,137	14.6	u	0.81	44.20	22.78	711.95	N	
				HAP	See Attachment S-1b		East North	760,802 2,302,137	14.6	u	0.81	44.20	22.78	711.95	N	
				GHG (CO ₂ e)	See Attachment S-1f		East North	760,802 2,302,137	14.6	u	0.81	44.20	22.78	711.95	N	

* Specify UTM Horizontal Datum as Old Hawaiian, NAD-83, or NAD-27

* Specify the direction of the stack exhaust as u=upward, d=downward, h=horizontal

Notes:

1. Emission rates for SO₂, NO_x, CO, VOC, and PM₁₀ are based on an evaluation of AP-42 calculations & stack test data. See Attachment S-1d for emission calculations.
2. Emission rates for NO_x were established by CSP No. 0067-01-C.
3. Emission rate for CO includes a 70% reduction to account for a CO emission rate reduction in accordance with 40 CFR Part 63 Subpart ZZZZ.
4. H₂SO₄ emission rate based on 13.83% of the SO₂ emission rate (0.73 lb/hr / 5.28 lb/hr). This ratio is derived from the August 19, 1994 SCEC report of Maui Electric Company, Ltd. Maalaea Generating Station M3 source tests.
5. Emission rate for Fluorides based on Maui Electric Company, Ltd. fuel test results of 0.2 ppm dated 04/11/85.
6. The equipment date is date of commercial operation.

(7/06)

Maalaea Generating Station - CSP No. 0067-01-C
Application for a Significant Modification to a Covered Source

Form S-1

March 2018

Company Name: Maui Electric Company, Ltd.

File No _____

Location: Maalaea Generating Station

(Make as many copies of this page as necessary)

Page 3

EMISSIONS UNITS TABLE

Review of applications and issuance of permits will be expedited by supplying all necessary information on this table.

AIR POLLUTANT DATA - EMISSION POINTS				AIR POLLUTANT EMISSION RATE		UTM		STACK SOURCE PARAMETERS						
Stack No.	Equipment Name/Description & SICC number	Equipment Date	Regulated/Hazardous Air Pollutant Name & CAS#	#HR	Tons/Year	Coordinates	Horizontal Datum*	Stack Height (mtrs)	Direction (u/d/h)*	Inside Diameter (mtrs)	Velocity (m/s)	Flow Rate (m ³ /s)	Temp. (°K)	Capped (Y/N)
M171 M19	GE LM2500 Combustion Turbine, Peak Load (24.66 MW), Combined Cycle	1/6/1998	SO ₂	110.0	481.8	East North	761,012.4 2,302,209.2	36.6	u	2.44	20.00	93.52	427	N
			NO _x	42.3	See Attachment S-1e	East North	761,012.4 2,302,209.2	36.6	u	2.44	20.00	93.52	427	N
			CO	26.8	117.4	East North	761,012.4 2,302,209.2	36.6	u	2.44	20.00	93.52	427	N
			VOC	3.8	16.6	East North	761,012.4 2,302,209.2	36.6	u	2.44	20.00	93.52	427	N
			PMP/PM-10	19.7	86.3	East North	761,012.4 2,302,209.2	36.6	u	2.44	20.00	93.52	427	N
			H ₂ SO ₄ Mist	15.2	66.6	East North	761,012.4 2,302,209.2	36.6	u	2.44	20.00	93.52	427	N
			Pb	See Attachment S-1b		East North	761,012.4 2,302,209.2	36.6	u	2.44	20.00	93.52	427	N
			Fluorides	2.77E-03	1.21E-02	East North	761,012.4 2,302,209.2	36.6	u	2.44	20.00	93.52	427	N
			TRS	Not Expected		East North	761,012.4 2,302,209.2	36.6	u	2.44	20.00	93.52	427	N
			CFC	Not Expected		East North	761,012.4 2,302,209.2	36.6	u	2.44	20.00	93.52	427	N
			HAP	See Attachment S-1b		East North	761,012.4 2,302,209.2	36.6	u	2.44	20.00	93.52	427	N
			GHG (CO ₂ e)	See Attachment S-1f		East North	761,012.4 2,302,209.2	36.6	u	2.44	20.00	93.52	427	N

* Specify UTM Horizontal Datum as Old Hawaiian, NAD-83, or NAD-27

* Specify the direction of the stack exhaust as u=upward, d=downward, h=horizontal

Notes:

1. Equipment date is the date the initial Covered Source Permit (No. 0067-01-C) for M17 and M19 in simple cycle was issued.
2. SO₂, CO, VOC, and PMP/PM₁₀ emission rates were established by the initial covered source permit.
3. SO₂ emissions at peak load are based on a maximum fuel flow rate of 13,750 lb fuel/hr per CT.
4. H₂SO₄ & H₂SO₄ emission rate based on 13.63% of the SO₂ emission rate (0.73 lb/hr / 5.28 lb/hr). This ratio is derived from the August 19, 1994 SCEC report of Maui Electric Company Ltd. Maalaea Generating Station M3 source tests
5. Emission rate for Fluorides based on Maui Electric Company, Ltd. fuel test results of 0.2 ppm dated 04/11/85.

(7/06)

Maalaea Generating Station - CSP No. 0067-01-C
Application for a Significant Modification to a Covered Source

Form S-1

March 2018

Company Name: Maui Electric Company, Ltd.

File No.: _____

Location: Maalaea Generating Station

Page 4

(Make as many copies of this page as necessary)

EMISSIONS UNITS TABLE

Review of applications and issuance of permits will be expedited by supplying all necessary information on this table

AIR POLLUTANT DATA: EMISSION POINTS				AIR POLLUTANT		AIR POLLUTANT EMISSION RATE		UTM		STACK SOURCE PARAMETERS					
Stack No.	Unit No.	EQUIPMENT NAME/DESCRIPTION & SICC number	Equipment Date	Regulated/Hazardous Air Pollutant Name & CAS#	#HR	Tons/Year	Coordinates	Stack Height (mtrs)	Direction (u/d/h) ^a	Inside Diameter (mtrs)	Velocity (m/s)	Flow Rate (m ³ /s)	Temp (°K)	Capped (Y/N)	
M17/ M19	M17 or M19	GE LM2500 Combustion Turbine, 75% Load, Combined Cycle	1/6/1998	SO ₂	88.0	385.4	East 761,012.4 North 2,302,209.2	36.6	u	2.44	17.90	83.70	425	N	
				NO _x	42.3	See Attachment S-1e	East 761,012.4 North 2,302,209.2	36.6	u	2.44	17.90	83.70	425	N	
				CO	56.4	247.0	East 761,012.4 North 2,302,209.2	36.6	u	2.44	17.90	83.70	425	N	
				VOC	2.5	11.0	East 761,012.4 North 2,302,209.2	36.6	u	2.44	17.90	83.70	425	N	
				PW/PM-10	19.7	86.3	East 761,012.4 North 2,302,209.2	36.6	u	2.44	17.90	83.70	425	N	
							East								
							North								
							East								
							North								
							East								
							North								
							East								
							North								
							East								
							North								

^a Specify UTM Horizontal Datum as Old Hawaiian, NAD-83, or NAD-27

^b Specify the direction of the stack exhaust as u=upward, d=downward, h=horizontal

Notes:

1. Equipment date is the date the initial Covered Source Permit (No. 0067-01-C) for M17 and M19 in simple cycle was issued.
2. SO₂, CO, VOC, and PM/PM₁₀ emission rates were established by the initial covered source permit.
3. SO₂ emissions at 75% load are based on a maximum fuel flow rate of 11,000 lb fuel/hr per CT.

Company Name: Maui Electric Company, Ltd.

File No. _____

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EMISSIONS UNITS TABLE

Review of applications and issuance of permits will be expedited by supplying all necessary information on this table.

AIR POLLUTANT DATA: EMISSION POINTS				AIR POLLUTANT EMISSION RATE		UTM		STACK SOURCE PARAMETERS						
Stack No.	Unit No.	EQUIPMENT NAME/DESCRIPTION & SIC number	Equipment Date	AIR POLLUTANT	#/HR.	Tons/Year	Coordinates	Stack Height (mtrs)	Direction (wd/h) ^a	Inside Diameter (mtrs)	Velocity (m/s)	Flow Rate (m ³ /s)	Temp (°C)	Capped (Y/N)
				Regulated/Hazardous Air Pollutant Name & CAS#			Zone: <u>4</u> Horizontal Datum: <u>NAD-83</u>							
M17/ M19	M17 or M19	GE LM2500 Combustion Turbine, 50% Load, Combined Cycle	1/6/1998	SO ₂	69.6	304.8	East North	761,012.4 2,302,209.2	u	2.44	14.20	66.40	419	N
				NO _x	42.3	See Attachment 5-1e	East North	761,012.4 2,302,209.2	u	2.44	14.20	66.40	419	N
				CO	181.0	792.8	East North	761,012.4 2,302,209.2	u	2.44	14.20	66.40	419	N
				VOC	22.6	99.0	East North	761,012.4 2,302,209.2	u	2.44	14.20	66.40	419	N
				PM ₁₀ /PM _{2.5}	19.7	86.3	East North	761,012.4 2,302,209.2	u	2.44	14.20	66.40	419	N
							East							
							North							
							East							
							North							
							East							
							North							
							East							
							North							
							East							
							North							
							East							
							North							

^a Specify UTM Horizontal Datum as Old Hawaiian, NAD-83, or NAD-27
^b Specify the direction of the stack exhaust as u=upward, d=downward, h=horizontal

Notes:

1. Equipment date is the date the initial Covered Source Permit (No. 0067-01-C) for M17 and M19 in simple cycle was issued.
2. SO₂, CO, VOC, and PM₁₀ emission rates were established by the initial covered source permit.
3. SO₂ emissions at 50% load are based on a maximum fuel flow rate of 8,700 lb fuel/hr per CT.

Company Name: Maui Electric Company, Ltd.

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EMISSIONS UNITS TABLE

Review of applications and issuance of permits will be expedited by supplying all necessary information on this table.

AIR POLLUTANT DATA: EMISSION POINTS				AIR POLLUTANT		AIR POLLUTANT EMISSION RATE		UTM		STACK SOURCE PARAMETERS						
Stack No.	Unit No.	EQUIPMENT NAME/DESCRIPTION & SICC number	Equipment Date	Regulated/Hazardous Air Pollutant Name & CAS#	#HR	Tons/Year	Coordinates	Stack Height (mtrs)	Direction (ur/dh) ^a	Inside Diameter (mtrs)	Velocity (m/s)	Flow Rate (m ³ /s)	Temp (°K)	Capped (Y/N)		
M17/ M19	M17 or M19	GE LM2500 Combustion Turbine, 25% Load, Combined Cycle	1/6/1998	SO ₂	48.0	210.2	East North	761,012.4 2,302,209.2	u	2.44	10.80	50.50	414	N		
				NO _x	42.3	See Attachment S-1e	East North	761,012.4 2,302,209.2	u	2.44	10.80	50.50	414	N		
				CO	475.6	2083.1	East North	761,012.4 2,302,209.2	u	2.44	10.80	50.50	414	N		
				VOC	22.6	99.0	East North	761,012.4 2,302,209.2	u	2.44	10.80	50.50	414	N		
				PM/PM-10	19.7	86.3	East North	761,012.4 2,302,209.2	u	2.44	10.80	50.50	414	N		
							East									
							North									
							East									
							North									
							East									
							North									
							East									
							North									
							East									
							North									

^a Specify UTM Horizontal Datum as Old Hawaiian, NAD-83, or NAD-27

^b Specify the direction of the stack exhaust as u=upward, d=downward, h=horizontal

Notes:

1. Equipment date is the date the initial Covered Source Permit (No. 0067-01-C) for M17 and M19 in simple cycle was issued.
2. SO₂, CO, VOC, and PM/PM₁₀ emission rates were established by the initial covered source permit.
3. SO₂ emissions at 25% load are based on a maximum fuel flow rate of 6,000 lb fuel/hr per CT.

Company Name: Maui Electric Company, Ltd.

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EMISSIONS UNITS TABLE

Review of applications and issuance of permits will be expedited by supplying all necessary information on this table.

AIR POLLUTANT DATA - EMISSION POINTS				AIR POLLUTANT EMISSION RATE		UTM		STACK SOURCE PARAMETERS						
Stack No.	Unit No	EQUIPMENT NAME/DESCRIPTION & SIC number	Equipment Date	Regulated/Hazardous Air Pollutant Name & CAS#	#HR.	Tons/Year	Coordinates	Stack Height (mtrs)	Direction (u/d/h)*	Inside Diameter (mtrs)	Velocity (m/s)	Flow Rate (m ³ /s)	Temp (°K)	Capped (Y/N)
M17/ M19	M17 or M19	GE LM2500 Combustion Turbine, Idle Load, Combined Cycle	1/6/1998	SO ₂	48.0	210.2	East North 761 012.4 2 302 209.2	36.6	u	2.44	10.80	50.50	414	N
				NO _x	42.3	See Attachment S-1e	East North 761 012.4 2 302 209.2	36.6	u	2.44	10.80	50.50	414	N
				CO	475.6	2083.1	East North 761 012.4 2 302 209.2	36.6	u	2.44	10.80	50.50	414	N
				VOC	22.6	99.0	East North 761 012.4 2 302 209.2	36.6	u	2.44	10.80	50.50	414	N
				PM ₁₀ /PM _{2.5}	9.37	41.0	East North 761 012.4 2 302 209.2	36.6	u	2.44	10.80	50.50	414	N
							East North							
							East North							
							East North							
							East North							
							East North							
							East North							
							East North							

* Specify UTM Horizontal Datum as Old Hawaiian, NAD-83, or NAD-27

* Specify the direction of the stack exhaust as u=upward, d=downward, h=horizontal

Notes:

1. Equipment date is the date the initial Covered Source Permit (No. 0067-01-C) for M17 and M19 in simple cycle was issued
2. NO_x rating removes the NO_x BACT analysis requirements. Therefore, the only limitation for NO_x is that the total annual NO_x emissions from M17 and M19 must be less than 370.5 tpy
3. A short-term NO_x emission limit is not required because the NO_x NAAQS and SAAQS are annual standards. NO_x modeling used an emission rate of 42.3 lb/hr (370.5 tpy / 2000 lb/ton / 8760 hr/yr) for each CT
4. SO₂, CO, and VOC emission rates are based on the 25% Load rates.
5. PM₁₀ emission rate is based on the permit limit of 0.045 gr/dscf and stack test results at 25% Load (Table 2.3-7 in Appendix C. 12/05/2002 Application for a Significant Modification Revisions).
6. SO₂ emissions at idle load are based on a maximum fuel flow rate of 6,000 lb fuel/hr per CT.

Company Name: Maui Electric Company, Ltd.

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EMISSIONS UNITS TABLE

Review of applications and issuance of permits will be expedited by supplying all necessary information on this table.

AIR POLLUTANT DATA - EMISSION POINTS				AIR POLLUTANT		AIR POLLUTANT EMISSION RATE		UTM				STACK SOURCE PARAMETERS					
Stack No.	Unit No.	EQUIPMENT NAME/DESCRIPTION & SICC number	Equipment Date	Regulated/Hazardous Air Pollutant Name & CAS#	#HR.	Tons/Year	Coordinates	Zone: <u>4</u>	Horizontal Datum*: <u>NAD-83</u>	Stack Height (mits)	Direction (u/d/h) ^a	Inside Diameter (mits)	Velocity (m/s)	Flow Rate (m ³ /s)	Temp. (°K)	Capped (Y/N)	
M17/ M19		GE LM2500 Combustion Turbine, Peak Load (24.66 MW), Simple Cycle	1/6/1998	SO ₂	110	481.8	East North	761,012.4 2,302,209.2		36.6	u	2.44	38.50	180.02	821	N	
				NO _x	42.3	See Attachment S-1e	East North	761,012.4 2,302,209.2		36.6	u	2.44	38.50	180.02	821	N	
				CO	26.8	117.4	East North	761,012.4 2,302,209.2		36.6	u	2.44	38.50	180.02	821	N	
				VOC	3.8	16.6	East North	761,012.4 2,302,209.2		36.6	u	2.44	38.50	180.02	821	N	
				PM ₁₀	19.7	86.3	East North	761,012.4 2,302,209.2		36.6	u	2.44	38.50	180.02	821	N	
				H ₂ SO ₄ Mist	15.2	66.6	East North	761,012.4 2,302,209.2		36.6	u	2.44	38.50	180.02	821	N	
				Pb	See Attachment S-1b		East North	761,012.4 2,302,209.2		36.6	u	2.44	38.50	180.02	821	N	
				Fluorides	2.77E-03	1.21E-02	East North	761,012.4 2,302,209.2		36.6	u	2.44	38.50	180.02	821	N	
				TRS	Not Expected		East North	761,012.4 2,302,209.2		36.6	u	2.44	38.50	180.02	821	N	
				CFCs	Not Expected		East North	761,012.4 2,302,209.2		36.6	u	2.44	38.50	180.02	821	N	
				HAPs	See Attachment S-1b		East North	761,012.4 2,302,209.2		36.6	u	2.44	38.50	180.02	821	N	
				GHG (CO ₂ e)	See Attachment S-1f		East North	761,012.4 2,302,209.2		36.6	u	2.44	38.50	180.02	821	N	

* Specify UTM Horizontal Datum as Old Hawaiian, NAD-83, or NAD-27

^a Specify the direction of the stack exhaust as u=upward, d=downward, h=horizontal

Notes:

1. Equipment date is the date the initial Covered Source Permit (No. 0067-01-C) for M17 and M19 in simple cycle was issued.
2. SO₂, CO, VOC, and PM₁₀ emission rates were established by the initial covered source permit.
3. SO₂ emissions at peak load are based on a maximum fuel flow rate of 13,750 lb fuel/hr per CT
4. H₂SO₄ emission rate based on 13.83% of the SO₂ emission rate (0.73 lb/hr / 5.29 lb/hr). This ratio is derived from the August 19, 1994 SCEC report of Maui Electric Company, Ltd. Maalaea Generating Station M3 source tests
5. Emission rate for Fluorides based on Maui Electric Company Ltd. fuel test results of 0.2 ppm dated 04/11/85.

Company Name: Maui Electric Company, Ltd.

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EMISSIONS UNITS TABLE

Review of applications and issuance of permits will be expedited by supplying all necessary information on this table.

AIR POLLUTANT DATA: EMISSION POINTS				AIR POLLUTANT		AIR POLLUTANT EMISSION RATE		UTM		STACK SOURCE PARAMETERS					
Stack No.	Unit No.	EQUIPMENT NAME/DESCRIPTION & SIC number	Equipment Date	Regulated/Hazardous Air Pollutant Name & CAS#	#HR	Tons/Year	Coordinates	Stack Height (mts)	Direction (u/d/h) ^a	Inside Diameter (mts)	Velocity (m/s)	Flow Rate (m ³ /s)	Temp (°K)	Capped (Y/N)	
M17/ M19	M17 or M19	GE LM2500 Combustion Turbine, 75% Load, Simple Cycle	1/8/1998	SO ₂	88.0	385.4	East North	761,012.4 2,302,209.2	u	2.44	31.70	148.22	764	N	
				NO _x	42.3	See Attachment S-1e	East North	761,012.4 2,302,209.2	u	2.44	31.70	148.22	764	N	
				CO	56.4	247.0	East North	761,012.4 2,302,209.2	u	2.44	31.70	148.22	764	N	
				VOC	2.5	11.0	East North	761,012.4 2,302,209.2	u	2.44	31.70	148.22	764	N	
				PMPM-10	19.7	86.3	East North	761,012.4 2,302,209.2	u	2.44	31.70	148.22	764	N	
							East								
							North								
							East								
							North								
							East								
							North								
							East								
							North								
							East								
							North								

^a Specify UTM Horizontal Datum as Old Hawaiian, NAD-83, or NAD-27

^b Specify the direction of the stack exhaust as u=upward, d=downward, h=horizontal

Notes:

1. Equipment date is the date the initial Covered Source Permit (No. 0067-01-C) for M17 and M19 in simple cycle was issued.
2. SO₂, CO, VOC, and PMPM₁₀ emission rates were established by the initial covered source permit.
3. SO₂ emissions at 75% load are based on a maximum fuel flow rate of 11,000 lb fuel/hr per CT.

Company Name: Maui Electric Company, Ltd.

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EMISSIONS UNITS TABLE

Review of applications and issuance of permits will be expedited by supplying all necessary information on this table.

AIR POLLUTANT DATA: EMISSION POINTS				AIR POLLUTANT	AIR POLLUTANT EMISSION RATE		UTM		STACK SOURCE PARAMETERS							
Stack No.	Unit No.	EQUIPMENT NAME/DESCRIPTION & SICC number	Equipment Date		Regulated/Hazardous Air Pollutant Name & CAS#	#HR.	Tons/Year	Coordinates	Horizontal Datum*	Stack Height (mtrs)	Direction (u/d/h) ^b	Inside Diameter (mtrs)	Velocity (m/s)	Flow Rate (m ³ /s)	Temp (°K)	Capped (Y/N)
M17/ M19	M17 or M19	GE LM2500 Combustion Turbine, 50% Load, Simple Cycle	1/6/1998	SO ₂	69.6	304.8	East North	761,012.4 2,302,209.2	NAD-83	36.6	u	2.44	24.50	114.56	728	N
				NO _x	42.3	See Attachment 5-16	East North	761,012.4 2,302,209.2		36.6	u	2.44	24.50	114.56	728	N
				CO	181.0	792.8	East North	761,012.4 2,302,209.2		36.6	u	2.44	24.50	114.56	728	N
				VOC	22.6	99.0	East North	761,012.4 2,302,209.2		36.6	u	2.44	24.50	114.56	728	N
				PMPM-10	19.7	86.3	East North	761,012.4 2,302,209.2		36.6	u	2.44	24.50	114.56	728	N
							East									
							North									
							East									
							North									
							East									
							North									
							East									
							North									
							East									
							North									

* Specify UTM Horizontal Datum as Old Hawaiian, NAD-83, or NAD-27
^b Specify the direction of the stack exhaust as u=upward, d=downward, h=horizontal

- Notes:
1. Equipment date is the date the initial Covered Source Permit (No. 0067-01-C) for M17 and M19 in simple cycle was issued.
 2. SO₂, CO, VOC, and PMPM₁₀ emission rates were established by the initial covered source permit.
 3. SO₂ emissions at 50% load are based on a maximum fuel flow rate of 8,700 lb fuel/hr per CT.

Company Name: Maui Electric Company, Ltd.

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EMISSIONS UNITS TABLE

Review of applications and issuance of permits will be expedited by supplying all necessary information on this table

AIR POLLUTANT DATA: EMISSION POINTS				AIR POLLUTANT		AIR POLLUTANT EMISSION RATE		UTM		STACK SOURCE PARAMETERS					
Stack No.	Unit No.	EQUIPMENT NAME/DESCRIPTION & SICC number	Equipment Date	Regulated/Hazardous Air Pollutant Name & CAS#	#HR	Tons/Year	Coordinates	Stack Height (mtrs)	Direction (u/d/h) ^a	Inside Diameter (mtrs)	Velocity (m/s)	Flow Rate (m ³ /s)	Temp (°K)	Capped (Y/N)	
M17/ M19	M17 or M19	GE LM2500 Combustion Turbine, 25% Load, Simple Cycle	1/6/1998	SO ₂	480	210.2	East North 761,012.4 2,302,209.2	36.6	u	2.44	18.20	701.00	414	N	
				NO _x	423	See Attachment S-1e	East North 761,012.4 2,302,209.2	36.6	u	2.44	18.20	701.00	414	N	
				CO	475.6	2083.1	East North 761,012.4 2,302,209.2	36.6	u	2.44	18.20	701.00	414	N	
				VOC	22.6	99.0	East North 761,012.4 2,302,209.2	36.6	u	2.44	18.20	701.00	414	N	
				PMPM-10	19.7	86.3	East North 761,012.4 2,302,209.2	36.6	u	2.44	18.20	701.00	414	N	
							East								
							North								
							East								
							North								
							East								
							North								
							East								
							North								
							East								
							North								

^a Specify UTM Horizontal Datum as Old Hawaiian, NAD-83, or NAD-27

^b Specify the direction of the stack exhaust as u=upward, d=downward, h=horizontal

Notes:

1. Equipment date is the date the initial Covered Source Permit (No. 0061-01-C) for M17 and M19 in simple cycle was issued.
2. SO₂, CO, VOC, and PMPM₁₀ emission rates were established by the initial covered source permit.
3. SO₂ emissions at 25% load are based on a maximum fuel flow rate of 6,000 lb fuel/hr per CT.

Attachment S-1b
Air Toxic Emissions for Unit M5 or M7

SECTION 112 HAZARDOUS AIR POLLUTANTS

CAS Number	Pollutant ¹	Source of Emission Factor	Emission Factor (lb/MMBtu)	Heat Input (MMBtu/hr)	Emissions (lb/hr)	Emissions (tpy)
75-07-0	Acetaldehyde	AP-42, Section 3.4, Table 3.4-3	2.52E-05	58.8	1.48E-03	6.49E-03
60-35-5	Acetamide			58.8		
75-05-8	Acetonitrile			58.8		
98-86-2	Acetophenone			58.8		
53-96-3	2-Acetylaminofluorene			58.8		
107-02-8	Acrolein	AP-42, Section 3.4, Table 3.4-3	7.88E-06	58.8	4.63E-04	2.03E-03
79-06-1	Acrylamide			58.8		
79-10-7	Acrylic acid			58.8		
107-13-1	Acrylonitrile			58.8		
107-05-1	Allyl chloride			58.8		
92-67-1	4-Aminobiphenyl			58.8		
62-53-3	Aniline			58.8		
90-04-0	o-Anisidine			58.8		
1332-21-4	Asbestos			58.8		
71-43-2	Benzene (including benzene from gasoline)	AP-42, Section 3.4, Table 3.4-3	7.76E-04	58.8	4.56E-02	2.00E-01
92-87-5	Benzidine			58.8		
98-07-7	Benzotrichloride			58.8		
100-44-7	Benzyl chloride			58.8		
92-52-4	Biphenyl			58.8		
117-81-7	bis(2-ethylhexyl)phthalate (DEHP)			58.8		
542-88-1	bis(chloromethyl) ether			58.8		
75-25-2	Bromoform			58.8		
106-99-0	1,3-Butadiene	AP-42, Section 3.1, Table 3.1-4	1.60E-05	58.8	9.41E-04	4.12E-03
156-62-7	Calcium cyanamide			58.8		
105-60-2	Caprolactam (Removed 06/18/96. See 61FR30816)			58.8		
133-08-2	Captan			58.8		
63-25-2	Carbaryl			58.8		
75-15-0	Carbon disulfide			58.8		
56-23-5	Carbon tetrachloride			58.8		
463-58-1	Carbonyl sulfide			58.8		
120-80-9	Catechol			58.8		
133-90-4	Chloramben			58.8		
57-74-9	Chlordane			58.8		
7782-50-5	Chlone			58.8		
79-11-8	Chloroacetic acid			58.8		
532-27-4	2-Chloroacetophenone			58.8		
108-90-7	Chlorobenzene			58.8		
510-15-6	Chlorobenzilate			58.8		
67-66-3	Chloroform			58.8		
107-30-2	Chloromethyl methyl ether			58.8		
126-99-8	Chloroprene			58.8		
1319-77-3	Cresol/Cresylic acid (mixed isomers)			58.8		
95-48-7	o-Cresol			58.8		
108-39-4	m-Cresol			58.8		
106-44-5	p-Cresol			58.8		
98-82-8	Cumene			58.8		
94-75-7	2,4-D, salts and esters			58.8		
72-55-9	DDE (1,1-dichloro-2,2-bis(p-chlorophenyl) ethylene)			58.8		
334-88-3	Diazomethane			58.8		
132-64-9	Dibenzofuran			58.8		
96-12-8	1,2-Dibromo-3-chloropropane			58.8		
84-74-2	Dibutyl phthalate			58.8		
106-46-7	1,4-Dichlorobenzene			58.8		
91-94-1	Dichlorobenzidine			58.8		
111-44-4	Dichloroethyl ether (Bis[2-chloroethyl]ether)			58.8		
542-75-6	1,3-Dichloropropene			58.8		
62-73-7	Dichlorvos			58.8		
111-42-2	Diethanolamine			58.8		
64-67-5	Diethyl sulfate			58.8		
119-90-4	3,3'-Dimethoxybenzidine			58.8		
60-11-7	4-Dimethylaminobenzene			58.8		
121-69-7	N,N-Dimethylaniline			58.8		
119-93-7	3,3'-Dimethylbenzidine			58.8		
79-44-7	Dimethylcarbamoyl chloride			58.8		
68-12-2	N,N-Dimethylformamide			58.8		
57-14-7	1,1-Dimethylhydrazine			58.8		
131-11-3	Dimethyl phthalate			58.8		
77-78-1	Dimethyl sulfate			58.8		
534-52-1	4,6-Dinitro-o-cresol (including salts)			58.8		
51-28-5	2,4-Dinitrophenol			58.8		
121-14-2	2,4-Dinitrotoluene			58.8		
123-91-1	1,4-Dioxane (1,4-Diethyleneoxide)			58.8		
122-66-7	1,2-Diphenylhydrazine			58.8		
106-89-8	Epichlorohydrin (1-Chloro-2,3-epoxypropane)			58.8		
106-88-7	1,2-Epoxybutane			58.8		
140-88-5	Ethyl acrylate			58.8		
100-41-4	Ethylbenzene			58.8		
51-79-6	Ethyl carbamate (Urethane)			58.8		
75-00-3	Ethyl chloride (Chloroethane)			58.8		
106-93-4	Ethylene dibromide (Dibromoethane)			58.8		
107-06-2	Ethylene dichloride (1,2-Dichloroethane)			58.8		
107-21-1	Ethylene glycol			58.8		

**Attachment S-1b
Air Toxic Emissions for Unit M5 or M7**

SECTION 112 HAZARDOUS AIR POLLUTANTS

CAS Number	Pollutant ¹	Source of Emission Factor	Emission Factor (lb/MMBtu)	Heat Input (MMBtu/hr)	Emissions (lb/hr)	Emissions (tpy)
151-56-4	Ethylenimine (Aziridine)			58.8		
75-21-8	Ethylene oxide			58.8		
96-45-7	Ethylene thiourea			58.8		
75-34-3	Ethylidene dichloride (1,1-Dichloroethane)			58.8		
50-00-0	Formaldehyde	AP-42, Section 3.4, Table 3.4-3	7.89E-05	58.8	4.64E-03	2.03E-02
76-44-8	Heptachlor			58.8		
118-74-1	Hexachlorobenzene			58.8		
87-68-3	Hexachlorobutadiene			58.8		
77-47-4	Hexachlorocyclopentadiene			58.8		
67-72-1	Hexachloroethane			58.8		
822-06-0	Hexamethylene diisocyanate			58.8		
680-31-9	Hexamethylphosphoramide			58.8		
110-54-3	Hexane			58.8		
302-01-2	Hydrazine			58.8		
7647-01-0	Hydrochloric acid (Hydrogen chloride (gas only))			58.8		
7664-39-3	Hydrogen fluoride (Hydrofluoric acid)			58.8		
123-31-9	Hydroquinone			58.8		
78-59-1	Isophorone			58.8		
58-89-9	Lindane (all isomers)			58.8		
108-31-6	Maleic anhydride			58.8		
67-56-1	Methanol			58.8		
72-43-5	Methoxychlor			58.8		
74-83-9	Methyl bromide (Bromomethane)			58.8		
74-87-3	Methyl chloride (Chloromethane)			58.8		
71-55-6	Methyl chloroform (1,1,1-Trichloroethane)			58.8		
78-93-3	Methyl ethyl ketone (2-Butanone) (Removed 12/19/05. See 70 FR75047)			58.8		
60-34-4	Methylhydrazine			58.8		
74-88-4	Methyl iodide (Iodomethane)			58.8		
108-10-1	Methyl isobutyl ketone (Hexone)			58.8		
624-83-9	Methyl isocyanate			58.8		
80-62-6	Methyl methacrylate			58.8		
1634-04-4	Methyl tert-butyl ether			58.8		
101-14-4	4,4'-Methylenebis (2-chloroaniline)			58.8		
75-09-2	Methylene chloride (Dichloromethane)			58.8		
101-68-8	4,4'-Methylenediphenyl diisocyanate (MDI)			58.8		
101-77-9	4,4'-Methylenedianiline			58.8		
91-20-3	Naphthalene	AP-42, Section 3.4, Table 3.4-4	1.30E-04	58.8	7.64E-03	3.35E-02
98-95-3	Nitrobenzene			58.8		
92-93-3	4-Nitrobiphenyl			58.8		
100-02-7	4-Nitrophenol			58.8		
79-46-9	2-Nitropropane			58.8		
684-93-5	N-Nitroso-N-methylurea			58.8		
62-75-9	N-Nitrosodimethylamine			58.8		
59-89-2	N-Nitrosomorpholine			58.8		
56-38-2	Parathion			58.8		
82-68-8	Pentachloronitrobenzene (Quintobenzene)			58.8		
87-86-5	Pentachlorophenol			58.8		
108-95-2	Phenol			58.8		
106-50-3	p-Phenylenediamine			58.8		
75-44-5	Phosgene			58.8		
7803-51-2	Phosphine			58.8		
7723-14-0	Phosphorus			58.8		
85-44-9	Phthalic anhydride			58.8		
1336-36-3	Polychlorinated biphenyls (Aroclors)			58.8		
1120-71-4	1,3-Propane sultone			58.8		
57-57-8	beta-Propiolactone			58.8		
123-38-6	Propionaldehyde			58.8		
114-26-1	Propoxur (Baygon)			58.8		
78-87-5	Propylene dichloride (1,2-Dichloropropane)			58.8		
75-56-9	Propylene oxide			58.8		
75-55-8	1,2-Propylenimine (2-Methylaziridine)			58.8		
91-22-5	Quinoline			58.8		
106-51-4	Quinone (p-Benzoquinone)			58.8		
100-42-5	Styrene			58.8		
96-09-3	Styrene oxide			58.8		
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin			58.8		
79-34-5	1,1,2,2-Tetrachloroethane			58.8		
127-18-4	Tetrachloroethylene (Perchloroethylene)			58.8		
7550-45-0	Titanium tetrachloride			58.8		
108-88-3	Toluene	AP-42, Section 3.4, Table 3.4-3	2.81E-04	58.8	1.65E-02	7.24E-02
95-80-7	Toluene-2,4-diamine			58.8		
584-84-9	2,4-Toluene diisocyanate			58.8		
95-53-4	o-Toluidine			58.8		
8001-35-2	Toxaphene (chlorinated camphene)			58.8		
120-82-1	1,2,4-Trichlorobenzene			58.8		
79-00-5	1,1,2-Trichloroethane			58.8		
79-01-6	Trichloroethylene			58.8		
95-95-4	2,4,5-Trichlorophenol			58.8		
88-06-2	2,4,6-Trichlorophenol			58.8		
121-44-8	Triethylamine			58.8		
1582-09-8	Trifluralin			58.8		
540-84-1	2,2,4-Trimethylpentane			58.8		

**Attachment S-1b
Air Toxic Emissions for Unit M5 or M7**

SECTION 112 HAZARDOUS AIR POLLUTANTS

CAS Number	Pollutant ¹	Source of Emission Factor	Emission Factor (lb/MMBtu)	Heat Input (MMBtu/hr)	Emissions (lb/hr)	Emissions (tpy)
108-05-4	Vinyl acetate			58.8		
593-60-2	Vinyl bromide			58.8		
75-01-4	Vinyl chloride			58.8		
75-35-4	Vinylidene chloride (1,1-Dichloroethylene)			58.8		
1330-20-7	Xylene (mixed isomers)	AP-42, Section 3.4, Table 3.4-3	1.93E-04	58.8	1.13E-02	4.97E-02
95-47-6	o-Xylene			58.8		
108-38-3	m-Xylene			58.8		
106-42-3	p-Xylene			58.8		
	Antimony Compounds			58.8		
	Arsenic Compounds (inorganic including arsine)	AP-42, Section 3.1, Table 3.1-5	1.10E-05	58.8	6.47E-04	2.83E-03
	Beryllium Compounds	AP-42, Section 3.1, Table 3.1-5	3.10E-07	58.8	1.82E-05	7.98E-05
	Cadmium Compounds	AP-42, Section 3.1, Table 3.1-5	4.80E-06	58.8	2.82E-04	1.24E-03
	Chromium Compounds	AP-42, Section 3.1, Table 3.1-5	1.10E-05	58.8	6.47E-04	2.83E-03
	Cobalt Compounds			58.8		
	Coke Oven Emissions			58.8		
	Cyanide Compounds ²			58.8		
	Glycol ethers ³			58.8		
	Lead Compounds	AP-42, Section 3.1, Table 3.1-5	1.40E-05	58.8	8.23E-04	3.61E-03
	Manganese Compounds	AP-42, Section 3.1, Table 3.1-5	7.90E-04	58.8	4.65E-02	2.03E-01
	Mercury Compounds	AP-42, Section 3.1, Table 3.1-5	1.20E-06	58.8	7.06E-05	3.09E-04
	Fine mineral fibers ⁴			58.8		
	Nickel Compounds	AP-42, Section 3.1, Table 3.1-5	4.60E-06	58.8	2.70E-04	1.18E-03
	Polycyclic Organic Matter ⁵	AP-42, Section 3.4, Table 3.4-4	2.12E-04	58.8	1.25E-02	5.46E-02
	Radionuclides (including radon) ⁶			58.8		
	Selenium Compounds	AP-42, Section 3.1, Table 3.1-5	2.50E-05	58.8	1.47E-03	6.44E-03
	Total				1.52E-01	6.65E-01

Notes:

- For all listings above which contain the word "compounds" and for glycol ethers, the following applies. Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., antimony, arsenic, etc.) as part of that chemical's infrastructure.
- X-CN where X = H or any other group where a formal dissociation may occur. For example KCN or Ca(CN)₂.
- Includes mono- and di-ethers of ethylene glycol, diethylene glycol, and triethylene glycol. R-(OCH₂CH₂)_n-OR' where:
n = 1, 2, or 3
R = alkyl or aryl groups
R' = R, H, or groups which, when removed, yield glycol ethers with the structure R-(OCH₂CH₂)_n-OH. Polymers are excluded from the glycol category.
- Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.
- Includes organic compounds with more than one benzene ring and which have a boiling point greater than or equal to 100°C.
- A type of atom which spontaneously undergoes radioactive decay.

Attachment S-1b
Air Toxic Emissions for Unit M17 or M19

SECTION 112 HAZARDOUS AIR POLLUTANTS

CAS Number	Pollutant ¹	Source of Emission Factor	Emission Factor (lb/MMBtu)	Heat Input (MMBtu/hr)	Emissions (lb/hr)	Emissions (tpy)
75-07-0	Acetaldehyde	AP-42, Section 3.4, Table 3.4-3	2.52E-05	275	0.00693	0.0303534
60-35-5	Acetamide			275		
75-05-8	Acetonitrile			275		
98-86-2	Acetophenone			275		
53-96-3	2-Acetylaminofluorene			275		
107-02-8	Acrolein	AP-42, Section 3.4, Table 3.4-3	7.88E-06	275	0.002167	0.00949146
79-06-1	Acrylamide			275		
79-10-7	Acrylic acid			275		
107-13-1	Acrylonitrile			275		
107-05-1	Allyl chloride			275		
92-67-1	4-Aminobiphenyl			275		
62-53-3	Aniline			275		
90-04-0	o-Anisidine			275		
1332-21-4	Asbestos			275		
71-43-2	Benzene (including benzene from gasoline)	AP-42, Section 3.1, Table 3.1-4	5.50E-05	275	0.015125	0.0662475
92-87-5	Benzidine			275		
98-07-7	Benzotrifluoride			275		
100-44-7	Benzyl chloride			275		
92-52-4	Biphenyl			275		
117-81-7	bis(2-ethylhexyl)phthalate (DEHP)			275		
542-88-1	bis(chloromethyl) ether			275		
75-25-2	Bromoform			275		
106-99-0	1,3-Butadiene	AP-42, Section 3.1, Table 3.1-4	1.60E-05	275	0.0044	0.019272
156-62-7	Butoum cyanamide			275		
105-60-2	Caprolactam (Removed 06/18/96. See 61FR30816)			275		
133-06-2	Captan			275		
63-25-2	Carbaryl			275		
75-15-0	Carbon disulfide			275		
56-23-5	Carbon tetrachloride			275		
463-58-1	Carbonyl sulfide			275		
120-80-9	Catechol			275		
133-90-4	Chloramben			275		
57-74-9	Chlordane			275		
7782-50-5	Chlone			275		
79-11-8	Chloroacetic acid			275		
532-27-4	2-Chloroacetophenone			275		
108-90-7	Chlorobenzene			275		
510-15-6	Chlorobenzilate			275		
67-66-3	Chloroform			275		
107-30-2	Chloromethyl methyl ether			275		
126-99-8	Chloroprene			275		
1319-77-3	Cresol/Cresylic acid(mixed isomers)			275		
95-48-7	o-Cresol			275		
108-39-4	m-Cresol			275		
106-44-5	p-Cresol			275		
98-82-8	Cumene			275		
94-75-7	2,4-D. salts and esters			275		
72-55-9	DDE (1,1-dichloro-2,2-bis(p-chlorophenyl) ethylene)			275		
334-88-3	Diazomethane			275		
132-64-9	Dibenzofuran			275		
96-12-8	1,2-Dibromo-3-chloropropane			275		
84-74-2	Dibutyl phthalate			275		
106-46-7	1,4-Dichlorobenzene			275		
91-94-1	3-Dichlorobenzidine			275		
111-44-4	Dichloroethyl ether (Bis[2-chloroethyl]ether)			275		
542-75-6	1,3-Dichloropropene			275		
62-73-7	Dichlorvos			275		
111-42-2	Diethanolamine			275		
64-67-5	Diethyl sulfate			275		
119-90-4	3,3-Dimethoxybenzidine			275		
60-11-7	4-Dimethylaminoozobenzene			275		
121-69-7	N,N-Dimethylaniline			275		
119-93-7	3,3-Dimethylbenzidine			275		
79-44-7	Dimethylcarbamoyl chloride			275		
68-12-2	N,N-Dimethylformamide			275		
57-14-7	1,1-Dimethylhydrazine			275		
131-11-3	Dimethyl phthalate			275		
77-78-1	Dimethyl sulfate			275		
534-52-1	4,6-Dinitro-o-cresol (including salts)			275		
51-28-5	2,4-Dinitrophenol			275		
121-14-2	2,4-Dinitrotoluene			275		
123-91-1	1,4-Dioxane (1,4-Diethyleneoxide)			275		
122-66-7	1,2-Diphenylhydrazine			275		
106-89-8	Epichlorohydrin (1-Chloro-2,3-epoxypropane)			275		
106-88-7	1,2-Epoxybutane			275		
140-88-5	Ethyl acrylate			275		
100-41-4	Ethylbenzene			275		
51-79-6	Ethyl carbamate (Urethane)			275		
75-00-3	Ethyl chloride (Chloroethane)			275		
106-93-4	Ethylene dibromide (Dibromoethane)			275		
107-06-2	Ethylene dichloride (1,2-Dichloroethane)			275		
107-21-1	Ethylene glycol			275		

Attachment S-1b
Air Toxic Emissions for Unit M17 or M19

SECTION 112 HAZARDOUS AIR POLLUTANTS

CAS Number	Pollutant ¹	Source of Emission Factor	Emission Factor (lb/MMBtu)	Heat Input (MMBtu/hr)	Emissions (lb/hr)	Emissions (tpy)
151-56-4	Ethyleneimine (Aziridine)			275		
75-21-8	Ethylene oxide			275		
96-45-7	Ethylene thiourea			275		
75-34-3	Ethylene dichloride (1,1-Dichloroethane)			275		
50-00-0	Formaldehyde	AP-42, Section 3.1, Table 3.1-4	2.80E-04	275	0.077	0.33726
76-44-8	Heptachlor			275		
118-74-1	Hexachlorobenzene			275		
87-68-3	Hexachlorobutadiene			275		
77-47-4	Hexachlorocyclopentadiene			275		
67-72-1	Hexachloroethane			275		
822-06-0	Hexamethylene diisocyanate			275		
680-31-9	Hexamethylphosphoramide			275		
110-54-3	Hexane			275		
302-01-2	Hydrazine			275		
7647-01-0	Hydrochloric acid (Hydrogen chloride (gas only))			275		
7664-39-3	Hydrogen fluoride (Hydrofluoric acid)			275		
123-31-9	Hydroquinone			275		
78-59-1	Isophorone			275		
58-89-9	Lindane (all isomers)			275		
108-31-6	Maleic anhydride			275		
67-56-1	Methanol			275		
72-43-5	Methoxychlor			275		
74-83-9	Methyl bromide (Bromomethane)			275		
74-87-3	Methyl chloride (Chloromethane)			275		
71-55-6	Methyl chloroform (1,1,1-Trichloroethane)			275		
78-93-3	Methyl ethyl ketone (2-Butanone) (Removed 12/19/05. See 70 FR75047)			275		
60-34-4	Methylhydrazine			275		
74-88-4	Methyl iodide (Iodomethane)			275		
108-10-1	Methyl isobutyl ketone (Hexone)			275		
624-83-9	Methyl isocyanate			275		
80-62-6	Methyl methacrylate			275		
1634-04-4	Methyl tert-butyl ether			275		
101-14-4	4,4'-Methylenebis (2-chloroaniline)			275		
75-09-2	Methylene chloride (Dichloromethane)			275		
101-68-8	4,4'-Methylenediphenyl diisocyanate (MDI)			275		
101-77-9	4,4'-Methylenedianiline			275		
91-20-3	Naphthalene	AP-42, Section 3.1, Table 3.1-4	3.50E-05	275	0.009625	0.0421575
98-95-3	Nitrobenzene			275		
92-93-3	4-Nitrobiphenyl			275		
100-02-7	4-Nitrophenol			275		
79-46-9	2-Nitropropane			275		
684-93-5	N-Nitroso-N-methylurea			275		
62-75-9	N-Nitrosodimethylamine			275		
59-89-2	N-Nitrosomorpholine			275		
56-38-2	Parathion			275		
82-68-8	Pentachloronitrobenzene (Quintobenzene)			275		
87-86-5	Pentachlorophenol			275		
108-95-2	Phenol			275		
106-50-3	p-Phenylenediamine			275		
75-44-5	Phosgene			275		
7803-51-2	Phosphine			275		
7723-14-0	Phosphorus			275		
85-44-9	Phthalic anhydride			275		
1336-36-3	Polychlorinated biphenyls (Aroclors)			275		
1120-71-4	1,3-Propane sultone			275		
57-57-8	beta-Propiolactone			275		
123-38-6	Propionaldehyde			275		
114-26-1	Propoxur (Baygon)			275		
78-87-5	Propylene dichloride (1,2-Dichloropropane)			275		
75-56-9	Propylene oxide			275		
75-55-8	1,2-Propyleneimine (2-Methylaziridine)			275		
91-22-5	Quinoline			275		
106-51-4	Quinone (p-Benzoquinone)			275		
100-42-5	Styrene			275		
96-09-3	Styrene oxide			275		
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin			275		
79-34-5	1,1,2,2-Tetrachloroethane			275		
127-18-4	Tetrachloroethylene (Perchloroethylene)			275		
7550-45-0	Titanium tetrachloride			275		
108-88-3	Toluene	AP-42, Section 3.4, Table 3.4-3	2.81E-04	275	0.077275	0.3384645
95-80-7	Toluene-2,4-diamine			275		
584-84-9	2,4-Toluene diisocyanate			275		
95-53-4	p-Toluidine			275		
8001-35-2	Toxaphene (chlorinated camphene)			275		
120-82-1	1,2,4-Trichlorobenzene			275		
79-00-5	1,1,2-Trichloroethane			275		
79-01-6	Trichloroethylene			275		
95-95-4	2,4,5-Trichlorophenol			275		
88-06-2	2,4,6-Trichlorophenol			275		
121-44-8	Trithylamine			275		
1582-09-8	Trifluralin			275		
540-84-1	2,2,4-Trimethylpentane			275		

**Attachment S-1b
Air Toxic Emissions for Unit M17 or M19**

SECTION 112 HAZARDOUS AIR POLLUTANTS

CAS Number	Pollutant ¹	Source of Emission Factor	Emission Factor (lb/MMBtu)	Heat Input (MMBtu/hr)	Emissions (lb/hr)	Emissions (tpy)
108-05-4	Vinyl acetate			275		
593-60-2	Vinyl bromide			275		
75-01-4	Vinyl chloride			275		
75-35-4	Vinylidene chloride (1,1-Dichloroethylene)			275		
1330-20-7	Xylene (mixed isomers)	AP-42, Section 3.1, Table 3.1-5	1.93E-04	275	0.053075	0.2324685
95-47-6	o-Xylene			275		
108-38-3	m-Xylene			275		
106-42-3	p-Xylene			275		
	Antimony Compounds			275		
	Arsenic Compounds (inorganic including arsine)	AP-42, Section 3.1, Table 3.1-5	1.10E-05	275	0.003025	0.0132495
	Beryllium Compounds	AP-42, Section 3.1, Table 3.1-5	3.10E-07	275	0.00008525	0.000373395
	Cadmium Compounds	AP-42, Section 3.1, Table 3.1-5	4.80E-06	275	0.00132	0.0057816
	Chromium Compounds	AP-42, Section 3.1, Table 3.1-5	1.10E-05	275	0.003025	0.0132495
	Cobalt Compounds			275		
	Coke Oven Emissions			275		
	Cyanide Compounds ²			275		
	Glycol ethers ³			275		
	Lead Compounds	AP-42, Section 3.1, Table 3.1-5	1.40E-05	275	0.00385	0.016863
	Manganese Compounds	AP-42, Section 3.1, Table 3.1-5	7.90E-04	275	0.21725	0.951555
	Mercury Compounds	AP-42, Section 3.1, Table 3.1-5	1.20E-06	275	0.00033	0.0014454
	Fine mineral fibers ⁴			275		
	Nickel Compounds	AP-42, Section 3.1, Table 3.1-5	4.60E-06	275	0.001265	0.0055407
	Polycyclic Organic Matter ⁵	AP-42, Section 3.1, Table 3.1-4	4.00E-05	275	0.011	0.04818
	Radionuclides (including radon) ⁶			275		
	Selenium Compounds	AP-42, Section 3.1, Table 3.1-5	2.50E-05	275	0.006875	0.0301125
	Total				0.49362225	2.162065455

Notes:

- For all listings above which contain the word "compounds" and for glycol ethers, the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (e.g., antimony, arsenic, etc.) as part of that chemical's infrastructure.
- XCN where X = H or any other group where a formal dissociation may occur. For example, KCN or Ca(CN)₂.
- Includes mono- and di-ethers of ethylene glycol, diethylene glycol, and triethylene glycol: R-(OCH₂CH₂)_n-OR' where n = 1, 2, or 3
R = alkyl or aryl groups
R' = R, H, or groups which, when removed, yield glycol ethers with the structure: R-(OCH₂CH₂)_n-OH. Polymers are excluded from the glycol category.
- Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.
- Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100°C.
- A type of atom which spontaneously undergoes radioactive decay.

**Attachment S-1b
Total Air Toxic Emissions**

SECTION 112 HAZARDOUS AIR POLLUTANTS

CAS Number	Pollutant ¹	Unit				Total (tpy)
		M5 (tpy)	M7 (tpy)	M17 (tpy)	M19 (tpy)	
75-07-0	Acetaldehyde	6.49E-03	6.49E-03	3.04E-02	3.04E-02	0.074
60-35-5	Acetamide					
75-05-8	Acetonitrile					
98-86-2	Acetophenone					
53-96-3	2-Acetylaminofluorene					
107-02-8	Acrolein	2.03E-03	2.03E-03	9.49E-03	9.49E-03	0.023
79-06-1	Acrylamide					
79-10-7	Acrylic acid					
107-13-1	Acrylonitrile					
107-05-1	Allyl chloride					
92-67-1	4-Aminobiphenyl					
62-53-3	Aniline					
90-04-0	o-Anisidine					
1332-21-4	Asbestos					
71-43-2	Benzene (including benzene from gasoline)	2.00E-01	2.00E-01	6.62E-02	6.62E-02	0.532
92-87-5	Benzidine					
98-07-7	Benzotrifluoride					
100-44-7	Benzyl chloride					
92-52-4	Biphenyl					
117-81-7	bis(2-ethylhexyl)phthalate (DEHP)					
542-88-1	bis(chloromethyl) ether					
75-25-2	Bromoform					
106-99-0	1,3-Butadiene	4.12E-03	4.12E-03	1.93E-02	1.93E-02	0.047
156-62-7	Calcium cyanamide					
105-60-2	Caprolactam (Removed 06/18/96. See 61FR30816)					
133-06-2	Captaf					
63-25-2	Carbaryl					
75-15-0	Carbon disulfide					
56-23-5	Carbon tetrachloride					
483-58-1	Carbonyl sulfide					
120-80-9	Catechol					
133-90-4	Chloramben					
57-74-9	Chlordane					
7782-50-5	Chlorine					
79-11-8	Chloroacetic acid					
532-27-4	2-Chloroacetophenone					
108-90-7	Chlorobenzene					
510-15-6	Chlorobenzilate					
67-66-3	Chloroform					
107-30-2	Chloromethyl methyl ether					
126-99-8	Chloroprene					
1319-77-3	Cresol/Cresylic acid (mixed isomers)					
95-48-7	o-Cresol					
108-39-4	m-Cresol					
106-44-5	p-Cresol					
98-82-8	Cumene					
94-75-7	2,4-D. salts and esters					
72-55-9	DDE (1,1-dichloro-2,2-bis(p-chlorophenyl) ethylene)					
334-88-3	Diazomethane					
132-64-9	Dibenzofuran					
96-12-8	1,2-Dibromo-3-chloropropane					
84-74-2	Dbutyl phthalate					
106-46-7	1,4-Dichlorobenzene					
91-94-1	Dichlorobenzidine					
111-44-4	Dichloroethyl ether (Bis[2-chloroethyl]ether)					
542-75-6	1,3-Dichloropropene					
62-73-7	Dichlorvos					
111-42-2	Diethanolamine					
64-67-5	Diethyl sulfate					
119-90-4	3,3'-Dimethoxybenzidine					
60-11-7	4-Dimethylaminoazobenzene					
121-69-7	N,N-Dimethylaniline					
119-93-7	3,3'-Dimethylbenzidine					
79-44-7	Dimethylcarbamoyl chloride					
68-12-2	N,N-Dimethylformamide					
57-14-7	1,1-Dimethylhydrazine					
131-11-3	Dimethyl phthalate					
77-78-1	Dimethyl sulfate					
534-52-1	4,6-Dinitro-o-cresol (including salts)					
51-28-5	2,4-Dinitrophenol					
121-14-2	2,4-Dinitrotoluene					
123-91-1	1,4-Dioxane (1,4-Diethyleneoxide)					
122-66-7	1,2-Diphenylhydrazine					
106-89-8	Epichlorohydrin (1-Chloro-2,3-epoxypropane)					
106-88-7	1,2-Epoxybutane					
140-88-5	Ethyl acrylate					
100-41-4	Ethylbenzene					
51-79-6	Ethyl carbamate (Urethane)					
75-00-3	Ethyl chloride (Chloroethane)					

**Attachment S-1b
Total Air Toxic Emissions**

SECTION 112 HAZARDOUS AIR POLLUTANTS

CAS Number	Pollutant ¹	Unit				Total (tpy)
		M5 (tpy)	M7 (tpy)	M17 (tpy)	M19 (tpy)	
106-93-4	Ethylene dibromide (Dibromoethane)					
107-06-2	Ethylene dichloride (1,2-Dichloroethane)					
107-21-1	Ethylene glycol					
151-56-4	Ethyleneimine (Aziridine)					
75-21-8	Ethylene oxide					
96-45-7	Ethylene thiourea					
75-34-3	Ethylidene dichloride (1,1-Dichloroethane)					
50-00-0	Formaldehyde	2.03E-02	2.03E-02	3.37E-01	3.37E-01	0.715
76-44-8	Heptachlor					
118-74-1	Hexachlorobenzene					
87-68-3	Hexachlorobutadiene					
77-47-4	Hexachlorocyclopentadiene					
67-72-1	Hexachloroethane					
822-06-0	Hexamethylene diisocyanate					
680-31-9	Hexamethylphosphoramide					
110-54-3	Hexane					
302-01-2	Hydrazine					
7647-01-0	Hydrochloric acid (Hydrogen chloride (gas only))					
7664-39-3	Hydrogen fluoride (Hydrofluoric acid)					
58-89-9	Lindane (all isomers)					
123-31-9	Hydroquinone					
78-59-1	Isophorone					
108-31-6	Maleic anhydride					
67-56-1	Methanol					
72-43-5	Methoxychlor					
74-83-9	Methyl bromide (Bromomethane)					
74-87-3	Methyl chloride (Chloromethane)					
71-55-6	Methyl chloroform (1,1,1-Trichloroethane)					
78-93-3	Methyl ethyl ketone (2-Butanone) (Removed 12/19/05. See 70 FR75047)					
60-34-4	Methylhydrazine					
74-88-4	Methyl iodide (Iodomethane)					
108-10-1	Methyl isobutyl ketone (Hexone)					
624-83-9	Methyl isocyanate					
80-62-6	Methyl methacrylate					
1634-04-4	Methyl tert-butyl ether					
101-14-4	4,4'-Methylenebis (2-chloroaniline)					
75-09-2	Methylene chloride (Dichloromethane)					
101-68-8	4,4'-Methylenediphenyl diisocyanate (MDI)					
101-77-9	4,4'-Methylenedianiline					
91-20-3	Naphthalene	3.35E-02	3.35E-02	4.22E-02	4.22E-02	0.161
98-95-3	Nitrobenzene					
92-93-3	4-Nitrophenyl					
100-02-7	4-Nitrophenol					
79-46-9	2-Nitropropane					
684-93-5	N-Nitroso-N-methylurea					
62-75-9	N-Nitrosodimethylamine					
59-89-2	N-Nitrosomorpholine					
56-38-2	Parathion					
82-68-8	Pentachloronitrobenzene (Quintobenzene)					
87-86-5	Pentachlorophenol					
108-95-2	Phenol					
106-50-3	p-Phenylenediamine					
75-44-5	Phosgene					
7803-51-2	Phosphine					
7723-14-0	Phosphorus					
85-44-9	Phthalic anhydride					
1336-36-3	Polychlorinated biphenyls (Aroclors)					
1120-71-4	1,3-Propane sultone					
57-57-8	beta-Propiolactone					
123-38-6	Propionaldehyde					
114-26-1	Propoxur (Baygon)					
78-87-5	Propylene dichloride (1,2-Dichloropropane)					
75-56-9	Propylene oxide					
75-55-8	1,2-Propylenimine (2-Methylaziridine)					
91-22-5	Quinoline					
106-51-4	Quinone (p-Benzoquinone)					
100-42-5	Styrene					
96-09-3	Styrene oxide					
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin					
79-34-5	1,1,2,2-Tetrachloroethane					
127-18-4	Tetrachloroethylene (Perchloroethylene)					
7550-45-0	Titanium tetrachloride					
108-88-3	Toluene	7.24E-02	7.24E-02	3.38E-01	3.38E-01	0.822
95-80-7	Toluene-2,4-diamine					
584-84-9	2,4-Toluene diisocyanate					
95-53-4	o-Toluidine					
8001-35-2	Toxaphene (chlorinated camphene)					
120-82-1	1,2,4-Trichlorobenzene					
79-00-5	1,1,2-Trichloroethane					

**Attachment S-1b
Total Air Toxic Emissions**

SECTION 112 HAZARDOUS AIR POLLUTANTS

CAS Number	Pollutant ¹	Unit				Total (tpy)
		M5 (tpy)	M7 (tpy)	M17 (tpy)	M19 (tpy)	
79-01-6	Trichloroethylene					
95-95-4	2,4,5-Trichlorophenol					
88-06-2	2,4,6-Trichlorophenol					
121-44-8	Trimethylamine					
1582-09-8	Trifluralin					
540-84-1	2,2,4-Trimethylpentane					
108-05-4	Vinyl acetate					
593-60-2	Vinyl bromide					
75-01-4	Vinyl chloride					
75-35-4	Vinylidene chloride (1,1-Dichloroethylene)					
1330-20-7	Xylene (mixed isomers)	4.97E-02	4.97E-02	2.32E-01	2.32E-01	0.564
95-47-6	o-Xylene					
108-38-3	m-Xylene					
106-42-3	p-Xylene					
	Antimony Compounds					
	Arsenic Compounds (inorganic including arsine)	2.83E-03	2.83E-03	1.32E-02	1.32E-02	0.032
	Beryllium Compounds	7.98E-05	7.98E-05	3.73E-04	3.73E-04	0.001
	Cadmium Compounds	1.24E-03	1.24E-03	5.78E-03	5.78E-03	0.014
	Chromium Compounds	2.83E-03	2.83E-03	1.32E-02	1.32E-02	0.032
	Cobalt Compounds					
	Coke Oven Emissions					
	Cyanide Compounds ²					
	Glycol ethers ³					
	Lead Compounds	3.61E-03	3.61E-03	1.69E-02	1.69E-02	0.041
	Manganese Compounds	2.03E-01	2.03E-01	9.52E-01	9.52E-01	2.310
	Mercury Compounds	3.09E-04	3.09E-04	1.45E-03	1.45E-03	0.004
	Fine mineral fibers ⁴					
	Nickel Compounds	1.18E-03	1.18E-03	5.54E-03	5.54E-03	0.013
	Polycyclic Organic Matter ⁵	5.46E-02	5.46E-02	4.82E-02	4.82E-02	0.206
	Radionuclides (including radon) ⁶					
	Selenium Compounds	6.44E-03	6.44E-03	3.01E-02	3.01E-02	0.073
	Total	6.65E-01	6.65E-01	2.16E+00	2.16E+00	5.67

Notes.

- For all listings above which contain the word "compounds" and for glycol ethers, the following applies. Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e. antimony, arsenic, etc.) as part of that chemical's infrastructure.
- XCN where X = H⁺ or any other group where a formal dissociation may occur. For example, KCN or Ca(CN)₂.
- Includes mono- and di-ethers of ethylene glycol, diethylene glycol, and triethylene glycol, R-(OCH₂CH₂)_n-OR' where n = 1, 2, or 3
R = alkyl or aryl groups
R' = R, H, or groups which, when removed, yield glycol ethers with the structure R-(OCH₂CH₂)_n-OH. Polymers are excluded from the glycol category.
- Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.
- Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100°C.
- A type of atom which spontaneously undergoes radioactive decay.

**Attachment S-1c
Other Regulated Pollutants**

Emissions for M17 or M19	Emissions (lb/hr)	Emissions (tpy)
Beryllium	See Attachment S-1b	
Mercury	See Attachment S-1b	
Asbestos	neg	neg
Hydrogen Sulfide	neg	neg
Halons	neg	neg
MWC Acid Gases	neg	neg
MWC Metals	neg	neg
MWC Organics	neg	neg

Emissions for M5 or M7	Emissions (lb/hr)	Emissions (tpy)
Beryllium	See Attachment S-1b	
Mercury	See Attachment S-1b	
Asbestos	neg	neg
Hydrogen Sulfide	neg	neg
Halons	neg	neg
MWC Acid Gases	neg	neg
MWC Metals	neg	neg
MWC Organics	neg	neg

Notes:

MWC = Municipal Waste Combustor

neg. = negligible

**Attachment S-1d
Pollutant Emission Rate Calculations**

Sulfur Dioxide (SO₂)

Unit	Heat Input ² (MMBtu/hr)	AP-42 Emission Factor ³ (lb/MMBtu)	CSP Application Emission Factor (lb/MMBtu)	CSP Application Emission Rate (lb/hr) ⁶
M5	58.80	0.404	0.413	24.28
M7	58.80	0.404	0.413	24.28

Nitrogen Oxides (NO_x)

Unit	Heat Input ² (MMBtu/hr)	AP-42 Emission Factor ³ (lb/MMBtu)	CSP Application Emission Factor (lb/MMBtu)	CSP Application Emission Rate (lb/hr)
M5	58.80	Not Applicable ¹	4.300	252.84
M7	58.80	Not Applicable ¹	5.700	335.16

Carbon Monoxide (CO)

Unit	Heat Input ² (MMBtu/hr)	AP-42 Emission Factor + 70% Redn ³ (lb/MMBtu)	CSP Application Emission Factor (lb/MMBtu)	CSP Application Emission Rate (lb/hr)
M5	58.80	0.26	0.403	23.72
M7	58.80	0.26	0.403	23.72

Volatile Organic Compounds (VOC)

Unit	Heat Input ² (MMBtu/hr)	AP-42 Emission Factor ⁴ (lb/MMBtu)	CSP Application Emission Factor (lb/MMBtu)	CSP Application Emission Rate (lb/hr)
M5	58.80	0.08	0.238	13.99
M7	58.80	0.08	0.238	13.99

Particulate Matter (PM/PM₁₀)

Unit	Heat Input ² (MMBtu/hr)	AP-42 Emission Factor ⁵ (lb/MMBtu)	CSP Application Emission Factor (lb/MMBtu)	CSP Application Emission Rate (lb/hr)
M5	58.80	0.0573	0.112	6.59
M7	58.80	0.0573	0.112	6.59

Notes:

1. Based on permitted emission rate. Therefore, AP-42 emission factor not needed.
2. Heat input for units M5 and M7 are from CSP No. 0067-01-C.
3. SO₂, NO_x, and CO AP-42 emission factors (uncontrolled) are from Section 3.4 dated October 1996, Table 3.4-1. A 70% reduction is applied to the CO AP-42 emission factor (uncontrolled) to account for the emission reduction required in accordance with 40 CFR Part 63 Subpart ZZZZ.
4. VOC AP-42 emission factors are based on the nonmethane fraction (91%) of TOC listed in Section 3.4, Table 3.4-1 dated 10/96.
5. PM₁₀ AP-42 emission factors from Section 3.4 dated October 1996, Table 3.4-2.
6. SO₂ emissions are calculated by mass balance based on fuel sulfur content of 0.0015%, No. 2 fuel oil heat content of 19,858 Btu/lb and all sulfur converted to SO₂.

Attachment S-1e - Example M5, M7, M17 and M19 NO_x Emissions Calculation

Month	12-Month Rolling												Running Total (Tons)
	Fuel HHV (Btu/gal)		Fuel Use (gal)		Emission Factor (lb/MMBtu)		NO _x Emissions (tons)				Total		
	M5	M7	M5	M7	M5	M7	M5	M7	M17	M19			
1	137,963	49,426	58,256	4.3	5.7	4.3	5.7	17.3	19.4	10.02	10.51	57.2	57.2
2	137,847	17,989	23,992	4.3	5.7	4.3	5.7	7.1	7.1	4.19	7.11	25.5	82.7
3	137,753	22,587	30,147	4.3	5.7	4.3	5.7	8.9	8.9	8.83	5.71	32.3	115.1
4	137,550	14,928	12,126	4.3	5.7	4.3	5.7	3.6	5.9	8.48	4.57	22.6	137.6
5	137,498	19,248	27,428	4.3	5.7	4.3	5.7	8.1	7.5	8.57	6.04	30.2	167.8
6	137,476	8,241	9,064	4.3	5.7	4.3	5.7	2.7	3.2	8.1	4.69	18.7	186.5
7	137,471	6,966	5,906	4.3	5.7	4.3	5.7	1.7	2.7	3.72	7.20	15.3	201.8
8	137,373	45,796	21,726	4.3	5.7	4.3	5.7	6.4	17.9	1.48	1.55	27.3	229.2
9	137,249	50,706	22,791	4.3	5.7	4.3	5.7	6.7	19.8	3.39	3.6	33.5	262.7
10	137,254	26,884	24,065	4.3	5.7	4.3	5.7	7.1	10.5	6.43	8.44	32.5	295.1
11	137,194	8,582	7,626	4.3	5.7	4.3	5.7	2.2	3.4	8.46	3.81	17.9	313.0
12	137,125	42,574	37,578	4.3	5.7	4.3	5.7	11.1	16.6	4.98	3.12	35.8	348.8

Notes

1. Initial M7 NO_x stack test was conducted 3/24/2005.
2. Initial M5 NO_x stack test was conducted 5/11/2005.
3. M5 and M7 NO_x emissions factors are 1.2X the initial test results.
4. M17 and M19 NO_x emissions from 2017 operating year CEMS.
5. Fuel HHV and Fuel Use are actual data from 2017 operating year, submitted to the DOH in a monitoring report dated 3/1/2018.

12-month Running NO_x Limit = 661.7

Percent of NO_x Limit Consumed = 52.7%

**Attachment S-1f
GHG Emissions Calculations**

Unit	Heat Input (MMBtu/hr)	Operating Hours (hrs/yr)	Annual Heat Input (MMBtu/yr)	GHG Pollutant ¹	Emission Factor ² (kg/MMBtu)	Maximum			Global Warming Potential ³	Total GHG Emissions	
						Hourly Emissions (kg/hr)	Annual Emissions (metric tpy)	(lb/hr)		(metric tpy)	(tpy)
M-5	58.8	8,760	515,088	CO ₂	73.96	4,349	38,096	1	9,588	38,096	41,994
				N ₂ O	6.0E-04	0.035	0.309	298	23	92	102
				CH ₄	3.0E-03	0.176	1.545	25	10	39	43
Total CO₂e = 9,620										38,227	42,138
M-7	58.8	8,760	515,088	CO ₂	73.96	4,349	38,096	1	9,588	38,096	41,994
				N ₂ O	6.0E-04	0.035	0.309	298	23	92	102
				CH ₄	3.0E-03	0.176	1.545	25	10	39	43
Total CO₂e = 9,620										38,227	42,138
M-17	275.0	8,760	2,409,000	CO ₂	73.96	20,339	178,170	1	44,840	178,170	196,398
				N ₂ O	6.0E-04	0.165	1.445	298	108	431	475
				CH ₄	3.0E-03	0.825	7.227	25	45	181	199
Total CO₂e = 44,994										178,781	197,072
M-19	275.0	8,760	2,409,000	CO ₂	73.96	20,339	178,170	1	44,840	178,170	196,398
				N ₂ O	6.0E-04	0.165	1.445	298	108	431	475
				CH ₄	3.0E-03	0.825	7.227	25	45	181	199
Total CO₂e = 44,994										178,781	197,072
Facility Total CO₂e =									434,015	478,420	

Notes:

- Greenhouse Gas (GHG) pollutants from the Mandatory Greenhouse Gas Reporting rule (40 CFR §98.32).
- Emission factors from the Mandatory Greenhouse Gas Reporting rule (40 CFR Part 98 Subpart C, Tables C-1 and C-2)
- Global Warming Potentials from the Mandatory Greenhouse Gas Reporting rule (40 CFR Part 98 Subpart A, Table A-1)

S-6: Application for a Significant Modification to a Covered Source

In providing the required information, reference the corresponding letters and numbers listed below.

Provide a minimum of two (2) sets (1 original and 1 copy) of all application materials to the Hawaii Department of Health. Also, mail one (1) set directly to EPA at the following address:

Chief (Attention: AIR-3)
Permits Office, Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

I. In accordance with Hawaii Administrative Rules (HAR) §11-60.1-104, the following information is required:

A. Equipment Specifications:

1. Maximum design capacity. Refer to the table below.
2. Fuel type.
No. 2 diesel fuel with 0.4% maximum sulfur content.
3. Fuel use. Refer to the table below.

Maximum Capacity and Fuel Use Per Unit

Unit ID	Manufacturer	Model Number	Unit Type	Nominal Output	Nominal Heat Input
M5	Cooper Bessemer	LSV-20-T	Diesel Engine	5.6 MW	58.8 MMBtu/hr
M7	Cooper Bessemer	LSV-20-T	Diesel Engine	5.6 MW	58.8 MMBtu/hr
M17	General Electric	LM2500	Combustion Turbine	20 MW	275 MMBtu/hr
M19	General Electric	LM2500	Combustion Turbine	20 MW	275 MMBtu/hr

4. Production capacity. Does not apply.
5. Production rates. Does not apply.
6. Raw materials. Does not apply.
7. Provide any manufacturer's literature. This application does not change any of Maalaea equipment's manufacturer's specifications.

B. Provide detailed descriptions of all processes and products defined by Standard Industrial Classification Code (SICC). Also, provide any reasonably anticipated alternative operating scenarios, associated processes, and products, by SICC.

Electrical power generation (SIC code 4911) is the only product or process.

Several types of alternative operating scenarios apply to the plant. The first alternative operating scenario is the ability to conduct steam blows activity per conditions specified in CSP No. 0067-01-C Attachment II Section C.7.a.1.

A second alternate scenario includes the use of a temporary replacement unit for Units M-17 and M-19, in the event of a failure or major overhaul of an installed unit. In the event that the projected down-time of the installed unit increases the likelihood of an interruption in electrical service, the installed unit would be temporarily replaced. Emissions from the temporary replacement unit will comply with the original unit's emission and operating limits.

A third alternative scenario is the ability to operate below the 25% load for maintenance and testing, provided that all emission limits and regulatory requirements of the DOH rules are met.

A fourth alternative scenario is the ability to switch fuels for Units M-17 and M-19. Should cheaper fuels become available or the supply of No. 6 fuel oil become limited, Maui Electric may propose an alternate scenario that would allow the fuel switch, provided that all emission limits and regulatory requirements of the DOH rules are met.

A fifth alternative operating scenario is the ability to operate Units M-17 and M-19 up to 110% above peak load if equipment malfunction such as a sudden loss of a unit occurs, provided conditions specified in CSP No. 0067-01-C Attachment II Section C.7.a.5 are met.

A sixth alternative operating scenario is the use of fuel additives and other products which may be used to control algae, inhibit corrosion, enhance combustion, etc. Emissions during this scenario will comply with all permit conditions.

No additional changes to operating scenarios are proposed with this application.

1. Identify and describe in detail all air pollution control equipment and compliance monitoring devices or activities planned by the owner or operator, and to the extent of available information, an estimate of emissions before and after controls. Provide all calculations and assumptions.

Sulfur emissions are controlled by limiting the fuel sulfur content to 0.4 percent. Water injection is used on M17 and M19 to limit NOx emissions to 42 ppmvd at 15 percent O₂, dry with a fuel-bound nitrogen content of 0.015 percent by weight or less. CO emissions from M5 and M7 are controlled by the Diesel Oxidation Catalyst (DOC). The DOC will reduce CO emissions by at least 70 percent or limit CO emissions to 23 ppmvd or less at 15 percent O₂. Emissions of PM, PM10, CO and VOC are controlled by combustion design and good combustion practices. Emissions of hazardous air pollutants are controlled by the use of No. 2 fuel oil and combustion system design.

Compliance monitoring devices and activities are discussed in Form C-2.

2. List all *new insignificant* activities in accordance with §11-60.1-82.

No additional changes/additions to insignificant activities are proposed with this application.

C. Maximum Operating Schedule (to the extent needed to determine or regulate emissions):

1. Total hours per day, per week, and/or per month. The planned operation is full load the majority of the time. Depending on future dispatch requirements, the plant may cycle off-line daily, or operate at reduced loads. While these expected operating levels are less than continuous, there may be times when the units must be run continuously for extended periods of time.
2. Total hours per year. Up to 8,760 hours per year.
3. If operation is seasonal or irregular, describe. Operation is not seasonal or irregular.

D. Cite and describe all applicable requirements as defined in HAR §11-60.1-81, including the following:

1. Description of or reference to any applicable test methods for determining compliance with each applicable requirement. See Form C-2.
2. Explanation of all proposed exemptions from any applicable requirements. See Forms C-1 and C-2.

E. Identify and describe current operational limitations or work practices the source plans to implement that affect emissions of any regulated or hazardous air pollutant. Provide all calculations and assumptions.

See item I.B.1. above for current work practices that affect emissions of any regulated or hazardous air pollutant.

Maui Electric requested incorporation of the applicable 40 CFR Part 63 Subpart ZZZZ RICE NESHAP requirements into the CSP in a revision to the renewal application dated August 21, 2012. On August 27, 2012, the Department of Health (DOH) approved the installation of Miratech V-CAT Diesel Oxidation Catalyst (DOC) on units M-5 and M-7, to meet carbon monoxide (CO) reduction requirement in accordance with the applicable RICE NESHAP requirements. The DOCs were installed in April (M-5) and May 2013 (M-7) and are currently in operation.

With this application, Maui Electric proposes to combine Maalaea CSP Nos. 0067-01-C and 0067-02-C, by incorporating CSP No. 0067-02-C into CSP No. 0067-01-C. Maui Electric also requests incorporation of the Greenhouse Gas Emissions Limitations into the Covered Source Permit CSP No. 0067-01-C, consistent with the Greenhouse Gas Emissions Reduction Plan submitted to the DOH on February 28, 2018. Refer to Attachment S-6a for the proposed emissions limitations, monitoring, and reporting requirements for Maui Electric's Greenhouse Gas Emission Reduction Plan.

F. Provide a detailed schedule for construction or modification of the proposed source, including any major milestones, if applicable. Not applicable.

G. Provide detailed information to define permit terms and conditions for any proposed *emissions trading* within the facility in accordance with HAR §11-60.1-96. No emissions trading is proposed.

H. For *significant* modifications which increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted, an assessment of the ambient air quality impact of the covered source or significant modification, with the inclusion of any available background air quality data. The assessment shall include all supporting data, calculations and assumptions, and a comparison with the National Ambient Air Quality Standards and State Ambient Air Quality Standards. Do not apply. The proposed modification will not increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted.

I. For *new* covered sources or *significant* modifications subject to the requirements of subchapter 7 of HAR Chapter 11-60.1, all analyses, assessments, monitoring, and other application requirements of subchapter 7. Do not apply. The proposed modification is not subject to Subchapter 7 of HAR Chapter 11-60.1.

J. Provide the following for Compliance purposes:

1. A compliance plan, Form C-1.

2. A compliance certification, Form C-2.
- II. **Submit an application fee according to the Application Fees Schedule in the Instructions for Applying for an Air Pollution Control Permit.**
 - III. **Provide other information as follows:**
 - A. As required by any applicable requirement or as requested and deemed necessary by the director to make a decision on the application.
 - B. As may be necessary to implement and enforce other applicable requirements of the Clean Air Act or of HAR Chapter 11-60.1 or to determine the applicability of such requirements.
 - IV. **The Director reserves the right to request the following information:**
 - A. A risk assessment of the air quality related impacts caused by the covered source or significant modification to the surrounding environment.
 - B. Results of source emissions testing, ambient air quality monitoring, or both.
 - C. Information on other available control technologies.
 - V. **An application shall be determined to be complete only when all of the following have been complied with:**
 - A. All information required or requested in numbers I, III, and IV has been submitted.
 - B. All documents requiring certification have been certified pursuant to HAR §11-60.1-4.
 - C. All applicable fees have been submitted.
 - D. The director has certified that the application is complete.
 - VI. **The Director shall not continue to act upon or consider an incomplete application.**
 - A. The applicant shall be notified in writing whether the application is complete:
 1. For the requirements of subchapter 7, thirty days after receipt of the application.
 2. For the requirements of HAR subchapter 5, sixty days after receipt of the application. For purposes of this paragraph, the date of receipt of an application for a new covered source or significant modification subject to the requirements of subchapter 7 shall be the date the application is determined to be complete for the requirements of subchapter 7.
 3. Unless the Director requests additional information or notifies the applicant of incompleteness within sixty days after receipt of an application pursuant to VI.A.2 above, the application shall be deemed complete for the requirements of subchapter 5.
 - B. During the processing of an application that has been determined or deemed complete, if additional information is necessary to evaluate or take final action on the application, the Director may request such information in writing and set a reasonable deadline for a response.
 - VII. **After receipt of a complete application, the Director, in writing, shall approve, conditionally approve, or deny an application within eighteen months, except as provided in HAR §11-60.1-88 and (A) and (B) below.**
 - A. Upon program approval, within nine months for an application containing an early reduction demonstration pursuant to section 112(i)(5) of the Clean Air Act.
 - B. Within twelve months for a new covered source or significant modification subject to the requirements of subchapter 7.
 - VIII. **The Director shall provide reasonable procedures and resources to complete the review of**

the majority of the applications for a significant modification within nine months after receipt of a complete application. An application for significant modification shall be approved only if the Director determines that the significant modification will be in compliance with all applicable requirements.

- IX. The Director shall provide for public notice, including the method by which a public hearing can be requested, and an opportunity for public comment on the draft significant modification to the covered source in accordance with HAR §11-60.1-99.
- X. The Director shall provide a statement that sets forth the legal and factual bases for the draft permit conditions (including references to the applicable statutory or regulatory provisions) to EPA and any other person requesting it.
- XI. Each application for a significant modification, and the proposed Covered Source Permit reflecting the significant modification shall be subject to EPA oversight in accordance with HAR §11-60.1-95.

Attachment S-6a
Proposed Attachment II-GHG: Special Conditions
Maalaea Generating Station
CSP No. 0067-01-C

**ATTACHMENT II - GHG: SPECIAL CONDITIONS
GHG REDUCTION REQUIREMENTS
COVERED SOURCE PERMIT NO. 0067-01-C**

Amended Date:

Expiration Date: July 27, 2009
(Expiration date to be revised upon permit renewal)

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. Attachment II-GHG of this permit encompasses the following equipment and associated appurtenances:

<u>Unit</u>	<u>Description</u>
M-1	2.5 MW General Motor Diesel Engine Generator, Model no. 20-645E4, 29.2 MMBtu/Hr
M-2	2.5 MW General Motor Diesel Engine Generator, Model no. 20-645E4, 29.2 MMBtu/Hr
M-3	2.5 MW General Motor Diesel Engine Generator, Model no. 20-645E4, 29.2 MMBtu/Hr
M-4	5.6 MW Cooper-Bessemer Diesel Engine Generator, Model no. LSV-20-T, 58.8 MMBtu/Hr
M-5	5.6 MW Cooper-Bessemer Diesel Engine Generator, Model no. LSV-20-T, 58.8 MMBtu/Hr
M-6	5.6 MW Cooper-Bessemer Diesel Engine Generator, Model no. LSV-20-T, 58.8 MMBtu/Hr
M-7	5.6 MW Cooper-Bessemer Diesel Engine Generator, Model no. LSV-20-T, 58.8 MMBtu/Hr
M-8	5.6 MW Colt Industries Diesel Engine Generator, Model no. C-P PC2V, 60.2 MMBtu/Hr
M-9	5.6 MW Colt Industries Diesel Engine Generator, Model no. C-P PC2V, 60.2 MMBtu/Hr
M-10	12.5 MW Mitsubishi Diesel Engine Generator, Model no. 185V52/55A, 122.7 MMBtu/Hr
M-11	12.5 MW Mitsubishi Diesel Engine Generator, Model no. 185V52/55A, 122.7 MMBtu/Hr
M-12	12.5 MW Mitsubishi Diesel Engine Generator, Model no. 185V52/55A, 122.7 MMBtu/Hr

Comment [HECO1]: Maui Electric proposes incorporation of the CSP No 0067-02-C into the CSP No 0067-01-C

	MMBtu/Hr
M-13	12.5 MW Mitsubishi Diesel Engine Generator, Model no. 185V52/55A, 122.7 MMBtu/Hr
M-14	20 MW General Electric Combustion Turbine, model no. LM2500, 275 MMBtu/Hr
M-16	20 MW General Electric Combustion Turbine, model no. LM2500, 275 MMBtu/Hr
M-17	20 MW nominal (24.66 MW Peakload) General Electric LM2500 Combustion Turbine Generator (maximum heat input: 275 MMBtu/Hr) capable of operating in simple or combined cycle mode
M-19	20 MW nominal (24.66 MW Peakload) General Electric LM2500 Combustion Turbine Generator (maximum heat input: 275 MMBtu/Hr) capable of operating in simple or combined cycle mode
X1	2.5 MW General Motors Diesel Engine Generator, Model no. 20-645E4, 28.5 MMBtu/Hr
X2	2.5 MW General Motors Diesel Engine Generator, Model no. 20-645E4, 28.5 MMBtu/Hr
SG1	600 kW General Motors/Detroit Black Start Diesel Engine Generator, Model no. 12V92TAB/8123-7416

(Auth.: HAR §11-60.1-3)

2. The equipment is subject to the GHG emission reduction requirements of HAR, Title 11 Chapter 60.1 Subchapter 11 and associated permit conditions established from review of the GHG emission reduction plan submitted by the facility and permit application for significant modification. The GHG emission reduction plan shall become a part of the covered source permit application process for renewals and any required modifications pursuant to HAR Title 11 Chapter 60.1 Subchapter 5. With each subsequent GHG reduction plan submittal, the permittee shall report:
 - a. The GHG emission reduction status;
 - b. Factors contributing to the emission changes;
 - c. Any control measure updates; and
 - d. Any new developments or changes that would affect the basis of the facility GHG emissions cap.

(Auth.: HAR §11-60.1-5, §11-60.1-204(g))

Section B. GHG Permit Conditions

1. Permit conditions specified in Attachment II - GHG, including provisions to limit GHG emissions, are state-only requirements which are not federally enforceable under the federal Clean Air Act.
(Auth.: HAR §11-60.1-3, §11-60.1-90, 11-60.1-161; 40 CFR §70.6)¹
2. The permittee shall comply with all applicable provisions of these conditions, including all emission limits, notification, testing, monitoring, and reporting requirements. The major requirements of these provisions are detailed in the special conditions of this attachment.
(Auth.: HAR §11-60.1-3, §11-60.1-90, 11-60.1-161)¹

Section C. GHG Emission Limitations

1. GHG Emission Caps
 - a. The Maalaea Generating Station shall not emit or cause to be emitted carbon dioxide equivalent (CO₂e) emissions in excess of its individual cap specified in Attachment II - GHG, Special Condition No. C.1.a of CSP No. 0548-01-C for Campbell Industrial Park Generating Station, except as specified in Attachment II - GHG, Special Condition No. C.1.c.iv. of this CSP.
 - b. The Maalaea Generating Station combined with all partnering facilities shall not emit or cause to be emitted total combined CO₂e emissions in excess of the combined limit specified in Attachment II - GHG, Special Condition No. C.1.b of CSP No. 0548-01-C for Campbell Industrial Park Generating Station.
 - c. For purposes of the CO₂e emission limits in Attachment II - GHG, Special Condition Nos. C.1.a and C.1.b:
 - i. The CO₂e emissions shall have the same meaning as that specified in HAR §11-60.1-1;
 - ii. In accordance with HAR §11-60.1-204(d)(6)(B), biogenic CO₂ emissions shall not be included when determining compliance with the emissions limit;
 - iii. The permittee shall be in compliance with the emissions limits by the end of 2019 and each calendar year thereafter;
 - iv. The Maalaea Generating Station may exceed the emissions cap specified in Attachment II - GHG, Special Condition No. C.1.a, if the GHG emissions limit specified in Attachment II - GHG, Special Condition No. C.1.b, is met; and

- v. At no time shall the Maalaea Generating Station exceed Attachment II - GHG, Special Condition Nos. C.1.a and C.1.b, simultaneously over a calendar year. For incidences when Attachment II - GHG, Special Condition Nos. C.1.a and C.1.b are exceeded simultaneously, emissions in excess of the total combined cap shall be allocated according to the following equation for compliance purposes:

$$X = XG \frac{(A - C)}{\sum_{A_i > C_i} (A_i - C_i)}$$

Where

- X = Adjusted portion in metric tons or tons of GHG emissions that are in excess of total combined cap specified in Special Condition No. C.1.b of CSP No. 0548-01-C for Campbell Industrial Park Generating Station. The equation applies to all affected facilities that do not meet the individual and total combined GHG emission caps specified in Special Condition Nos. C.1.a and C.1.b, respectively of CSP 0548-01-C for Campbell Industrial Park Generating Station
- XG = Total combined actual GHG emissions from affected facilities minus total combined GHG emissions cap. Total combined emissions cap shall be sixteen percent (16%) below the total combined baseline emission level less biogenic CO₂ emissions.
- A = Actual GHG emissions from the affected facility
- C = GHG emissions cap for the affected facility
- $\sum_{A_i > C_i} (A_i - C_i)$ = The sum of the difference between the actual emissions and cap emissions for all facilities that did not achieve the individual facility GHG emissions cap.

(Auth.: HAR §11-60.1-3, §11-60.1-90, §11-60.1-204)

2. GHG Emission Cap Revisions

- a. The facility GHG emissions cap may be re-evaluated and revised by the Department in accordance with HAR §11-60.1-204(h).
- b. Any revision to the GHG emissions caps shall be considered a significant modification subject to the application and review requirements of HAR §11-60.1-104. For each GHG emission cap revision, the Department may impose additional emission limits or requirements, or limit the time-frame allowed for the revised GHG emissions cap.

(Auth.: HAR §11-60.1-3, §11-60.1-90, §11-60.1-204)

Section D. Monitoring and Record Keeping Requirements

1. GHG Emissions

For calculating CO₂e emissions to assess fees and for determining compliance with the GHG emission caps, the permittee shall:

- a. Monitor mass emissions data for the stationary source combustion units listed in attachment II - GHG, Special Condition No. A.1 with the appropriate methods specified in 40 CFR §98.34;
- b. Estimate missing data in accordance with the applicable procedures in 40 CFR §98.35;
- c. Determine the metric tons of carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) in accordance with the appropriate calculation methodology in 40 CFR §98.33 based on company records of the fuel combusted as defined in 40 CFR §98.6;
- d. Calculate the GHG emissions, expressed in metric tons of CO₂e, using Equation A-1 of 40 CFR §98.2;
- e. Convert the metric tons of CO₂e emissions to tons (also referred to as short tons) for monitoring and annual emissions reporting as applicable. For the conversion, one metric ton is equal to 1.10231 tons; and
- f. Obtain CO₂e emissions data from all other partnering facilities to report the total combined CO₂e emissions in accordance with Attachment II - GHG Special Condition No. E.4.

(Auth.: HAR §11-60.1-3, §11-60.1-90; 40 CFR §98.2, §98.33, §98.34, §98.35, §98.6)

2. Records

All records, including support information, shall be maintained for at least five (5) years from the date of the monitoring sample, measurement, test, report, or applications. Support information includes all maintenance, inspection, and repair records, and copies of all reports required by this permit. These records shall be true, accurate, and maintained in a permanent form suitable for inspection and be made available to the Department or authorized representative(s) upon request.

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

Section E. Notification and Reporting Requirements

1. Standard Condition Reporting

Notification and reporting pertaining to the following events shall be done in accordance with Attachment I, Standard Condition Nos. 17 and 25, respectively:

- a. Emissions of air pollutants in violation of HAR, Chapter 11-60.1 or this permit (excluding technology-based emission exceedances due to emergencies); and
- b. 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, SIP §11-

60-16)²

2. Deviations

The permittee shall report in writing any CO₂e emissions exceeding the GHG Emission Cap specified in Attachment II-GHG Section C.1 to the Department of Health annually. The report shall include the magnitude of excess emissions using the equation specified in Attachment II-GHG, Special Condition No. C.1.c.v, probable cause of such deviations, and any corrective actions or preventive measures taken. Corrective actions may include a requirement for testing, or more frequent monitoring, or could trigger implementation of a corrective action plan. Reports shall be submitted within sixty (60) days following the end of each calendar period.

Except for deviation from the GHG Emission Cap, the permittee shall report in writing within five (5) working days any other deviations from permit requirements, the probable cause of such deviations, and any corrective actions or preventive measures taken. Corrective actions may include a requirement for testing, or more frequent monitoring, or could trigger implementation of a corrective action plan.

(Auth.: HAR §11-60.1-3, §11-60.1-15, §11-60.1-16, §11-60.1-90)

3. Compliance Certification

- a. During the permit term, the permittee shall submit at least annually to the Department and U.S. EPA, Region 9, the attached Compliance Certification Form pursuant to HAR, Subsection 11-60.1-86. The permittee shall indicate whether or not compliance is being met with each term or condition of this permit. The compliance certification shall include, at a minimum, the following information:
 - i. The identification of each term or condition of the permit that is the basis of the certification;
 - ii. The compliance status;
 - iii. Whether compliance was continuous or intermittent;
 - iv. The methods used for determining the compliance status of the source currently and over the reporting period;
 - v. 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;
 - vi. Brief description of any deviations including identifying as possible exceptions to compliance any periods during which compliance is required and which the excursion or exceedances as defined in 40 CFR 64 occurred; and
 - vii. Any additional information as required by the Department, including information to determine compliance.

Comment [HECO2]: Maui Electric requests annual deviation reporting requirement for any deviation from the GHG Emission Caps. Per Attachment II-GHG Section C.1 a, the caps are based on calendar year. In addition, per GHG Section C.1 c iv, individual cap may be exceeded if total emission cap in Section C.1 b is met. Based on these two conditions, deviation from GHG emissions caps cannot be determined until after all partnering facilities share their calendar year emissions at the end of January each year.

- b. The compliance certification shall be submitted within ninety (90) days after the end of each calendar year and shall be signed and dated by a responsible official.
- c. Upon the written request of the permittee, the deadline for submitting the compliance certification may be extended, if the Department determines that reasonable justification exists for the extension.

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

- 4. By August 29, 2019, and within sixty (60) days following the end of each semi-annual calendar period (January 1 – June 30 and July 1 – December 31) thereafter, the permittee shall report semi-annually to the Department, the tons of CO₂e emitted by all partnering facilities, except that biogenic CO₂ shall be excluded from the total CO₂e emissions. The report shall be signed and dated by a responsible official. The following enclosed form, or equivalent form, shall be used for reporting and shall be signed and dated by a responsible official:

Monitoring Report Form: GHG Emissions

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90)

Section F. Agency Notification

Any document (including reports) required to be submitted by this permit shall be done in accordance with Attachment I, Standard Condition No. 29.

(Auth.: HAR §11-60.1-4, §11-60.1-90)

- ¹ The citations to the 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.
- ² 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.

**MONITORING REPORT FORM
GHG EMISSIONS
COVERED SOURCE PERMIT NO. 0067-01-C
(Page 1 of 2)**

Amended Date: _____

Expiration Date: July 27, 2009
(Expiration date to be revised upon permit renewal)

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: _____

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): _____

1. Report the CO₂e emitted by Maalaea Generating Station during each reporting period for purposes of the facility's individual GHG emissions cap.
2. Submit the following information or equivalent to each partnering facility to report the CO₂e emitted by Maalaea Generating Station during each reporting period for purposes of calculating the total combined GHG emissions:

Emission Year Reporting For _____					
Reporting Period	Maalaea Generating Station Emissions (Metric Tons of CO ₂ e)			Maalaea Generating Station Emissions (Total CO ₂ e)	
	CO ₂ (Non-biogenic)	CH ₄	N ₂ O	Metric Tons	Tons
January 1 – June 30 (1 st Semi-annual Period)					
July 1 – December 31 (2 nd Semi-annual Period)					
Total Emissions →					

**MONITORING REPORT FORM
GHG EMISSIONS
COVERED SOURCE PERMIT NO. 0067-01-C
(CONTINUED, Page 2 of 2)**

Amended Date:

Expiration Date: July 27, 2009
(Expiration date to be revised upon permit renewal)

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:
(Reproduce this sheet as needed for each partnering facility)

3. Report the total combined CO₂e emitted by all partnering facilities during each reporting period for purposes of the total combined GHG emissions cap for these facilities:

Emission Year Reporting For _____					
Reporting Period	Total Combined Emissions from all partnering facilities (Metric Tons of CO ₂ e)			Total CO ₂ e Emissions	
	CO ₂ (Non-biogenic)	CH ₄	N ₂ O	Metric-tons	Tons
January 1 – June 30 (1 st Semi-annual Period)					
July 1 – December 31 (2 nd Semi-annual Period)					
Total Emissions →					

4. For incidences when the individual cap for Maalaea Generating Power Station and total combined cap for all partnering facilities is exceeded, report the emissions in excess of the total combined cap using the following equation:

$$X = XG \frac{(A-C)}{\sum_{A_i > C_i} (A_i - C_i)} = \underline{\hspace{2cm}}$$

Where:

- X = Adjusted portion in metric tons of GHG emissions that are in excess of total combined cap specified in Attachment II - GHG Special Condition No C 1.b of CSP No. 0548-01-C for Campbell Industrial Park Generating Station. The equation applies to all affected facilities that do not meet the individual and total combined GHG emission caps specified in Attachment II- GHG Special Condition Nos. C 1.a and C 1.b, respectively, of CSP No. 0548-01-C for Campbell Industrial Park Generating Station.
- XG = Total combined actual GHG emissions from affected facilities minus total combined GHG emissions cap. Total combined emissions cap shall be sixteen percent (16%) below the total combined baseline emission level less biogenic CO₂ emissions.
- A = Actual GHG emissions from the affected facility
- C = GHG emissions cap for the affected facility
- $\sum_{A_i > C_i} (A_i - C_i)$ = The sum of the difference between the actual emissions and cap emissions for all facilities that did not achieve the individual facility GHG emissions cap.

**ATTACHMENT III: ANNUAL FEE REQUIREMENTS
COVERED SOURCE PERMIT NO. 0067-01-C**

Amended Date:

Expiration Date: July 27, 2009

(Expiration Date will be revised upon permit renewal)

The following requirements for the submittal of annual fees are established pursuant to Hawaii Administrative Rules (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 one hundred and twenty (120) 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 Hawaii Administrative Rules, 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 submitted on forms furnished by the Department.
4. The annual fees and the emission data shall be mailed to:

**Clean Air Branch
Environmental Management Division
Hawaii Department of Health
2827 Waimano Home Road
Hale Ola Building, Room 130
Pearl City, HI 96782**

**COMPLIANCE CERTIFICATION FORM
COVERED SOURCE PERMIT NO. 0067-01-C
(PAGE 1 OF ___)**

Amended Date: _____

Expiration Date: July 27, 2009

(Expiration Date will be revised upon permit renewal)

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. 0067-01-C
(CONTINUED, PAGE 2 OF __)**

Amended Date:

Expiration Date: July 27, 2009

(Expiration Date will be Revised Upon Permit Renewal)

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</u>	<u>Compliance</u>
All standard conditions	All Equipment 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</u>	<u>Compliance</u>
All monitoring conditions	All Equipment listed in the permit	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
All recordkeeping conditions	All Equipment listed in the permit	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
All reporting conditions	All Equipment listed in the permit	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
All testing conditions	All Equipment listed in the permit	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
All INSIG conditions	All Equipment listed in the permit	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent

**COMPLIANCE CERTIFICATION FORM
COVERED SOURCE PERMIT NO. 0067-01-C
(CONTINUED, PAGE 2 OF ___)**

Amended Date:

Expiration Date: July 27, 2009

(Expiration Date will be Revised Upon Permit Renewal)

C. Special Conditions - Operational and Emissions Limitations

Each permit term/condition shall be identified in chronological order using attachment and section numbers (e.g., Attachment II, B.1, Attachment IIA, Special Condition No. B.1.f, etc.). Each piece of 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	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. 0067-01-C
(CONTINUED, PAGE 2 OF ___)**

Amended Date:

Expiration Date: July 27, 2009
(Expiration Date will be Revised Upon Permit Renewal)

D. Deviations

<u>Permit Term/Condition</u>	<u>Equipment / Brief Summary of Deviation</u>	<u>Deviation Period time (am/pm) & 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:	

*Identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion or exceedance as defined under 40 CFR 64 occurred.
(Make Additional Copies if Needed)

C-1: Compliance Plan

The Responsible Official shall submit a Compliance Plan as indicated in the Instructions for Applying for an Air Pollution Control Permit and at such other times as requested by the Director of Health (hereafter, Director).

Use separate sheets if necessary.

1. Compliance status with respect to all Applicable Requirements:

Will your facility be in compliance, or is your facility in compliance, with all applicable requirements in effect at the time of your permit application submittal?

YES { If YES, Complete items a and c below}

NO { If NO, complete items a-c below}

a. Identify all applicable requirement(s) for which compliance is achieved:

Refer to: 1) CSP No. 0067-01-C issued on July 28, 2004;

2) June 23, 2009 Administrative Amendment for CSP Nos. 0067-01-C;

3) January 10, 2014 Amendment to CSP No. 0067-01-C;

4) The National Ambient Air Quality Standards (NAAQS) and the State Ambient Air Quality Standards (SAAQS) are "Applicable requirement[s]" as defined in HAR 11-60.1-81¹; and

5) 40 CFR Part 63 Subpart ZZZZ, National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE NESHAP).

Provide a statement that the source is in compliance and will continue to comply with all such requirements.

The facility is in compliance and will continue to comply with the applicable requirements identified in

CSP No. 0067-01-C issued on July 28, 2004, the June 23, 2009 Administrative Amendment,

the January 10, 2014 Amendment to CSP No. 0067-01-C, and applicable RICE NESHAP requirements.

The NAAQS and SAAQS are "Applicable requirement[s]" as defined in HAR 11-60.1-81.¹

b. Identify all applicable requirement(s) for which compliance is NOT achieved:

N/A

Provide a detailed Schedule of Compliance and a description of how the source will achieve compliance with all such applicable requirements. Use separate sheets of paper, if necessary.

Description of Remedial Action

Expected Date of Completion

N/A

¹ Based on information currently available, the Maalaea Generating Station is not causing or contributing to an exceedance of the NAAQS.

- c. Identify any other applicable requirement(s) with a future date that your source is subject to. These applicable requirements may be in effect AFTER permit issuance:

<u>Applicable Requirement</u>	<u>Effective Date</u>	<u>Currently in Compliance?</u>
HAR Title 11 Chapter 60.1 Subchapter 11 – Greenhouse Gas Emissions	June 19, 2014 Compliance Date: December 31, 2019	Yes
_____	_____	_____
_____	_____	_____
_____	_____	_____

If the source is not currently in compliance, submit a Schedule of Compliance and a description of how the source will achieve compliance with all such requirements:

<u>Description of Proposed Action/Steps to Achieve Compliance</u>	<u>Expected Date of Achieving Compliance</u>
N/A	_____
_____	_____
_____	_____
_____	_____
_____	_____

Provide a statement that the source on a timely basis will meet all these applicable requirements. The source will meet any future applicable requirements on a timely basis.

If the expected date of achieving compliance will NOT meet the applicable requirement's effective date, provide a more detailed description of all remedial actions and the expected dates of completion.

<u>Description of Remedial Action and Explanation</u>	<u>Expected Date of Completion</u>
N/A	_____
_____	_____
_____	_____
_____	_____
_____	_____

2. Compliance Progress Reports:

- a. If a compliance plan is being submitted to remedy a violation, complete the following information:

Frequency of Submittal: _____ Beginning Date: _____
(less than or equal to 6 months)

b. Date(s) that the Action described in (1)(b) was achieved:

<u>Remedial Action</u>	<u>Date Achieved</u>
Not applicable.	

c. Narrative description of why any date(s) in (1) (b) was not met, and any preventive or corrective measures taken in the interim:

Not applicable.

RESPONSIBLE OFFICIAL

(as defined in HAR §11-60.1-1)

Name (Last): McNeff (First): Mathew (MI): _____

Title: Manager, Power Supply Phone: (808) 872-3245

Mailing Address: PO Box 398

City: Kahului State: HI Zip Code: 96733

Certification by Responsible Official

(pursuant to HAR §11-60.1-4)

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 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.

Name (Print/Type): Mathew McNeff

(Signature):  Date: 3/20/18

Facility Name: Maalaea Generating Station

Location: 1000 North Kihei Road, Kihei, HI 96753

Permit Number: CSP No. 0067-01-C

FOR AGENCY USE ONLY	
File/Application No.:	_____
Island:	_____
Date Received:	_____

C-2: Compliance Certification

The Responsible Official shall submit a Compliance Certification as indicated in the Instructions for Applying for an Air Pollution Control Permit and at such other times as requested by the Director of Health (hereafter, Director).

Complete as many copies of this form as necessary. Use separate sheets of paper if necessary.

RESPONSIBLE OFFICIAL

(as defined in HAR §11-60.1-1)

Name (Last): McNeff (First): Mathew (MI): _____Title: Manager, Power Supply Phone: (808) 872-3245Mailing Address: PO Box 398City: Kahului State: HI Zip Code: 96733**Certification by Responsible Official**

(pursuant to HAR §11-60.1-4)

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 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.

Name (Print/Type): Mathew McNeff(Signature):  Date: 3/26/18Facility Name: Maalaea Generating StationLocation: 1000 North Kihei Road, Kihei, HI 96753Permit Number: CSP Nos. 0067-01-C**FOR AGENCY USE ONLY**

File/Application No.: _____

Island: _____

Date Received: _____

Complete the following information for *each* applicable requirement that applies to *each* emissions unit at the source. Also include any additional information as required by the Director. The compliance certification may reference information contained in a previous compliance certification submittal to the director, provided such referenced information is certified as being current and still applicable.

1. Schedule for submission of Compliance Certifications during the term of the permit:

Frequency of Submittal: In accordance with §11-60.1-86.
 Beginning Date: In accordance with §11-60.1-86.

2. Emissions Unit No./Description:

Unit ID	Manufacturer	Capacity (Nominal)
M5 and M7	Cooper Bessemer	5.6 MW
M17 & M19	General Electric	20 MW

3. Identify the applicable requirement(s) that is/are the basis of this certification:

See Attachment C-2a.

4. Compliance status:

a. Will the emissions unit be in compliance with the identified applicable requirement(s)?

YES NO

b. If YES, will compliance be continuous or intermittent?

Continuous Intermittent

Intermittent excursions may occur, otherwise continuous compliance is expected. Refer to attachment C-2a.

c. If NO, explain.

5. Describe the methods to be used in determining compliance of the emissions unit with the applicable requirement(s), including any monitoring, recordkeeping, reporting requirements, and/or test methods:

See Attachment C-2a.

Provide a detailed description of the methods used to determine compliance: (e. g. monitoring device type and location, test method description, or parameter being recorded, frequency of recordkeeping, etc.)

See Attachment C-2a.

6. Statement of Compliance with Enhanced Monitoring and Compliance Certification Requirements.

- a. Will the emissions unit identified in this application be in compliance with applicable enhanced monitoring and compliance certification requirements?

YES

NO

- b. If YES, identify the requirements and the provisions being taken to achieve compliance:

The final Enhanced Monitoring Rule was published in the Federal Register on
October 22, 1997 (62 FR 54900). According to that final rule, the Enhanced Monitoring
Rules do not apply to the Maalaea Generating Station. The compliance certification
requirement is established by 40 CFR 70 and HAR 11-60.1.

- c. If NO, describe below which requirements will not be met:

**Attachment C-2a
Compliance Status
Maalaea Generating Station
CSP No. 0067-01-C
Issued July 28, 2004
Amended on June 23, 2009 and January 10, 2014**

**Attachment C-2a
Compliance Status
Maalaea Generating Station - CSP No. 0067-01-C
Issuance Dates: July 28, 2004
Amended on June 23, 2009 and January 10, 2014**

A. Attachment I, Standard Conditions

<u>Permit term/condition</u>	<u>Equipment(s)</u>	<u>Method</u>	<u>Compliance</u>
All standard conditions	All Equipment(s) listed in the permit	<input checked="" type="checkbox"/> monitoring <input type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" 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>Method</u>	<u>Compliance</u>
All monitoring conditions	All Equipment(s) listed in the permit	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
All recordkeeping conditions	All Equipment(s) listed in the permit	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<u>Compliance</u> <input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
All reporting conditions	All Equipment(s) listed in the permit	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<u>Compliance</u> <input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
All testing conditions	All Equipment(s) listed in the permit	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<u>Compliance</u> <input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
All INSIG conditions	All Equipment(s) listed in the permit	<input type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<u>Compliance</u> <input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent

C. Special Conditions - Operational and Emissions Limitations

<u>Permit term/condition</u>	<u>Equipment(s)</u>	<u>Method</u>	<u>Compliance</u>
40 CFR Part 60 Subpart GG (NOx limit)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.1.a (Start-up daily limit)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.1.b.1 (Start-up limit in simple cycle)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.1.b.2.a (First daily start-up limit in combined cycle)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.1.b.2.b (Second daily start-up limit in combined cycle)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.1.b.2.c (CO maximum emission limit during combined cycle start-up)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.1.c (Shut down limit)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.2 (Minimum operating load)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Intermittent

C. Special Conditions - Operational and Emissions Limitations (Continued)

<u>Permit term/condition</u>	<u>Equipment(s)</u>	<u>Method</u>	<u>Compliance</u>
Attachment II, Special Condition C.3.a (MECO shall design, install, continuously operate, and maintain a water injection system)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.3.b (Water injection operation and minimum water-to-fuel ratios)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Intermittent ¹
Attachment II, Special Condition C.4 (NO _x , SO ₂ , PM, CO, and VOC maximum emission limits)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input checked="" type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.5 (Opacity limits)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input checked="" type="checkbox"/> testing <input type="checkbox"/> none of the above	<input type="checkbox"/> Continuous <input checked="" type="checkbox"/> Intermittent ¹
Attachment II, Special Condition C.6.a (Fuel specifications and fuel sulfur limit)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input checked="" type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.6.b (Alternative fuels must be approved by DoH and all permit conditions must be met)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input type="checkbox"/> monitoring <input type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input checked="" type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.7.a.1.a (DoH must pre-approve planned steam blow operations)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input type="checkbox"/> monitoring <input type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input checked="" type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.7.a.1.b (Maximum CO emissions during steam blow operations)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent

C. Special Conditions - Operational and Emissions Limitations (Continued)

<u>Permit term/condition</u>	<u>Equipment(s)</u>	<u>Method</u>	<u>Compliance</u>
Attachment II, Special Condition C.7.a.1.c (Maximum fuel flow during steam blow operations)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.7.a.1.d (MECO shall submit to DoH time of steam blows and verification of compliance w/ related permit conditions)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.7.a.1.e (DoH may impose additional monitoring, testing, recordkeeping, and reporting requirements)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input type="checkbox"/> monitoring <input type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input checked="" type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.7.a.2 (Alt. operating scenario – temporary unit replacement)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.7.a.3 (Alt. operating scenario – low load operation)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.7.a.4 (Alt. operating scenario – fuel switching)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.7.a.5 (Alt. operating scenario – emergency load conditions)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.7.a.6 (Alt. operating scenario – fuel additives)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent

C. Special Conditions - Operational and Emissions Limitations (Continued)

<u>Permit term/condition</u>	<u>Equipment(s)</u>	<u>Method</u>	<u>Compliance</u>
Attachment II, Special Condition C.7.b (Alt. operating scenario must meet permit requirements)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle)	<input type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.8 (Maximum NO _x emission limits)	<u>Units M5 and M7</u> – 5.6 MW Cooper-Bessemer diesel engine generators, model no. LSV-20-T	<input type="checkbox"/> monitoring <input type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input checked="" type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.9 (Fuel specifications and fuel sulfur limit)	<u>Units M5 and M7</u> – 5.6 MW Cooper-Bessemer diesel engine generators, model no. LSV-20-T	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input checked="" type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.10 (Opacity limits)	<u>Units M5 and M7</u> – 5.6 MW Cooper-Bessemer diesel engine generators, model no. LSV-20-T	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input checked="" type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.11.a (Alt. operating scenario – fuel additives)	<u>Units M5 and M7</u> – 5.6 MW Cooper-Bessemer diesel engine generators, model no. LSV-20-T	<input type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.11.b (Alt. operating scenario must meet permit requirements)	<u>Units M5 and M7</u> – 5.6 MW Cooper-Bessemer diesel engine generators, model no. LSV-20-T	<input type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.12 (12-month rolling NO _x emission limit)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle) <u>Units M5 and M7</u> – 5.6 MW Cooper-Bessemer diesel engine generators, model no. LSV-20-T	<input checked="" type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input checked="" type="checkbox"/> reporting <input checked="" type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Attachment II, Special Condition C.13 (Units should be well maintained)	<u>Units M17 and M19</u> – 20 MW nominal General Electric LM2500 combustion turbine generators (combined cycle and simple cycle) <u>Units M5 and M7</u> – 5.6 MW Cooper-Bessemer diesel engine generators, model no. LSV-20-T	<input type="checkbox"/> monitoring <input checked="" type="checkbox"/> recordkeeping <input type="checkbox"/> reporting <input type="checkbox"/> testing <input type="checkbox"/> none of the above	<input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent

¹ Deviation reports are submitted in accordance with the CSP.