PERMIT APPLICATION REVIEW
COVERED SOURCE PERMIT (CSP) NO. 0255-01-C
PERMIT RENEWAL APPLICATION NO. 0255-07

Company: Covanta Honolulu Resource Recovery Venture (CHRRV)
Honolulu Program of Waste Energy Recovery (H-POWER)

Facilities: Mass-Burn Facility
Refuse-Derived Fuel (RDF) Facility

Located at: 91-174 Hanua Street, Kapolei, Oahu
UTM – 592,618 Meters East and 2,356,415 Meters North, Zone 4 (NAD-27)

Mailing Address: 91-174 Hanua Street
Kapolei, Hawaii 96707-1735

Responsible Official/Contact:	Robert A. Webster	**Contact:**	Glen Kashiwabara
Company:	H-POWER/CHRRV	**Company:**	H-POWER/CHRRV
Title:	Facility Manager	**Title:**	Environmental Compliance Engineer
Phone:	(808) 682-0201	**Phone:**	(808) 682-0273

Contact: Kelly Champion
Company: Covanta Energy
Title: Western Region Environmental Manager
Phone: 503-393-0890, Ext. 216

1. Background.

1.1 H-POWER, owned by the City and County of Honolulu, has submitted an application to renew its covered source permit to provide disposal of municipal solid waste (MSW). Equipment for the facility includes two existing 854 ton per day municipal waste combustor (MWC) boilers that burn refuse-derived fuel (RDF) and one 900 ton per day mass-burn MWC boiler that is currently being constructed onsite to burn MSW directly. For the 854 ton per day boilers, MSW is processed into RDF through shredding and size classification to remove inert material and produce a uniform waste fuel that can be combusted. The Standard Industrial Classification Code for this waste-to-energy facility is 4953 (Refuse Systems).

1.2 The burn disposal of MSW and RDF supplies steam for generating electricity. Steam from the RDF boilers drives a 58 megawatt turbine generator. Another turbine generator will be installed for the new mass-burn boiler to generate additional electricity. Electricity generated at the plant is distributed to customers by Hawaiian Electric Company. A small amount of the electricity generated by H-POWER is used onsite.

1.3 Air pollution controls are used for the MWC boilers to minimize emissions from burning MSW and RDF. Each boiler uses a spray dryer absorber and baghouse to control pollutants. The spray dryer absorbers inject a lime slurry which absorbs sulfur dioxide (SO_2) and other acid gases. The baghouses then remove the lime slurry precipitate and other particulate from the boiler exhaust stream. Additional control for the new mass-burn boiler will be from an activated carbon injection system to reduce mercury and MWC organics. The system injects activated carbon upstream of the baghouse and pollutants adsorbed by the carbon are collected on baghouse filter bags. Selective non-catalytic reduction (SNCR) and very low-NO_X (VLN) systems will also be used for the mass-burn boiler to control nitrogen dioxide (NO_2) emissions.

1.4 Cooling towers are used to dissipate heat from boiler circulation water systems and are a source of particulate and volatile organic compound (VOC) emissions. As air passes through the towers, some of the liquid is carried out of the tower as “drift droplets”. The total dissolve solids (TDS) constituent of the drift droplets causes particulate (PM) emissions. The TDS content of cooling tower recirculation water is currently limited to 57,000 ppm. The applicant requests that the limit be increased to 85,000 ppm because the TDS concentration of cooling tower recirculation water supplied from groundwater has exceeded the 57,000 ppm level specified in the current permit. A new modeling assessment has been provided for increasing the TDS concentration limit that demonstrates compliance with air quality standards for particulate. Hydrocarbons in the recirculation water supplied from ground water wells at the H-POWER facility also cause VOC emissions.

1.5. The VOC emissions from the cooling towers were found to be negligible based on laboratory analysis of the cooling tower recirculation water for VOC content. An April 29, 2011 Laboratory analysis found cooling tower source water to contain a VOC content of 0.186 ppm resulting in total VOC emissions of 0.118 pound per year for the 2-cell cooling tower and 0.424 pound per year for the 5-cell cooling tower. The laboratory method used to measure VOCs, mimics what happens to the VOCs in the operation of the cooling towers (i.e., the evaporation of the cooling tower water with release of any VOCs that may be present in the recirculation water).

1.6 The cooling towers are equipped with drift eliminators to remove droplets from the air stream before exiting the tower to reduce particulate and VOC emissions. A 5-cell induced draft cooling tower with 0.002% drift rate is currently used for the existing RDF boilers. The applicant proposes to change this unit to a 5-cell crossflow mechanical draft cooling tower with 0.001% drift rate. Also, for the mass-burn boiler, H-POWER constructed a 2-cell induced draft cooling tower with 0.0005% drift rate instead of a 3-cell induced draft cooling tower with 0.0005% drift rate that was originally proposed for the facility expansion.

1.7 For the RDF boilers, MSW is received by truck in the receiving area and transferred into the MSW feed and storage building where the MSW undergoes shredding and size classification, including metals separation, to convert the MSW into RDF. After MSW is processed into RDF, it is transferred to the RDF storage building. Other material from the waste stream is recycled off-site. Ventilation air from the primary shredding process inside the building is controlled by two primary baghouses. Ventilation air from secondary shredding and metal separation processes is controlled by two secondary baghouses. All baghouses are located on top of the MSW feed and storage building. The MSW feed and storage building and RDF storage building are equipped with twelve (12) total combined roof vents to prevent the build-up of motor vehicle exhaust. Replaceable filter elements are installed upstream of each exhaust vent to control particulate.

1.8 For the mass-burn boiler, MSW will be unloaded from trucks into a waste pit inside the tipping building. Multiple tipping bays will allow simultaneous discharge of waste from multiple vehicles. A shredder will be located on the tipping floor level for reducing the size of bulky items (e.g., mattresses, carpeting, construction and demolition material, etc.) and will discharge shredded material into the pit. All the MSW will be stored inside a fully enclosed tipping hall/refuse pit prior to combustion. The mass-burn boiler will be designed to draw combustion air from above the storage pit. Negative pressure in the tipping building will prevent the escape of dust and odor. When the entrance doors are closed during non-delivery hours, combustion air will be admitted to the tipping area from outside the building through manually operated louvers in the building walls. Roof vents are not required to prevent exhaust build-up for buildings where MSW is handled for the mass-burn boiler because air from these buildings will be drawn into the combustion chamber of the mass-burn boiler.

1.9 The two 854 ton per day RDF MWC boilers are permitted to burn RDF, fuel oil No. 2, supplemental waste, and specification used oil. Each boiler is equipped with four oil-fired auxiliary burners for operating the units during warm-ups, start-ups, and shut-downs and to maintain furnace temperatures when sustained low-Btu wastes are encountered. . The initial Title V permit application for the RDF MWC boilers indicates maximum auxiliary fuel consumption for each boiler is 1,984 gallons per hour. The maximum fuel consumption correlates to a total combined auxiliary fuel burning capacity for each boiler of 278 MMBtu/hr based on a 140,000 Btu/gallon heating value for fuel oil No. 2. Auxiliary fuels for the existing boilers are fuel oil No. 2, used cooking oil as a supplemental waste, and specification used oil as a supplemental waste. The following fuel limits are specified for the RDF boilers:

a. Each boiler shall be fired only on RDF, fuel oil No. 2, and supplemental waste.
b. The maximum sulfur content of fuel oil No. 2 auxiliary fuel fired by the RDF MWC boilers shall not exceed 0.5% by weight.
c. The RDF MWC boilers shall only be fired on fuel oil No. 2 auxiliary fuel during warm-up periods.
d. The RDF MWC boilers shall only be fired on fuel oil No. 2 auxiliary fuel and RDF during start-up and shut-down periods.
e. The RDF MWC boilers may be fired on specification used oil and used cooking oil auxiliary fuels when combusting RDF.
f. The total combined firing rate of fuel oil No. 2, specification used oil, and used cooking oil auxiliary fuels for each RDF MWC boiler shall not exceed 1,770 gallons per hour.
g. The total combined specification used oil auxiliary fuel fired by the RDF MWC boilers shall not exceed 430,000 gallons in any rolling twelve (12) month period. This condition will be removed as requested by the applicant because maximum potential emissions are based on the emission limits and emission factors for firing RDF as worst-case scenario.
h. The total combined fuel oil No. 2, specification used oil, and used cooking oil consumption for each RDF MWC boiler shall not exceed 1,738,500 gallons in any rolling twelve-month (12-month) period. This condition will be removed because 40 Code of Federal Regulations (CFR) Part 60, Subpart Db is not applicable to the RDF boilers due to a revision to the regulation in 2006. Therefore, a total combined fuel limit for firing oil is not necessary to lower the annual capacity factor for each boiler to below 10%. If the boilers were subject to Subpart Db, limiting the annual capacity factor for each boiler below 10% for firing oil would prevent the applicability of a NO_X emissions limit specified in Subpart Db. See Paragraph 2.11 of this permit application review for additional information.

1.10 The 900 ton per day mass-burn boiler is permitted to burn MSW, fuel oil No. 2, and supplemental waste. The boiler will be equipped with two oil-fired auxiliary burners for operating the unit during warm-ups, start-ups, and shut-downs and to maintain furnace temperatures when sustained low-Btu wastes are encountered. Each auxiliary burner is rated at 90 MMBtu/hr. Auxiliary fuels for the boiler are fuel oil No. 2 with maximum sulfur content not to exceed 0.05% by weight and used cooking oil as a supplemental waste. The following fuel limits are specified for the mass-burn boiler:

a. The mass-burn MWC boiler shall be fired only on municipal solid waste (MSW), fuel oil No. 2, and supplemental waste.
b. The maximum sulfur content of fuel oil No. 2 auxiliary fuel fired by the mass-burn MWC boiler shall not to exceed 0.05% by weight.
c. The mass-burn MWC boiler shall only be fired on fuel oil No. 2 auxiliary fuel during warm-up periods.
d. The mass-burn MWC boiler shall only be fired on fuel oil No. 2 auxiliary fuel and MSW during start-up and shut-down periods.
e. The mass-burn MWC boiler may be fired on used cooking oil auxiliary fuel when combusting MSW. This condition will be changed to add used specification used oil as another auxiliary fuel allowed for the mass-burn boiler.
f. The total combined firing rate for the mass-burn MWC boiler shall not exceed 1,200 gallons per hour of fuel oil No. 2 and used cooking oil auxiliary fuels. This fuel limit will be removed because the condition is not necessary because the total combined rated capacity for the boiler's two auxiliary fuel burners is 180 MMB/hr which is below 250 MMBtu/hr. Therefore, a fuel limit is not required to prevent the boiler from being subject to 40 Code of Federal Regulations (CFR) Part 60, Subpart D and Subpart Da. As such, this condition will be removed from the permit.
g. The total combined fuel oil No. 2 and used cooking oil auxiliary fuel consumption for the mass-burn MWC boiler shall not exceed 869,250 gallons in any rolling twelve-month (12-month) period. This fuel limit it not necessary to prevent the mass-burn boiler from being subject to 40 CFR Part 60, Subpart Db because the mass-burn boiler is subject to 40 CFR Part 60, Subpart Eb. As such, this condition will be removed from the permit. See Paragraph 2.12 for additional information.

1.11 The combustion process generates two ash streams (bottom ash and fly ash) that are combined into one ash stream that leaves the facility. Available literature indicates that bottom ash accounts for 75-80% of the combined ash stream. Also, approximately 90% of bottom ash stream consists of grate ash which is the ash fraction that remains on the stoker or grate at the completion of the combustion cycle. Fly ash accounts for approximately 10-15% of the total ash stream.

1.12 The bottom ash handling system involves ash dischargers that receive ash and cool the ash in quench baths. From the quench chamber, a hydraulic arm pushes the ash up an inclined draining/drying chute where an electromagnetic vibrator mounted on the chute vibrates the ash. The bottom ash, containing moisture to prevent dust, is transferred by conveyor to a grizzly scalper to remove large material before being transferred by enclosed belt conveyor to the processing building. Inside the ash building, the bottom ash is directed past a drum magnet to remove ferrous material and then discharged onto a spreader feeder that passes an eddy current separator to remove non-ferrous materials. The bottom ash is deposited into load-out trailers. Metal extracted from the bottom ash stream is deposited into a separate container.

1.13 The fly ash handling system collects ash from the convection pass, superheater, economizer, and air pollution control system (spray dryer absorbers and baghouses). Fly ash is collected on conveyors and discharged to a surge bin inside the ash storage building. The surge bin feeds an ash conditioner with water to control dust. The wetted stream, consisting of spent dry scrubber reagent and fly ash, is blended with bottom ash and conveyed to the load-out trailers. The combined ash and recovered metal is disposed of in a landfill or recycled, as appropriate.

1.14 The applicant requested that separate covered source permits be processed for the mass-burn and RDF facilities. Pursuant to the applicant's request, the RDF facility will be permitted under Covered Source Permit No. 0255-01-C and the mass-burn facility will be permitted under Covered Source Permit No. 0255-02-C.

1.15 The applicant requested a change to the alternate operating scenario for allowing the mass-burn boiler to be fired on whole tires as a supplemental waste. As indicated by the applicant, tires do no require shredding because the mass-burn boiler has the capacity to burn whole tires. H-POWER, though, would need to review the feasibility of burning whole tires with the RDF boilers.

1.16 Pictures from an October 11, 2010 site inspection of the H-POWER facility are shown in Enclosure (1).

1.17 Equipment for the mass-burn facility is listed as follows:

MASS-BURN FACILITY				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Capacity**
mass-burn waterwall MWC boiler with VLN system	Martin	not available	not available	900 ton per day 445.3 MMBtu/hr
spray dryer absorber servicing mass-burn MWC boiler	Martin	not available	not available	3,300 lb/hr maximum $Ca(OH_2)$ injection 40 gpm reagent flow rate
baghouse servicing mass- burn MWC boiler	not available	not available	not available	8 modules and 361 bags per module with 9,073 ft^2 filter cloth area per module
SNCR System servicing mass-burn MWC boiler	not available	not available	not available	70.1 gpm aqueous ammonia (19.2% NH_3) flow rate with six (6) injection nozzles with each nozzle designed to provide 11.7 gph aqueous ammonia
carbon injection system servicing mass-burn MWC	not available	not available	not available	10 lb/hr - 112.5 lb/hr activated carbon feed rate
2-cell induced draft counter flow cooling tower	Midwest Cooling Towers	CLT4242-3005-2	not available	29,000 gpm recirculation water with 0.0005% drift rate

1.18 Equipment for the RDF facility includes the following:

RDF FACILITY				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Capacity**
RDF MWC boiler (see note a)	Combustion Engineering	VU-40	28185-01	854 ton/day 370 MMBtu/hr
RDF MWC boiler (see note b)	Combustion Engineering	VU-40	28185-02	854 ton/day 370 MMBtu/hr
spray dryer absorber servicing one of two RDF combustors	Combustion Engineering	C-E ESD	85187-01	189,500 acfm
spray dryer absorber servicing one of two RDF combustors	Combustion Engineering	C-E ESD	85187-02	189,500 acfm
baghouse servicing one of two RDF combustors (see note c)	SPE-Amerex	RA-35-180-D12	1921-01	8-10 modules 175-200 bags/module
baghouse servicing one of two RDF combustors	SPE-Amerex	RA-35-180-D13	1921-02	8-10 modules 175-200 bags/module
baghouse servicing one of two primary shredders	Ray-Jet Fabric Filter	696-8-SWIP	990467-01P	4,500 acfm
baghouse servicing two primary shredders	Ray-Jet Fabric Filter	696-8-SWIP	990467-01P	4,500 acfm
baghouse servicing two secondary shredders	Ray-Jet Fabric Filter	61214-20	990467-01S	40,000 acfm
baghouse servicing two secondary shredders	Ray-Jet Fabric Filter	61214-20	990467-01S	40,000 acfm
twelve roof vents at RDF processing building with electric fan filter	---------------	---------------	---------------	---------------
existing 5-cell induced draft cross flow cooling tower	Lilie Hoffman	---------------	990467-01S	50,500 gpm recirculation water with 0.002% drift rate
new 5-cell cross flow mechanical draft cooling tower replacement	SPX Cooling Technologies	---------------		52,000 gpm recirculation water with 0.001% drift rate

a: National Board number is 23608
b: National Board number is 23609

2. Applicable Requirements.

2.1 Hawaii Administrative Rules (HAR)
Chapter 11-59, Ambient Air Quality Standards
Chapter 11-60.1, Subchapter 1, General Requirements
Chapter 11-60.1, Subchapter 2, General Prohibitions

11-60.1-31, Applicability
11-60.1-32, Visible emissions
11-60.1-38, Sulfur Oxides from Fuel Combustion
11-60.1-39, Storage of Volatile Organic Compounds
Chapter 11-60.1, Subchapter 5, Covered Sources
Chapter 11-60.1, Subchapter 6, Fees for Covered Sources, Noncovered Sources, and Agricultural Burning
11-60.1-111, Definitions
11-60.1-112, General fee Provisions for Covered Sources
11-60.1-113, Application Fees for Covered Sources
11-60.1-114, Annual fees for Covered Sources
Chapter 11-60.1, Subchapter 7, Prevention of Significant Deterioration Review
Chapter 11-60.1, Subchapter 8, Standards of Performance for Stationary Sources
11-60.1-161, New Source Performance Standards
Chapter 11-60.1, Subchapter 9, Hazardous Air Pollutant Sources
Subchapter 10 – Field Citations

2.2 40 CFR Part 52, §52.21, Prevention of Significant Deterioration (PSD) of Air Quality is applicable based on previous PSD permits for the H-POWER facility. PSD permit HI 84-01 is for the two (2) RDF boilers, waste processing facility, and 5-cell cooling tower. PSD permit 0255-01-C, under application No. 0255-05, is for the facility expansion to add the mass-burn boiler and 2-cell cooling tower. See Paragraphs 2.31.1 through 2.31.10 of this permit application review for the PSD reviews.

2.3 40 CFR Part 58, Ambient Air Quality Surveillance applies to post-construction ambient air quality monitoring is applicable to the mass-burn facility expansion.

2.4 Post-construction ambient air quality monitoring has been completed for the two (2) RDF boilers. Therefore, 40 CFR Part 58 does not apply to the existing facility.

2.5 40 CFR Part 60, New Source Performance Standards (NSPS), Subpart A, General Provisions is applicable because the three (3) MWC boilers are subject to NSPS provisions.

2.6 40 CFR Part 60, NSPS, Subpart Cb, Emissions Guidelines and Compliance Times for Large Municipal Waste Combustors That are Constructed on or Before September 20, 1994 is applicable to the two (2) RDF boilers because these units were constructed prior to September 20, 1994. The following emission limits are specified in 40 CFR Part 60, Subpart Cb for the two (2) existing RDF spreader stoker boilers:

RDF MWC Boiler, 40 CFR Part 60, Subpart Cb Limits	
Pollutant/Parameter	Flue Gas Concentration @ 7% O_2 dry gas basis, except for opacity
CO	200 ppmdv (24-hr block average)
NO_X	250 ppmdv (24-hr daily arithmetic average)
SO_2	29 ppmdv or at least 75% reduction (24-hr daily geometric mean)
PM	25 mg/dscm
Lead (elemental)	400 ug/dscm
Cadmium	35 ug/dscm
Mercury	50 ug/dscm or at least 85% reduction
Hydrogen Chloride	29 ppmdv or at least 95% reduction
Dioxin/Furans	30 ng/dscm
Opacity	10%

2.7 40 CFR Part 60, NSPS, Subpart Cb is not applicable to the mass-burn boiler because the combustor will be constructed after September 20, 1994. Construction of the mass-burn boiler will be completed in 2012.

2.8 40 CFR Part 60, NSPS, Subpart Ce, Emission Guidelines and Compliance Times for Hospital/Medical/Infectious waste is not applicable to the mass-burn and RDF boilers because the combustors are not hospital/medical/infectious waste incinerators.

2.9 40 CFR Part 60, NSPS, Subpart D, Standards of Performance for Fossil-Fuel-Fired Steam Generators for Which Construction is Commenced After August 17, 1971, does not apply to either the mass-burn or RDF boilers. Subpart D applies to units with a fossil fuel heat input rate greater than 250 MMBtu/hr. Fossil fuel for each of the two RDF boilers is limited to 1,770 gallons per hour (about 247.8 MMBtu/hr). The fuel limit for each RDF boiler ensures that the fossil fuel firing rate for each unit is below 250 MMBtu/hr. The total combined firing rate for auxiliary fuel burners of the mass-burn boiler is 180 MMBtu/hr which is below the Subpart D fossil fuel input rate threshold.

2.10 40 CFR Part 60, NSPS, Subpart Da, Standards of Performance for Fossil-Fuel-Fired Steam Generating Units for Which Construction is Commenced After September 18, 1978, is not applicable to either the mass-burn or RDF boilers. Subpart Da applies to units with a fossil fuel heat input rate greater than 250 MMBtu/hr. An total combined auxiliary fuel oil, specification used oil, and used cooking oil limit of 1,770 gallons/hr was applied to ensure the fossil fuel firing rate for each RDF boiler is below 250 MMBtu/hr. The total combined firing rate for auxiliary fuel burners of the mass-burn boiler is 180 MMBtu/hr which is below the Subpart Da fossil fuel input rate threshold.

2.11 40 CFR Part 60, NSPS, Subpart Db, Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units is applicable to the two RDF boilers. Pursuant to 40 CFR Part 60 §60.40b(k), any affected facility that meets the applicability requirements and is subject to an EPA approved State or Federal section 111(d)/129 plan implementing Subpart Cb is not covered by Subpart Db of 40 CFR Part 60.

2.12 40 CFR Part 60, NSPS, Subpart Db is not applicable to the mass-burn boiler because the combustor is subject to 40 CFR Part 60, Subpart Eb. Pursuant to 40 CFR §60.40b(h), any facility that meets the requirements of Subpart Eb is not covered by Subpart Db.

2.13 40 CFR Part 60, NSPS Subpart E, Standards of Performance for Incinerators is not applicable to the either the mass-burn or RDF boilers because the combustors are subject to 40 CFR Part 60, Subparts Eb and Cb. Pursuant to 40 CFR §60.50(c), any facility covered by 40 CFR Part 60, Subparts Cb and/or Eb is not covered by 40 CFR Part 60, Subpart E.

2.14 40 CFR Part 60, NSPS, Subpart Ea, Standards of Performance for Municipal Waste Combustors for Which Construction is Commenced After December 20, 1989, and on or Before September 20, 1994, does not apply to the mass-burn and RDF boilers because the construction dates for the combustors is outside the time range covered by the regulation.

2.15 40 CFR Part 60, NSPS Subpart Eb, Standards of Performance for Large Municipal Waste Combustors for Which Construction is Commenced After September 20, 1994, or for Which Modification or Reconstruction is Commenced After June 19, 1996, is applicable to the mass-burn boiler because the combustor's capacity is greater than 250 tons per day municipal solid waste and the unit will be constructed after September 20, 1994. Subpart Eb emission limits for affected facilities constructed after December 19, 2005 will apply to the mass-burn boiler. Emissions limits for the mass-burn boiler, as specified in 40 CFR Part 60, Subpart Eb, are listed as follows:

Mass Burn MWC Boiler, 40 CFR Part 60, Subpart Eb Limits	
Pollutant/Parameter	Flue Gas Concentration @ 7% O_2 dry gas basis, except for opacity
CO	100 ppmdv (4-hr block arithmetic average)
NO_X	180 ppmdv for first year of operation (24-hr daily arithmetic average) 150 ppmdv after the first year of operation (24-hr daily arithmetic average)
SO_2	30 ppmdv or at least 80% reduction (24-hr daily arithmetic average)
PM	20 mg/dscm
Lead (elemental)	140 ug/dscm
Cadmium	10 ug/dscm
Mercury	50 ug/dscm or at least 85% reduction
Hydrogen Chloride	25 ppmdv or at least 95% reduction
Dioxin/Furans	13 ng/dscm
Opacity	10%

2.16 Emission limits from 40 CFR Part 60, NSPS, Subpart Eb are not applicable to the RDF boilers because the combustors were constructed prior to September 20, 1994, and were not modified or reconstructed after June 19, 1996. However, in various sections of 40 CFR Part 60, Subpart Cb, it is specified that requirements must be at least as protective or meet those requirements listed in 40 CFR Part 60, Subpart Eb (e.g., fugitive ash emissions, compliance and performance testing, and reporting and recordkeeping). Therefore, Subpart Eb is applicable to the RDF boilers as referenced by Subpart Cb.

2.17 40 CFR Part 60, NSPS, Subpart CCCC, Standards of Performance for Commercial and Industrial Solid Waste Incineration Units for Which Construction Is Commenced After November 30, 1999 or for Which Modification or Reconstruction Is Commenced After June 1, 2001, is not applicable to the mass-burn or RDF boilers. Pursuant to 40 CFR §60.2020(c), municipal waste combustion units that are regulated under Subparts Eb and Cb of 40 CFR Part 60 are exempt from Subpart CCCC.

2.18 40 CFR Part 60, NSPS, Subpart DDDD, Emission Guidelines and Compliance Times for Commercial and Industrial Solid Waste Incineration Units that Commence Construction On or Before November 30, 1999 is not applicable to the mass-burn and RDF boilers. The regulation is not applicable to the mass-burn boiler because the unit will be constructed after 1999. The regulation is also not applicable to the RDF boilers. Pursuant to 40 CFR §60.2555 (c), municipal waste combustion units that are regulated under Subparts Eb and Cb of 40 CFR Part 60 are exempt from Subpart DDDD.

2.19 40 CFR Part 60, NSPS, Subpart EEEE, Standards of Performance for Other Solid Waste Incineration Units for Which Construction is Commenced After December 9, 2004, or for Which Modification or Reconstruction is Commenced on or after June 16, 2006, is not applicable to the mass-burn or RDF boilers. The regulation is not applicable to the RDF boilers because the units were constructed prior to December 9, 2004. The regulation is not applicable to the mass-burn boiler because the unit is subject to 40 CFR Part 60, Subpart Eb and is exempt from Subpart EEEE pursuant to 40 CFR §60.2887(m).

2.20 40 CFR Part 60, NSPS, Subpart FFFF, Emission Guidelines and Compliance Times for Other Solid Waste Incineration Units That Commenced Construction On or Before December 9, 2004 is not applicable to the mass-burn or RDF boilers. The regulation is not applicable to mass-burn boiler because the unit will be constructed after to December 9, 2004. The regulation is not applicable to the RDF boilers because the units are subject to 40 CFR Part 60, Subparts Cb and Eb and are exempt pursuant to 40 CFR §60.2993(m).

2.21 40 CFR Part 60, NSPS, Subpart LLLL, Standards of Performance for New Sewage Sludge Incineration Units is not applicable to the mass-burn or RDF boilers because the units are not permitted to combust sewage sludge wastes.

2.22 40 CFR Part 60, NSPS, Subpart MMMM, Emission Guidelines and Compliance Times for Existing Sewage Sludge Incineration Units is not applicable to the mass-burn or RDF boilers because the units are not permitted to combust sewage sludge wastes.

2.23 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants (NESHAP), Subpart C - National Emission Standard for Beryllium is not applicable to either the mass-burn or RDF boilers because the combustors will not burn beryllium-containing wastes as defined in 40 CFR, Part 61, Subpart C.

2.24 40 CFR Part 61, NESHAP, Subpart E, National Emission Standard for Mercury is not applicable because the existing RDF boilers and new mass-burn boiler are not permitted to combust sewage sludge wastes.

2.25 40 CFR Part 62, Subpart FFF is applicable to the two (2) RDF boilers because the boilers were constructed on or before September 20, 1994, both boilers have a capacity to combust greater than 250 tons per day of MSW, and the combustors are not regulated by an EPA approved and currently effective State plan.

2.26 40 CFR Part 62, Subpart FFF is not applicable to the mass-burn boiler because this unit will be constructed after September 20, 1994.

2.27 40 CFR Part 63, NESHAP, Subpart Q, National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers is not applicable to the cooling towers because the units are not operated with chromium-base water treatment chemicals.

2.28 40 CFR Part 63, NESHAP, Subpart EEE, National Emission Standards for Hazardous from Hazardous Waste Combustors is not applicable to the mass-burn and RDF boilers because the units are not permitted to burn hazardous waste.

2.29 40 CFR Part 63, Subpart DDDDD, NESHAP for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters is not applicable to the mass-burn and RDF boilers, because the combustors are an affected source under Section 129 of the Clean Air Act. The mass-burn boiler is subject 40 CFR Part 60, Subpart Eb. The two (2) RDF boilers are subject to 40 CFR Part 60, Subparts Cb and Eb.

2.30 40 CFR Part 63, NESHAP, Subpart JJJJJJ, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources is not applicable to the mass-burn and RDF boilers. Pursuant to 40 CFR §63.11195, any boiler specifically listed as an affected source in another standard established under Section 129 of the Clean Air Act are not subject to Subpart JJJJJJ of 40 CFR Part 63.

2.31.1 For the existing facility with two (2) RDF boilers, 5-cell cooling tower, and waste processing and storage facility, PSD review was required for CO, NO_X, SO_2, PM, VOC, fluorides, beryllium, lead, and mercury which exceeded significant emission levels. The following control technologies were determined to meet BACT requirements pursuant to PSD permit HI 84-01 issued on November 12, 1987:

a. Good combustion control and furnace operating practices to minimize CO and VOC emissions from each RDF boiler.
b. Spray dryer absorbers with lime injection for each RDF boiler (control technology reduces SO_2, fluorides, H_2SO_4, MWC acid gases (SO_2 and HCl), and MWC organics;
c. Electrostatic precipitators (ESPs) for each RDF boiler which have since been upgraded to baghouses for the removal of PM that includes metal (e.g., mercury adsorbed by soot particles in exhaust stream, beryllium, lead, and acid precipitates from the spray dryer absorber);
d. Type 44 AAF filter elements installed upstream of the exhaust fans for MSW processing building vents; and
e. Baghouses to control PM from the waste processing facility.

2.31.2 The following emission limits were established as BACT for each RDF boiler and specified in PSD permit HI 84-01 for normal operation (operation other than warm-up, start-up, shut-down, and malfunction):

Pollutant	BACT Emission Limit @ 12% O_2 Dry Gas Basis	Time Weighted Average	Compliance Method
CO	377 ppmdv or 300 lb/hr	3-hour average	EPA Method 10
NO_X	260 ppmdv or 340 lb/hr	3-hour average	CEMS[1] and EPA Method 7
SO_2	30 ppmdv 70 ppmdv	24-hour period 8-hour period	CEMS[1] and EPA Method 8
PM	24 lb/hr or 0.015 gr/dscf		EPA Method 5
VOC	21 ppmdv or 18 lb/hr		EPA Methods 18 and 25A
Fluorides	0.036 lb/ton-RDF or 2.6 lb/hr		EPA Method 13B
Beryllium	0.000013 lb/ton-RDF or 0.0009 lb/hr		EPA Method 103
Lead	0.0028 lb/ton-RDF or 0.20 lb/hr		EPA Method 12
Mercury	0.0022 lb/ton-RDF or 0.16 lb/hr		EPA Method 101

1. CEMS – Continuous Emission Monitoring System

2.31.3 The table below lists the BACT emission limit for SO_2 for each RDF boiler during start-up periods. Continuous emission monitoring systems (CEMSs) for NO_X, SO_2, CO, and oxygen gas (O_2) continuously operate during warm-up, start-up, shut-down, and normal operation. Use of a continuous emissions monitoring system (CERMS) in conjunction with the CEMSs will provide a means to determine compliance with the SO_2 emissions limit. Each start-up period is limited to three (3) hours.

Pollutant	Basis[1]	Limit	
		(lb/hr)	lbs/start-up
SO_2	PSD Permit 84-01	63	189

1: Procedures specified in Appendix F to 40 Code of Federal Regulations (CFR), Part 75 Paragraph 3.3.4 (minimum concentration of 5.0% for CO_2 and 14% for O_2) apply to the emission limits.

2.31.4 The following table summarizes Subpart Cb emission limits, BACT emission limits, permit emission limits, and explanations for selecting permit emission limits for each RDF boiler under normal operation (operation other than warm-up start-up, shut-down, and malfunction):

Pollutant		Subpart Cb Limit[1,2]	BACT Limit[1,2]	Permit Limit[1,2]	Reason for Permit Limit
SO_2	24-hour[3,6]	29 ppmdv	30 ppmdv	29 ppmdv	Subpart Cb emission limit is more stringent than BACT emission limit
	8-hour[4]	----------	70 ppmdv	70 ppmdv	Proposed as BACT from PSD permit number HI 84-01
PM		25 mg/dscm	24 lb/hr or 0.015 gr/dscf	25 mg/dscm	Subpart Cb emission limit is more stringent than BACT emission limit
NO_X	24-hour[5]	250 ppmdv	----------	250 ppmdv	Subpart Cb requirement
	3-hour	----------	260 ppmdv	----------	BACT emissions limit from PSD permit number HI 84-01
CO	24-hour[5]	200 ppmdv	----------	200 ppmdv	Subpart Cb emission limit is more stringent than BACT emission limit
	3-hour	----------	377 ppmdv	----------	BACT emissions limit from PSD permit number HI 84-01
VOC		----------	21 ppmdv	21 ppmdv	Proposed as BACT from PSD permit HI 84-01
Cadmium		35 ug/dscm	----------	35 ug/dscm	Subpart Cb requirement
Beryllium		----------	0.0009 lb/hr	0.0009 lb/hr	BACT requirement
Lead		400 ug/dscm	0.20 lb/hr	400 ug/dscm	Subpart Cb emission limit is more stringent than BACT emission limit
Mercury[7]		50 ug/dscm	0.16 lb/hr	50 ug/dscm	Subpart Cb emission limit is more stringent than BACT emission limit
Fluorides (as HF)		----------	2.6 lb/hr	2.6 lb/hr	Proposed as BACT from PSD permit HI 84-01
HCl[8]		29 ppmdv	----------	29 ppmdv	Subpart Cb requirement
Dioxin/Furans		30 ng/dscm	----------	30 ng/dscm	Subpart Cb requirement

1. Emission limits shall not be exceeded for each RDF boiler, except for warm-up, start-up, shut-down, and malfunction.
2. All emission limits are referenced as 7% O_2, dry gas basis.
3. 24-hour daily geometric average.
4. 8-hour block geometric average.
5. 24-hour daily arithmetic average.
6. Maximum emissions limit indicated,or at least 75% reduction by weight or volume (whichever is less stringent).
7. Maximum emissions limit indicated, or at least 85% reduction by weight (whichever is less stringent).
8. Maximum emissions limit indicated, or at least 95% reduction by weight or volume (whichever is less stringent).

2.31.5 For the facility expansion to add the mass-burn boiler and 2-cell cooling tower, PSD review was required for CO, NO_X, SO_2, PM, PM_{10}, $PM_{2.5}$, fluorides, sulfuric acid mist (H_2SO_4), MWC acid gases (measured as SO_2 and hydrogen chloride [HCl]), MWC metals (measured as PM), and MWC organics (dioxins and furans) that exceeded significant emission levels. The following control technologies were determined to meet BACT requirements for the mass-burn boiler:

a. Good combustion control and furnace operating practices to minimize CO emissions and dioxin/furan formation;
b. Covanta VLN system and SNCR for controlling NO_X emissions;
c. Powdered activated carbon injection for controlling mercury and MWC organics;
d. Spray dryer absorber with lime injection to control SO_2, H_2SO_4, fluorides, MWC acid gases (SO_2 and HCL), and MWC organics; and
e. Baghouse to remove particulate matter (PM, PM_{10}, and $PM_{2.5}$), particulate bound-SO_2, metals, H_2SO_4, fluorides, MWC acid gases, and MWC organics.

2.31.6 The table below lists BACT emission limits for operating the mass-burn boiler during warm-up periods. The emission limits were based on AP-42, Section 1.3 (9/98) emission factors and maximum boiler auxiliary fuel burning capacity. The SO_2 emission rate was based on a mass-balance calculation using 0.05% by weight fuel sulfur content, a 1,200 gallon per hour maximum fuel consumption, and a 7.05 lb/gal fuel density for fuel oil No. 2. Use of a continuous emissions rate monitoring system (CERMS) in conjunction with the CEMSs provide a means to determine compliance with the emission limits. Each warm-up period is limited to twelve (12) hours.

Pollutant	**Basis**	**Limit**	
		(lb/hr)	**lbs/warm-up period**
SO_2	fuel sulfur content and mass balance	8.5	102
CO	AP-42 (9/98), Section 1.3 emission factor	6.0	72
NO_X	AP-42 (9/98), Section 1.3 emission factor	28.8	346

2.31.7 The table below lists BACT emission limits for the mass-burn boiler during start-up and shut-down periods. A CERMS will be used in conjunction with the CEMSs to accurately measure NO_X, SO_2, and CO emissions. Each start-up and shut-down period is limited to three (3) hours.

Pollutant	**Basis**[1]	**Limit**	
		(lb/hr)	**lbs/start-up or shut-down period**
SO_2	9.13 lb/hr + 39 ppmdv @7% O_2	32.5	98
CO	6.43 lb/hr + 500 ppmdv @7% O_2	137.9	414
NO_X	31 lb/hr + 375 ppmdv @7% O_2	192.9	579

1: Procedures specified in Appendix F to 40 Code of Federal Regulations (CFR), Part 75 Paragraph 3.3.4 (minimum concentration of 5.0% for CO_2 and 14% for O_2) apply to the emission limits.

2.31.8 The following emission limits were established as BACT for the mass-burn boiler under normal operation (operation other than warm-up start-up, shut-down, and malfunction):

Pollutant	BACT Emissions Limit @ 7% O_2 Dry Gas Basis	Time Weighted Average	Compliance Method
CO	100 ppmdv 80 ppmdv	4-hour block average 30-day rolling average	CEMS[1]
NO_X	110 ppmdv 90 ppmdv	24-hour arithmetic average annual average	CEMS[1]
SO_2	26 ppmdv or 80% reduction 26 ppmdv or 80% reduction 44 ppmdv or 80% reduction (see note b)	24-hour daily geometric average annual average 3-hour block average	CEMS[1]
PM	12 mg/dscm (see notes 2 and 4)	per method	CAM[3] and EPA Methods 5, 201A, and 202
PM_{10}	32 mg/dscm (see note 4)	per method	CAM[3] and EPA Methods 5, OTM-27, and OTM-28
$PM_{2.5}$	30 mg/dscm (see note 4)	per method	CAM[3] and EPA Methods 5 and 22
MWC Metals	10 ug/dscm cadmuim 140 ug/dscm lead 28 ug/dscm mercury (see note 2)	per method	CAM[3] and EPA Methods 5, 201A, 202, and 29
Fluorides	3.5 ppmdv	per method	CAM[3] and EPA Method 13B
H_2SO_4	5 ppmdv	per method	CAM[c] and EPA Method CTM-013
MWC Acid Gases	26 ppmdv or 80% reduction 25 ppmdv or 95% reduction	SO_2 24-hour daily geometric average HCl per method	CAM[3] SO_2 – CEMS[1] HCL –EPA Method 26A
MWC Organics	13 ng/dscm	per method	EPA Method 23

1: CEMS – Continuous Emission Monitoring System
2: Proposed BACT limits for SO_2, particulate matter, and mercury are more stringent than NSPS, Subpart Eb requirements.
3: CAM – Compliance Assurance Monitoring
4: PM includes only filterable particulate matter. PM_{10} and $PM_{2.5}$ include filterable + condensable particulate.

2.31.9 The following table summarizes Subpart Eb emission limits, BACT emission limits, permit limits, and explanations for selecting permit emission limits for the mass-burn boiler under normal operation (operation other than warm-up, start-up, shut-down, and malfunction):

Pollutant		Subpart Eb Limit[1,2]	BACT Limit[1,2]	Permit Limit[1,2]	Reason for Permit Limit
SO_2	Annual[3,9]	----------	26 ppmdv	26 ppmdv	better than BACT from similar mass-burn facilities permitted
	24-hour[4,9]	30 ppmdv	26ppmdv	26 ppmdv	better than BACT from similar mass-burn facilities permitted, limit also meets Subpart Eb
	3-hour[5,9]	----------	44ppmdv	44 ppmdv	better than BACT from similar mass-burn facilities permitted
PM (filterable only)		20 mg/dscm	12 mg/dscm	12 mg/dscm	better than BACT from similar mass-burn facilities permitted, limit also meets Subpart Eb
PM_{10} (filterable + condensable)		-----------	32 mg/dscm	32 mg/dscm	BACT, no data from other facilities permitted
$PM_{2.5}$ (filterable + condensable)		-----------	30 mg/dscm	30 mg/dscm	BACT, no data from other facilities permitted
NO_X	Annual[3]	-----------	90 ppmdv	90 ppmdv	BACT based on similar mass-burn facilities permitted
	24-hour[6]	180 ppmdv[12] 150 ppmdv[13]	110 ppmdv	110 ppmdv	BACT based on similar mass-burn facilities permitted, limit also meets Subpart Eb
CO	4-hour[7]	100 ppmdv	100 ppmdv	100 ppmdv	BACT based on similar mass-burn facilities permitted, limit also meets Subpart Eb
	30-day[8]	-----------	80 ppmdv	80 ppmdv	limit specified by Department to be consistent with recent BACT decision
VOC (as CH_4)		-----------	-----------	10 ppmdv	limit specified at the Department's discretion, VOC emissions were based on a 10 ppmdv concentration
Ammonia		-----------	-----------	15 ppmdv	limit specified at the Department's discretion, ammonia emissions were based on a 15 ppmdv concentration
Cadmium		10 ug/dscm	-----------	10 ug/dscm	Subpart Eb requirement
Lead		140 ug/dscm	-----------	140 ug/dscm	Subpart Eb requirement
Mercury[10]		50 ug/dscm	28 ug/dscm	28 ug/dscm	BACT, limit also meets Subpart Eb
Fluorides (as HF)		-----------	3.5 ppmdv	3.5 ppmdv	BACT, no BACT data from other facilities permitted
H_2SO_4		-----------	5 ppmdv	5 ppmdv	BACT based on similar mass-burn facilities permitted
HCl[11]		25 ppmdv	25 ppmdv	25 ppmdv	BACT based on similar mass-burn facilities permitted, limit also meets Subpart Eb
MWC Metals (as PM)		12 mg/dscm	12 mg/dscm	12 mg/dscm	BACT based on similar mass-burn facilities permitted, limit also meets Subpart Eb
Dioxin/Furans		13 ng/dscm	13 ng/dscm	13 ng/dscm	BACT based on similar mass-burn facilities permitted, limit also meets Subpart Eb

1. Emission limits shall not be exceeded for the mass-burn boiler except for warm-up, start-up, shut-down, and malfunction.
2. All emission limits are referenced to 7% O_2, dry gas basis.

3. Annual arithmetic average emissions limit.
4. 24-hour daily geometric average emissions limit.
5. 3-hour block arithmetic average.
6. 24-hour daily arithmetic average.
7. 4-hour block arithmetic average.
8. 30-day rolling average.
9. Maximum emissions limit indicated or at least 80% reduction by weight or volume (whichever is less stringent).
10. Maximum emissions limit indicated, or at least 85% reduction by weight (whichever is less stringent).
11. Maximum emissions limit indicated or at least 95% reduction by weight or volume (whichever is less stringent).
12. For first year of operation.
13. After first year of operation.

2.31.10 The permit modification for the cooling towers which includes an increase in TDS concentration for recirculation water from 57,000 ppm to 85,000 ppm does not cause a net emissions increase greater than significant emission levels as defined in HAR, Section 11-60.1. Therefore, a BACT review is not required for cooling tower modifications.

2.31.1 The purpose 40 CFR Part 64, Compliance Assurance Monitoring (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.

2.32.2 A CAM applicability determination disclosed the following for each RDF boiler:

a. The CAM regulation applies to each existing RDF boiler because: (1) the boilers are located at a major source; (2) the boilers are subject to a BACT emission limit for fluorides; (3) air pollution control devices are required for compliance with BACT emission limit; (4) potential pre-control fluoride emissions from each boiler are greater than the major source threshold, and (5) the boilers are not otherwise exempt from CAM for fluoride emissions.
b. The CAM regulation does not apply to emission limits or standards proposed after November 15, 1990. Because NSPS, Subpart Cb was promulgated on December 19, 1995, the CAM regulation is not applicable to emission limits specified for the RDF boilers from Subpart Cb.
c. The CAM regulation applies to the BACT emission limit for fluorides because all the criteria in Paragraph 2.32.2.a is met and the PSD standards were promulgated prior to November 15, 1990.
d. The CEMSs for determining compliance with NO_X, SO_2, and CO emission limits for the RDF boilers are exempt from the CAM regulation pursuant to 40 CFR Part 64, §64.2(b)(vi). The permit requires installation, calibration, maintenance, and operation of CEMSs for each boiler's exhaust stream to measure and record the NO_X, SO_2, and CO emissions. The CEMSs for measuring these pollutants is a requirement from 40 CFR Part 60, Subparts Cb and Eb.

e. The following is a summary of CAM applicability for each RDF boiler:

Pollutant	Controlled Emission for One RDF Boiler (TPY)	Uncontrolled Emission for One RDF Boiler (TPY)	Control Device Efficiency	Applicability		Control Device Employed	CAM Applicable	Notes
				NSPS	BACT			
CO	338	338		Y	Y	N	N	note 1
NO_X	694	694		Y	Y	N	N	note 2
SO_2	112	560	80%	Y	Y	Y	N	note 3
PM	36	3,625	90%	Y	Y	Y	N	note 4
VOC	20	20		Y	Y	N	N	note 5
Lead	0.60	60	99%	Y	Y	Y	N	note 6
Cadmium	0.10	10	99%	Y	N	Y	N	note 7
Beryllium	0.005	0.5	99%	N	Y	Y	N	note 8
Mercury	0.075	7.5	99%	Y	Y	Y	N	note 9
Fluorides	11.4	228	95%	N	Y	Y	Y	note 10
MWC Organics	2.38E-05	7.94E-05	95%	Y	N	Y	N	note 11
HCl	65	1,294	95%	Y	N	Y	N	note 12

1. CAM not applicable for CO; a control device is not used to achieve compliance with CO emissions limit.
2. CAM not applicable for NO_X; exempt due to CEMS requirement (40 CFR §64.3 (d)(1)).
3. CAM not applicable for SO_2; exempt due to CEMS requirement (40 CFR §64.3 (d)(1)).
4. CAM not applicable for PM because NSPS emissions limit is more stringent than BACT emissions limit and NSPS Subparts Cb and Eb were proposed after November 15, 1990.
5. CAM not applicable for VOC; a control device is not used to achieve compliance with VOC emissions limit.
6. CAM not applicable for lead because NSPS emissions limit is more stringent than BACT emissions limit and NSPS Subparts Cb and Eb were proposed after November 15, 1990.
7. CAM not applicable for cadmium because emissions limit is specified by Subpart Cb and Subparts Cb and Eb were proposed after November 15, 1990.
8. CAM not applicable for beryllium; pre-control emissions are below major source level.
9. CAM not applicable for mercury because pre-control emissions are below major source level.
10. CAM applicable for fluorides; compliance demonstrated using lime slurry feed rate and SO_2 CEMS.
11. CAM not applicable for MWC organics; pre-control MWC organic emissions are below major source level.
12. CAM not applicable for HCl because Subpart Cb emissions limit is more stringent than BACT emissions limit and Subparts Cb and Eb were proposed after November 15, 1990.

f. Presumptively acceptable monitoring meets CAM requirements for the fluoride emissions limit and are based on utilizing a spray dryer absorber and baghouse to control acid gases. The control technology removes multiple gases that include SO_2, H_2SO_4, HF, and HCl. Also, the lime slurry feed rate monitoring system used in conjunction with SO_2 monitoring by the CEMS, as required by the NSPS, satisfies the presumptive acceptable monitoring pursuant to 40 CFR §64.4(b)(2). Acid gases are removed by the spray dryer absorber and baghouse by order of acid reactivity (HF-then-H_2SO_4/HCl-then-SO_2). The lime slurry feed rate can be set during annual performance testing to determine compliance with the HF, H_2SO_4, and HCl emission limits to allow continuous compliance. Based on source test data, continuous compliance with acid gas emission limits can be achieved by associating the CEM SO_2 measurement with a lime slurry injection rate that returns the SO_2 emission to the CAM set point which ensures compliance with the applicable emissions limit for acid gases. Indicators of an excursion for the fluoride emissions limit are as follows:

(1) A lime slurry feed rate in gallon per minute that is less than the minimum lime slurry feed rate established during the most recent boiler performance test that shows compliance with the applicable emissions limit for fluorides.

(2) An SO_2 emission that is greater than 29 ppmdv or less than 80% reduction @ 7% O_2 over a 24-hour daily geometric average during normal operation (i.e., boiler operation, except for warm-up, start-up, shut-down, and malfunction).

2.32.3 A CAM applicability determination disclosed the following for the mass-burn boiler:

a. The CAM regulation applies to the mass-burn boiler because: (1) the boiler is located at a major source; (2) the boiler is subject to BACT emission limits; (3) air pollution control devices are required for compliance with BACT emission limits; (4) potential pre-control PM, PM10, PM2.5, fluorides, H_2SO_4, and MWC metal emissions from the boiler are each greater than the major source threshold, and (5) the boiler is not otherwise exempt from CAM for pollutants that require an air pollution control device for compliance with BACT emission limits that are more stringent than limits specified in 40 CFR, NSPS Subpart Eb.

b. The CAM regulation does not apply to emission limits or standards proposed after November 15, 1990. Because 40 CFR Part 60, NSPS, Subpart Eb was promulgated on December 19, 1995, the CAM regulation is not applicable to this standard.

c. Pursuant to the technical guidance document “Compliance Assurance Monitoring (Revised Draft, August 1998)”, if the Boiler is subject to both Subpart Eb limits (exempt limits) and BACT emissions limits (non-exempt limits), CAM is still applicable. The Department agrees with the applicant, that CAM only applies to BACT emission limits that are more stringent than those from 40 CFR Part 60, Subpart Eb if criteria in Paragraph 2.32.3.a. is met.

d. The CEMS for determining compliance with NO_X, SO_2, and CO emission limits for the mass-burn boiler are exempt from the CAM regulation pursuant to 40 CFR Part 64, §64.2(b)(vi). The permit will require the applicant to install, calibrate, maintain, and operate one or more CEMSs for the boiler’s exhaust stream to measure and record the NO_X, SO_2, and CO emissions. The CEMSs for measuring these pollutants is a requirement from 40 CFR Part 60, Subpart Eb.

e. The following is a summary of CAM applicability for the mass-burn boiler:

Pollutant	Controlled Emission (TPY)	Uncontrolled Emission (TPY)	Control Device Efficiency	Applicability		Control Device Employed	CAM Applicable	Notes
				NSPS	BACT			
CO	213	213		Y	Y	N	N	note 1
NO_X	315	1,209	74%	Y	Y	Y	N	note 2
SO_2	126	632	80%	Y	Y	Y	N	note 3
$PM/PM_{10}/PM_{2.5}$	22/59/55	2,190	90%	Y	Y	Y	Y	note 4
VOC	12	12		Y	Y	N	N	note 5
Lead	0.300	30	99%	Y	Y	Y	N	note 6
Cadmium	0.020	2	99%	Y	N	Y	N	note 7
Mercury	0.050	5	99%	Y	N	Y	N	note 8
Fluorides	5	106	95%	N	Y	Y	Y	note 9
H_2SO_4	37	186	80%	N	Y	Y	Y	note 10
MWC Organics	2.38E-05	1.59E-04	95%	Y	Y	Y	N	note 11
HCl	69	1,384	80%	Y	Y	Y	N	note 12
Ammonia	19	19		N	N	N	N	note 13
Acid Gases (SO_2 + HCl)	196	2,018	80% SO_2 95% HCl	Y	Y	Y	N	note 14
MWC Metals (PM)	22	2,190	99%	Y	Y	Y	Y	note 15

1. CAM not applicable for CO; a control device is not used to achieve compliance with CO emissions limit.
2. CAM not applicable for NO_X; exempt due to CEMS requirement (40 CFR §64.3 (d)(1)).
3. CAM not applicable for SO_2; exempt due to CEMS requirement (40 CFR §64.3 (d)(1)).
4. CAM applicable for $PM/PM_{10}/PM_{2.5}$ because the BACT emissions limit is more stringent than Subpart Eb emissions limit; compliance demonstrated using presumptive CAM.
5. CAM not applicable for VOC; a control device is not used to achieve compliance with the VOC emissions limit.
6. CAM not applicable for lead because emissions limit is specified by NSPS Subpart Eb that was proposed after November 15, 1990.
7. CAM not applicable for cadmium because pre-control cadmium emissions are less than the major source threshold.
8. CAM not applicable for mercury because pre-control mercury emissions are less than the major source threshold.
9. CAM applicable for fluorides; compliance demonstrated using lime slurry feed rate and SO_2 CEMS.
10. CAM applicable for H_2SO_4; compliance demonstrated using lime slurry feed rate and SO_2 CEMS.
11. CAM not applicable for MWC organics; pre-control MWC organic emissions are below major source level.
12. CAM not applicable for HCl; both BACT and Subpart Eb limits are the same.
13. CAM not applicable for ammonia; does not use a control device to achieve compliance.
14. CAM not applicable for acid gases; see Notes 3 and 12.
15. CAM applicable for MWC metals (measured as PM); compliance demonstrated using presumptive CAM.

f. Presumptively acceptable monitoring was selected to meet CAM requirements for the emissions limit specified for fluorides and H_2SO_4 based on utilizing a spray dryer absorber and baghouse to control acid gases. The control technology removes multiple gases that include SO_2, H_2SO_4, HF, and HCl. Also, the lime slurry feed rate monitoring system used in conjunction with SO_2 monitoring by the CEMS, as required by the NSPS, satisfies the presumptive acceptable monitoring pursuant to 40 CFR §64.4(b)(2). Acid gases are removed by the spray dryer absorber and baghouse by order of acid reactivity (HF-then-H_2SO_4/HCl-then-SO_2). The lime slurry feed rate can be set during annual performance testing to determine compliance with the HF emission limit to allow continuous compliance. Based on source test data, continuous compliance with the HF and H_2SO_4 emissions limit can be achieved by associating the CEM SO_2 measurement with a lime slurry injection rate that returns the SO_2 emission to the CAM set point which ensures compliance with the HF emissions limit. Indicators of an excursion for the HF and H_2SO_4 emissions limit are as follows:

   (1) A lime slurry feed rate in gallon per minute that is less than the minimum lime slurry feed rate established during the most recent boiler performance test that shows compliance with the emissions limit for fluorides.
   (2) An SO_2 emission that is greater than 26 ppmdv or less than 75% reduction @ 7% O_2 over a 24-hour daily geometric average during normal operation (i.e., boiler operation, except for warm-up, start-up, shut-down, and malfunction).

g. The CAM regulation applies to PM, PM_{10}, $PM_{2.5}$, and MWC metal emission limits. Excursions for these pollutants are incidences when the opacity, as measured by the COMS, exceeds 5% on a one hour average basis for three consecutive hour.

2.33 The facility is subject to the greenhouse gas reporting requirements specified in 40 CFR Part 98 because the total greenhouse gas emissions (biogenic and Non-biogenic) on a CO_2 equivalent (CO_2e) basis are greater than 25,00 metric tons per year. The CO_2e emissions using the global warming potential (GWP) of each GHG are shown in the tables below.

Non-Biogenic GHG Emissions				
GHG	GWP	GHG Mass-Based Emissions (TPY)[a]	Non-Biogenic CO_2e Based Emissions	
			Short Tons	Metric Tons
carbon dioxide (CO_2)	1	349,687	349,687	317,231
Methane (CH_4)	21	311	6,531	5,925
Nitrous Oxide (N_2O)	310	43	13,330	12,093
		Total Emissions→	368,548	335,249

Biogenic GHG Emissions				
GHG	GWP	GHG Mass-Based Emissions (TPY)[a]	Non-Biogenic CO_2e Based Emissions	
			Short Tons	Metric Tons
carbon dioxide (CO_2)	1	193,697	193,697	175,719
Methane (CH_4)	21	311	6,531	5,925
Nitrous Oxide (N_2O)	310	43	13,330	12,093
		Total Emissions→	213,558	193,737

Total GHG Emissions				
GHG	GWP	GHG Mass-Based Emissions (TPY)[a]	Total CO_2e Based Emissions	
			Short Tons	Metric Tons
carbon dioxide (CO_2)	1		543,384	492,950
Methane (CH_4)	21	311	6,531	5,925
Nitrous Oxide (N_2O)	310	43	13,330	12,093
		Total Emissions→	563,245	510,968

2.34 The Consolidated Emissions Reporting Rule (CERR) is applicable because potential emissions from H-POWER exceed reporting levels pursuant to 40 CFR 51, Subpart A for Type B sources (see table below for applicability).

Pollutant	Potential Emissions (TPY)	CERR Triggering Levels (TPY)	
		1 year cycle (Type A sources)	3 year cycle (Type B sources)
PM-10	173.4	≥250	≥100
PM-2.5	149.5	≥250	≥100
SO_2	350.6	≥2,500	≥100
NO_x	1,720	≥2,500	≥100
VOC	52.9	≥250	≥100
CO	888.5	≥2,500	≥1,000
Pb	1.2	--------	≥5
NH_3	19.3	≥250	≥100

2.35 Annual emissions reporting is required because H-POWER is a covered source and potential greenhouse gas emissions on a CO_2e basis are greater than 100,000 tons per year.

3. Insignificant Activities and Exemptions

3.1 The following is a list of insignificant activities identified by the applicant that meet the exemption criteria specified in HAR §11-60.1-82:

a. Two (2) 25,000 gallon diesel storage tanks are exempt pursuant to HAR §11-60.1-82(f)(1).
b. A 120 gallon gasoline storage tank is exempt pursuant to HAR §11-60.1-82(f)(1).
c. An 80 hp Caterpillar emergency diesel engine generator, model no. 3304B, is exempt in accordance with HAR §11-60.1-82(f)(5).
d. A 121 hp Caterpillar emergency fire pump diesel engine, model no. 3208-175, is exempt pursuant to HAR §11-60.1-82(f)(5).
e. An 11 hp engine for power-washing is exempt in accordance with HAR §11-60.1-82(f)(2).
f. A 10.1 hp engine for an air compressor is exempt pursuant to HAR §11-60.1-82(f)(2).
g. An 11.1 hp diesel engine powered welder is exempt pursuant to HAR §11-60.1-82(f)(2).
h. 24 hp ETL Mi-T-M Corporation pressure washer, model no. 2HC-5005, serial no. 10349893 is an insignificant activity in accordance with HAR §11-60.1-82(f)(2).
i. 16 hp Miller Bobcat 225, with ONAN P216/220 gas engine, 8000 W, Max. 8.5 kW, welding machine, serial no. KF992309, is an insignificant activity in accordance with HAR §11-60.1-82(f)(2).
j. 11 hp Honda GX 340 motor, air compressor, serial no. 5345, is an insignificant activity pursuant to HAR §11-60.1-82(f)(2).
k. 13 hp Mi-T-M Corp pressure washer, model no. 4004, is an insignificant activity pursuant to HAR §11-60.1-82(f)(2).

l. 13 hp Mi-T-M Corp pressure washer, model no. GH-3504-OEGH, serial no. 15025832, is an insignificant activity pursuant to HAR §11-60.1-82(f)(2).
m. 249 hp Atlas COPCO XAMS 850, Caterpillar engine is an insignificant activity pursuant to HAR §11-60.1-82(f)(5).
n. 11 hp Dayton Pro generator, 3W738, 6000 Watts (Honda GX-40 engine) is an insignificant activity pursuant to HAR §11-60.1-82(f)(2).
o. 8 hp MQ Honda GX 240 generator is an insignificant activity pursuant to HAR §11-60.1-82(f)(2).
p. A 30 gallon mineral spirits tank for metal parts cleaning is considered an insignificant activity pursuant to HAR §11-60.1-82(f)(7).
q. A Lime silo with baghouse servicing the spray dryer absorbers for the two 854 ton per day RDF MWC boilers is considered an insignificant activity pursuant to HAR §11-60.1-82(f)(7).
r. A Lime silo with baghouse servicing the spray dryer absorber for the 900 ton per day mass-burn MWC boiler is considered an insignificant activity pursuant to HAR §11-60.1-82(f)(7).
s. An activated carbon silo with baghouse servicing the activated carbon injection system for the 900 ton per day mass-burn MWC boiler is considered an insignificant activity pursuant to HAR §11-60.1-82(f)(7).

4. Alternate Operating Scenario

4.1 The permit allows the burning of the following supplemental wastes as an alternate operating scenario for the mass-burn boiler and each RDF boiler:

a. Commodity wastes;
b. Pharmaceutical wastes;
c. Manufacturing wastes;
d. Oily wastes;
e. Used cooking oil;
f. Triple rinsed containers;
g. Shredded tires and automobile shredded residue;
h. Treated medical wastes; and
i. Treated foreign wastes.

4.2 The permits allow the mass-burn boiler and each RDF boiler to be fired on specification used oil as an alternate operating scenario. The specification used oil must meet the following limits:

Constituent/Property	Limit
Arsenic	≤ 5 ppm
Cadmium	≤ 2 ppm
Chromium	≤10 ppm
Lead	≤ 100 ppm
Total Halogens	≤ 1,000 ppm
Sulfur	≤ 0.5% by weight
Flash Point	≥ 100 ^{O}F
PCBs	< 2 ppm

5. Air Pollution Controls

5.1 The mass-burn boiler will be equipped with Covanta VLN system to control NO_X. The system will be an integral part of the boiler that changes the combustion process. The Covanta VLN system reduces NO_X and increases boiler efficiency by:

a. Reducing the overall excess air rate from approximately 90% to 100% excess air to between 50% and 55% excess air;
b. Reducing the amount of secondary air and adding a tertiary gas stream at a higher elevation in the furnace; and
c. Including an internal recirculated gas system.

5.2 An SNCR system will be installed for the mass-burn boiler to control NO_X emissions from the flue gas downstream of the boiler's combustion zone. The post combustion control technology utilizes injection of either ammonia (NH_3) or urea ($NH_2C(O)H_2$) into the flue gas that acts as a reducing agent for NO_X. The reducing agent is injected into the exhaust stream at a temperature between 1,600 ^{O}F and 2,100 ^{O}F. The high temperatures support high chemical reaction rates within the exhaust stream so that a catalyst is not required for the NO_X reduction reaction. The reagent reduces NO_X to nitrogen and water. Placement of the injection probes for the SNCR system is important. If reagent is injected at a point where the temperature is greater than 2,100 ^{o}F, NH_3 or $NH_2C(O)H_2$ will react with oxygen to form additional NO_X. Injection of the reagent at a point where temperatures are below 1,600 ^{o}F will promote excessive/unreacted ammonia that passes through the duct work and out the stack ("ammonia slip"). Increasing levels of ammonia slip promotes ammonium bisulfate formation that can plug and corrode the air preheater. Also, ammonia slip can contribute to formation of ammonium chloride that may cause a visible white plume. It is expected that the total combined NO_X removal efficiency for using the Covanta VLN and SNCR systems will be 74%.

5.3 Spray dryer absorbers (semi-dry scrubber) are used for the mass-burn boiler and each RDF boiler to control acid gases. For this technology, hot untreated boiler flue gases are introduced into an absorbing chamber where flue gases are contacted by a fine spray of lime slurry. To form the reagent lime slurry, lime is slaked with water to form calcium hydroxide that is pumped to nozzles or rotary atomizers inside the scrubber's absorbing chamber. Acid gases are absorbed by the slurry mixture and the alkaline component reacts with the flue gases to form salts. Evaporation of water from the slurry forms a finely divided particle of mixed salt and unreacted alkali and lowers the flue gas temperature. A portion of the dry powder drops to the bottom of the spray dryer absorber scrubber vessel. Flue gases that contain the remaining powder with reacted acid gas salts and particulates generated from combustion flow downstream for removal by the baghouse. Removal efficiency for the spray dryer absorber with baghouse is anticipated to be 80% for SO_2, H_2SO_4, and fluorides, and greater between 80% to 95% for MWC acid gases (as HCl and SO_2).

5.4 An activated carbon injection system will be installed for the mass-burn boiler to control mercury and dioxin/furan emissions. The activated carbon will be injected into the flue gas upstream of the baghouse. The baghouse will collect the activated carbon that adsorbs mercury and dioxin/furan pollutants within the exhaust stream. It is anticipated that the removal efficiency for mercury and dioxin/furan emissions will be greater than 85% and 95%, respectively.

5.5 A baghouse is specified for the mass-burn boiler and each RDF boiler to collect particulate from MSW combustion and other particulate generated by spray dryer absorbers to control acid gases. The baghouse is also used to collect particulate generated after control of pollutants by an activated carbon injection system for the mass-burn boiler. Expected particulate removal efficiency for the baghouse is 99%. The filter bags can be replaced during boiler operation by removing the affected filter bag module from the baghouse for bag replacement. Specific filter bag modules can be turned off during boiler operation to determine which module contains a leaking bag. A decrease in opacity after module shut-down would indicate a bag leak for that module.

5.6. Four (4) bagouses are operating for the waste processing and storage buildings to control dust from primary and secondary shredders inside the waste processing building. Expected particulate removal efficiency for each baghouse is 99%.

5.7 Twelve (12) exhaust vents are used for the MSW receiving and storage building and RDF storage building. The vents function primarily to prevent pollutant buildup from motor vehicles operating inside the buildings. Replaceable filter elements are installed upstream of the exhaust fans for each vent.

6. Project Emissions

6.1 Emissions for normal operation (operation except for warm-up, start-up, and shut-down) of the mass-burn boiler were based on emission limits specified in 40 CFR Part 60, Subpart Eb, other emission limits established pursuant to the BACT analysis, and AP-42 emission factors. Maximum potential emissions were based on operating 8,760 hours per year at the 110% MCR- 6,400 Btu/lb operating scenario with a 3,157 dry standard cubic meter per minute stack flue gas flow rate. The ppm pollutant emission limits were multiplied by M/24.04 to convert ppm to mg/m^3, where M is the molecular weight of the air pollutant. Arsenic, chromium, and nickel emissions were determined using emission factors from AP-42, Section 2.1 (10/96), Refuse Combustion. The VOC emissions were based on a molecular weight for methane of

16.05 grams per mole. A 900 ton per day boiler capacity was used to determine the ton per year emissions. Emissions are shown in Enclosure (2) and summarized below.

900 TON PER DAY MASS-BURN MWC BOILER (Normal Operation with Controls)			
Pollutant	Emission Rate		Emission TPY
	lb/hr	g/s	8,760 hr/yr
CO	48.6	6.131	212.7
NO_X	71.8	9.063	314.4
SO_2	28.9	3.646	126.5
PM (see note 1)	5.0	0.631	21.9
PM_{10} (see note 1)	13.3	1.684	58.4
$PM_{2.5}$ (see note 1)	12.5	1.579	54.8
VOC as CH_4	2.8	0.350	12.2
Arsenic	3.0×10^{-4}	3.79×10^{-5}	0.001
Cadmium	0.004	0.0005	0.020
Chromium	3.49×10^{-3}	4.41×10^{-4}	0.015
Lead	0.016	0.002	0.300
Mercury	0.012	0.0015	0.050
Nickel	6.75×10^{-3}	8.52×10^{-4}	0.030
Fluorides as HF	1.2	0.153	5.3
H_2SO_4	8.5	1.073	37.2
Dioxin/Furans	5.42×10^{-6}	6.84×10^{-7}	2.37×10^{-5}
HCl	15.8	1.996	69.2
MWC Acid Gases as SO_2 and HCl	44.7	5.642	195.8
MWC Metals	5.0	0.631	21.9
Ammonia	4.4	0.556	12.9
Total HAPs	-----------	-----------	74.9

1: PM includes only filterable particulate matter. PM_{10} and $PM_{2.5}$ include filterable + condensable particulate.

6.2 Total GHG emissions from the 900 ton per day boiler were based on information supplied by the applicant that used emission factors from 40 CFR Part 98. For CO_2, both biogenic (renewable energy/biomas) and anthropogenic (caused directly by humans such as burning of fossil fuel) emissions were determined. Based on stack test data for new mass-burn boiler at a California facility, 60% of the CO_2 emissions are biogenic and 40% of the CO_2 emissions are anthropogenic. The GHG emissions for the mass-burn boiler are summarized in the table below.

900 TON PER DAY MASS-BURN MWC BOILER			
Greenhouse Gas	Emission TPY[a]		
	Biogenic	Anthropogenic	Total
Carbon Dioxide (CO_2)	193,697	129,131	322,828
Methane (CH_4)	----------	-----------	107
Nitrous Oxide (N_2O)	----------	-----------	15

a: Emissions are in short tons per year.

6.3 Emissions for normal operation of the two 854 ton per day RDF boilers were based on emission limits specified in 40 CFR Part 60, Subpart Cb, other emission limits established pursuant to the BACT analysis, and AP-42 emission limits. Maximum potential emissions were based on operating 8,760 hours per year with a 150,480 dry standard cubic meter per hour stack flue gas flow rate. The ppm pollutant emission limits were multiplied by M/24.04 to convert ppm to mg/m^3, where M is the molecular weight of the pollutant. Arsenic, chromium and nickel emissions estimates were based on AP-42 emission factors from Section 2.1 (10/96) and a 36 ton per hour maximum MSW consumption for each boiler was used to determine emissions. Emissions are calculated in Enclosure (2) and summarized below.

854 TON PER DAY RDF MWC BOILERS (Normal Operation with Controls)			
Pollutant	Emission Rate (two boilers)		Emission TPY (two boilers)
	lb/hr	g/s	8,760 hr/yr
CO	154.3	19.481	675.8
NO_X	316.8	40.000	1,387.6
SO_2	51.2	6.461	224.1
PM	16.6	2.257	72.5
PM_{10}	16.6	2.257	72.5
$PM_{2.5}$	16.6	2.257	72.5
VOC as CH_4	9.3	1.172	40.7
Arsenic	3.72×10^{-4}	4.70×10^{-5}	0.002
Beryllium	0.002	0.0002	0.010
Cadmium	0.02	0.003	0.10
Chromium	3.70×10^{-4}	2.93×10^{-3}	0.013
Lead	0.3	0.033	1.2
Mercury	0.033	0.004	0.150
Nickel	5.73×10^{-4}	4.54×10^{-3}	0.020
Fluorides as HF	5.2	0.675	22.8
H_2SO_4	13.5	1.706	59.2
Dioxin/Furans	1.99×10^{-5}	2.51×10^{-6}	8.70×10^{-5}
HCl	29.6	3.731	129.4
MWC Acid Gases as SO_2 and HCl	80.8	10.192	353.9
MWC Metals	16.6	2.090	72.5
HAPs	----------	----------	153.7

6.4 Total GHG emissions from the 900 ton per day boiler were based on information supplied by the applicant that used emission factors from 40 CFR Part 98. For CO_2, both biogenic (renewable energy/biomas) and anthropogenic (caused directly by humans such as burning of fossil fuel) emissions were determined. Based on stack test data for new mass-burn boiler at a California facility, 64% of the CO_2 emissions are biogenic and 36% of the CO_2 emissions are anthropogenic. The GHG emissions for the boilers are summarized in the table below.

854 TON PER DAY RDF MWC BOILERS			
Greenhouse Gas	Emission TPY[a]		
	Biogenic	Anthropogenic	Total
Carbon Dioxide (CO_2)	392,100	220,556	612,256
Methane (CH_4)	----------	-----------	204
Nitrous Oxide (N_2O)	----------	-----------	28

a: Emissions are in short tons per year for two 854 ton per day RDF MWC boilers.

6.5 Particulate emissions from the two (2) 4,500 ft^3/min capacity baghouses servicing the primary shredders and two (2) 40,000 ft^3/min capacity baghouses servicing the secondary shredders were estimated. Emissions were based on the rated ft^3/min baghouse capacity, 8,760 hr/yr operation, and information from the initial covered source permit application that a typical particulate outlet concentration for the baghouses is 0.01 grains/ft^3. Emission estimates were based on information that there are 64.799 mg of particulate per grain. Based on a filter analysis, it was assumed that 70% of the PM_{10} is $PM_{2.5}$ and PM_{10} equals PM. Emissions are calculated in Enclosure (3) and summarized below.

RDF PROCESSING FACILITY- BAGHOUSES			
Pollutant	Emission Rate (each baghouse)		Emission TPY (all baghouses)
	(lb/hr) primary/secondary	(g/s) primary/secondary	
PM	0.385/3.421	0.049/0.432	33.4
PM_{10}	0.385/3.421	0.049/0.432	33.4
$PM_{2.5}$	0.269/2.395	0.049/0.432	23.3

6.6 Particulate emissions were determined for operating 2-cell and 5-cell cooling towers. The PM emission estimates for the 5-cell cooling tower were based on a maximum recirculation water flow rate of 50,500 gallons per minute, a 0.001% drift rate (water droplets carried out of the tower as drift droplets), and a total dissolved solids content for the circulating water of 85,000 ppm. The PM emissions for the 2-cell cooling tower were based on a maximum recirculation water flow rate of 29,000 gallons per minute, a 0.0005% drift rate, and total dissolved solids content for the recirculation water of 85,000 ppm. Based on information from the permit application, for every pound of PM emitted from the cooling tower, 0.073 pound of PM_{10} and 0.00105 pound of $PM_{2.5}$ are discharged from the cooling tower. Emissions are calculated in Enclosure (4) and summarized below.

COOLING TOWERS			
Pollutant	Emission Rate		Emission TPY (both cooling towers)
	(lb/hr) 2-cell tower/5-cell tower	(g/s) 2-cell tower/5-cell tower	
PM	1.9/6.9	0.244/0.875	38.8
PM_{10}	0.1/0.5	0.018/0.064	3.3
$PM_{2.5}$	0.002/0.007	0.00026/0.001	0.04

6.7 Worst-case yearly emissions of criteria pollutant and HAPs from operating permitted equipment at the facility are as follows:

FACILITY-WIDE EMISSIONS					
Pollutant	Emissions (TPY)				
	Mass-Burn Boiler	RDF MWC Boilers	Waste Processing Baghouses	Cooling Towers	Total Emissions [no limits]
CO	212.7	675.8			888.5
NO_X	314.4	1,387.6			1,702
SO_2	126.5	224.1			350.6
PM	21.9	78.3	33.4	45.2	178.8
PM_{10}	58.4	78.3	33.4	3.3	173.4
$PM_{2.5}$	54.8	78.3	16.3	0.05	149.5
VOC	12.2	40.7			52.9
Fluorides (as HF)	5.3	11.4			16.7
H_2SO_4	37.2	59.2			96.4
HCl	69.2	129.4			198.6
MWC Acid Gases	195.8	353.9			549.7
MWC Metals	21.9	78.3			100.2
Arsenic	0.001	0.002			0.003
Beryllium	----------	0.3			0.3
Cadmium	0.02	0.12			0.14
Chromium	0.015	0.033			0.048
Lead	0.3	0.9			1.2
Mercury	0.05	0.23			0.28
Nickel	0.030	0.020			0.050
NH_3	19.3	----------			19.3
Dioxin/Furans	2.37×10^{-5}	1.74×10^{-4}			1.97×10^{-4}
Total Haps	---------	---------			217.3

7. Ambient Air Quality Impact Analysis

7.1 An ambient air quality impact analysis was performed for the modification to increase the TDS concentration for the cooling tower recirculation water from 57,000 ppm to 85,000 ppm. A Lakes Environmental AERMOD View (v.7.1.0) program was used by the Department of Health Clean Air Branch to check model inputs and determine air impacts for some of the model runs. Model assumptions are listed below.

a. Modeling was conducted with one year site-specific meteorological data and five years of meteorological data from the nearest National Weather Service (NWS) station. The one year of site-specific data was obtained from the Hawaiian Electric Company, Inc. (HECO) No. 064 monitoring station at Ewa Beach. The site specific data was gathered from a meteorological tower at several levels between October 1, 1992 and September 30, 1993. Data from HECO's No. 064 monitoring station includes 64 meter wind speed, wind direction, and ambient temperature measurements. The applicant also ran the model with NWS meteorological data from years 2003, 2004, 2005, 2006, and 2007.

b. Surface data and upper air data were processed with the AERMET meteorological processor. Surface characteristic values were determined from land around the HECO No. 064 meteorological tower for the site specific data. Surface characteristic values were determined from land around the Honolulu International Airport for NWS data. The three (3) surface characteristics determined were noon-time albedo, Bowen ratio, and the surface roughness length. Upper air data was obtained from the NWS station at Lihue International Airport.

c. Rural dispersion coefficients were used for the model. Based on Auer's land use method (AUER 1978), it was found that more than 50% of the land within 3 kilometers of the facility is rural.

d. A total of 9,008 receptors were placed in the area surrounding the H-POWER facility. Coarse grid receptors were spaced 250 meters apart, and the fine receptor grid spacing was at most 50 meters on the flat coastal plane and 25 meters in elevated terrain.

e. Receptor elevations were assigned using the AERMAP software tool that extracted elevations from the USGS digital elevation model (DEM) files. The DEM data files consist of a regular array of elevations reference horizontally in the Universe Transverse Mercator (UTM) coordinate system. The DEM, data based on the 1927 North American Datum (NAD27), was from the EWA and SCHOFIELD BARRACKS topographic quadrangles.

f. Three (3) operating scenarios were evaluated in the air modeling assessment to determine impacts from cooling tower modifications. The three (3) scenarios evaluated are as follows:

(1) Scenario 1 – Current configuration (2-cell cooling tower with 0.0005% drift rate and 5-cell cooling tower with 0.002% drift rate) with 85,000 ppm recirculation water solids content and ESP in place;
(2) Scenario 2 – Current configuration (2-cell cooling tower with 0.0005% drift rate and 5-cell cooling tower with 0.002% drift rate) with 85,000 ppm recirculation water solids content and ESP removed;
(3) Scenario 3 – Final configuration (2-cell cooling tower with 0.0005% drift rate and 5-cell cooling tower with 0.001% drift rate) with 85,000 ppm recirculation water solids content and ESP removed.

7.2 Background concentrations of PM_{10} and $PM_{2.5}$ were from the Department of Health Clean Air Branch ambient air monitoring station in Kapolei for air quality data collected in 2009.

7.3 The tables below show emission rates for the two-cell and five-cell cooling towers. Each cooling tower cell was modeled as a point source. Cells one through five are for the five-cell cooling tower, and cells six and seven are for the two-cell cooling tower.

EXISTING CONFIGURATION		
Emission Point	PM_{10} (g/s)	$PM_{2.5}$ (g/s)
5-cell Cooling Tower (cell-1)	0.0254	0.0004
5-cell Cooling Tower (cell 2)	0.0254	0.0004
5-cell Cooling Tower (cell 3)	0.0254	0.0004
5-cell Cooling Tower (cell 4)	0.0254	0.0004
5-cell Cooling Tower (cell 5)	0.0254	0.0004
2-cell Cooling Tower (cell 6)	0.00885	0.00013
2-cell Cooling Tower (cell 7)	0.00885	0.00013

FINAL CONFIGURATION		
Emission Point	PM_{10} (g/s)	$PM_{2.5}$ (g/s)
5-cell Cooling Tower (cell-1)	0.0128	0.0002
5-cell Cooling Tower (cell 2)	0.0128	0.0002
5-cell Cooling Tower (cell 3)	0.0128	0.0002
5-cell Cooling Tower (cell 4)	0.0128	0.0002
5-cell Cooling Tower (cell 5)	0.0128	0.0002
2-cell Cooling Tower (cell 6)	0.0089	0.0001
2-cell Cooling Tower (cell 7)	0.0089	0.0001

7.4 The tables below provide stack parameters used for the air modeling assessment of the two-cell and five-cell cooling towers.

EXISTING CONFIGURATION					
Emission Point	Height (ft)	Base Elevation (ft)	Exit Diameter (ft)	Exhaust Flow Rate (acfm)	Exhaust Temperature (^{O}F)
5-cell Cooling Tower (cell-1)	56	13	30	1,150,000	85
5-cell Cooling Tower (cell 2)	56	13	30	1,150,000	85
5-cell Cooling Tower (cell 3)	56	13	30	1,150,000	85
5-cell Cooling Tower (cell 4)	56	13	30	1,150,000	85
5-cell Cooling Tower (cell 5)	56	13	30	1,150,000	85
2-cell Cooling Tower (cell 6)	56	13	30	1,150,000	85
2-cell Cooling Tower (cell 7)	56	13	30	1,150,000	85

FINAL CONFIGURATION					
Emission Point	Height (ft)	Base Elevation (ft)	Exit Diameter (ft)	Exhaust Flow Rate (acfm)	Exhaust Temperature (^{O}F)
5-cell Cooling Tower (cell-1)	56	6.5	30	1,150,000	85
5-cell Cooling Tower (cell 2)	56	6.5	30	1,150,000	85
5-cell Cooling Tower (cell 3)	56	6.5	30	1,150,000	85
5-cell Cooling Tower (cell 4)	56	6.5	30	1,150,000	85
5-cell Cooling Tower (cell 5)	56	6.5	30	1,150,000	85
2-cell Cooling Tower (cell 6)	56	6.5	30	1,150,000	85
2-cell Cooling Tower (cell 7)	56	6.5	30	1,150,000	85

7.5 The tables below show that ambient air impacts from the cooling towers comply with the state and federal ambient air quality standards for particulate.

COOLING TOWERS CURRENT CONFIGURATION (Scenario 1[a])						
AIR POLLUTANT	AVERAGING TIME	IMPACT (ug/m^3)[a]	BACKGROUND (ug/m^3)[a]	TOTAL IMPACT (ug/m^3)	AIR STANDARD (ug/m^3)	PERCENT STANDARD
PM_{10}	24-Hour Annual	1.75 0.444	37.0 13.0	38.8 13.4	150 50	26 27
$PM_{2.5}$	24-Hour Annual	0.025 0.006	25.0 5.5	25 5.5	35 15	71 37

a: Current configuration (2-cell cooling tower with 0.0005% drift rate and 5-cell cooling tower with 0.002% drift rate) with 85,000 ppm recirculation water solids content and ESP in place.

COOLING TOWERS CURRENT CONFIGURATION (Scenario 2[a])						
AIR POLLUTANT	AVERAGING TIME	IMPACT (ug/m^3)[a]	BACKGROUND (ug/m^3)[a]	TOTAL IMPACT (ug/m^3)	AIR STANDARD (ug/m^3)	PERCENT STANDARD
PM_{10}	24-Hour Annual	1.75 0.444	37.0 13.0	38.8 13.4	150 50	26 27
$PM_{2.5}$	24-Hour Annual	0.025 0.006	25.0 5.5	25 5.5	35 15	71 37

a: Current configuration (2-cell cooling tower with 0.0005% drift rate and 5-cell cooling tower with 0.002% drift rate) with 85,000 ppm recirculation water solids content and ESP removed.

COOLING TOWERS FINAL CONFIGURATION (Scenario 3[a])						
AIR POLLUTANT	AVERAGING TIME	IMPACT (ug/m^3)[a]	BACKGROUND (ug/m^3)[a]	TOTAL IMPACT (ug/m^3)	AIR STANDARD (ug/m^3)	PERCENT STANDARD
PM_{10}	24-Hour Annual	1.0 0.249	37.0 13.0	38.0 13.2	150 50	25 26
$PM_{2.5}$	24-Hour Annual	0.025 0.003	25.0 5.5	25.0 5.5	35 15	71 37

a: Final configuration (2-cell cooling tower with 0.0005% drift rate and 5-cell cooling tower with 0.001% drift rate) with 85,000 ppm recirculation water solids content and ESP removed.

8. Significant Permit Conditions (CSP No. 0255-02-C)

8.1 Except as specified in the permit for firing waste in accordance with the alternate operating scenario, the mass-burn MWC boiler shall be fired only on municipal solid waste (MSW) and fuel oil No. 2.

8.2 The maximum sulfur content of fuel oil No. 2 auxiliary fired by the mass-burn MWC boiler shall not to exceed 0.05% by weight.

8.3 The mass-burn MWC boiler may be fired on specification used oil and used cooking oil auxiliary fuels in accordance with alternate operating scenario conditions when combusting MSW.

8.4 The mass-burn MWC boiler shall only be fired on fuel oil No. 2 auxiliary fuel during warm-up periods.

8.5 The mass-burn MWC boiler shall only be fired on fuel oil No. 2 and MSW during start-up and shut-down periods.

Reason for 8.1 to 8.5: Fuel limits were incorporated based on proposals from previous permit applications for operating the mass-burn boiler.

8.6 Incorporate SO_2, CO, and NO_X BACT emission limits for mass-burn boiler warm-up periods.

Reason for 8.6: Incorporate limits pursuant to Paragraph 2.31.6 of the permit application review. Emission limits were only applied to pollutants that require monitoring with CEMSs. Monitoring with CEMSs was specified in 40 CFR, NSPS, Subpart Eb for NO_X, SO_2, and CO. A CERMS will be used in conjunction with a CEMS to accurately measure pollutant emissions.

8.7 Incorporate SO_2, CO, and NO_X BACT emission limits for mass-burn boiler start-ups.

8.8 Incorporate SO_2, CO, and NO_X BACT emission limits for mass-burn boiler shut-downs.

Reason for 8.7 and 8.8: Incorporate limits pursuant to Paragraph 2.31.7 of this review. Emission limits were only applied to pollutants that required monitoring with CEMS as specified in 40 CFR, NSPS, Subpart Eb for NO_X, SO_2, and CO. A CERMS will be used in conjunction with a CEMS to accurately measure pollutant emissions.

8.9 For start-up and shut-down emission limits, a minimum concentration of 5.0% CO_2 and a maximum concentration of 14.0% O_2 may be substituted for the measured diluent gas concentration values during hours when the hourly average concentration of CO_2 is less than 5.0% CO_2 or the hourly average concentration of O_2 is greater than 14.0% O_2.

Reason for 8.9: This condition was incorporated to prevent inaccurate readings by the CEMS for determining compliance with the emission limits for start-up and shut-down.

8.10 Incorporate the applicable BACT or Subpart Eb emission limits for SO_2, PM, PM_{10}, $PM_{2.5}$, NO_X, CO, VOC, ammonia, cadmium, lead, mercury, fluorides (as HF), H_2SO_4, HCl, MWC metals (as PM), and dioxin/furans for normal operation of the mass-burn boiler.

Reason for 8.10: Incorporate permit limits pursuant to Paragraph 2.31.9 of the permit application review.

8.11 Specify 40 CFR Part 60, Subpart Eb requirements for the mass-burn boiler which includes:

a. Boiler emission limits as specified in Paragraph 2.15 of this review, unless BACT emission limits are more stringent;
b. Boiler opacity limit;
c. Start-up, shut-down, and malfunction provisions;
d. Operating load requirements;
e. Baghouse inlet temperature requirements;
f. Activated carbon mass feed rate requirements;
g. Fugitive emission limits for combustion ash;
h. Operator training and certification requirements;

i. CEMS monitoring for NO_X, SO_2, and CO; and
j. Source test requirements.

Reason for 8.11: Incorporate pursuant to Paragraph 2.15 of the permit application review.

8.12 Specify that the combustion temperature of each MWC boilers shall be maintained at or above 1,800 ^oF during normal operation.

Reason for 8.12: The condition was incorporated to ensure organic compounds are minimized from the combustion of MSW and RDF. Available literature indicates that combustion temperatures at or above 1000 ^oC (approximately 1800 ^oF) promote destruction of organic compounds.

8.13 Incorporate CAM provisions for the mass-burn boiler to ensure compliance with the emissions limit on fluorides, sulfuric acid mist, PM, PM_{10}, $PM_{2.5}$, and MWC metals.

Reason for 8.13: Incorporate CAM provisions for the mass-burn boiler pursuant to Paragraph 2.32.3 of the review.

8.14 The dissolved solids content of the recirculation water from the 5-cell and cooling tower shall not exceed 85,000 ppm.

Reason for 8.14: Maximum potential emissions were based on the maximum total dissolved solids content specified for the cooling tower recirculation water. Modeling showed compliance with PM_{10} and $PM_{2.5}$ air standards based on emissions determined from the maximum proposed TDS concentration for cooling tower recirculation water. Cooling tower recirculation water is obtained from ground water wells at the H-POWER facility. The TDS content was based on laboratory analysis of recirculation water obtained from ground water source wells.

9. Conclusion and Recommendation

9.1 Emissions from mass-burn boiler, two RDF MWC boilers, RDF processing and storage buildings, and cooling towers were based on operation at maximum rated capacity. The boilers are equipped with post combustion air pollution controls to minimize emissions from burning MSW, RDF, and supplemental waste, and specification used oil. Particulate in ventilation air from the RDF processing and storage buildings is controlled with baghouses at the roof of the buildings. The cooling towers are equipped with drift eliminators to reduced particulate from dissolve solids in drift droplets that leave the cooling towers. The air modeling assessment for changes to the cooling towers showed compliance with ambient air quality standards for PM_{10} and $PM_{2.5}$. Recommend issuance of the covered source permit subject to the significant permit conditions, the thirty day public comment period, and forty-five day EPA review period.

Mike Madsen
December 23, 2011