

## **MODULE 5 INCINERATION**

The incinerator consists of a slagging rotary kiln followed by a vertical afterburner. Combustion gases, after exiting the afterburner, pass through a spray dryer, a baghouse, a saturator, a two-stage packed bed scrubber, and exit out the stack. The air pollution control train also includes a carbon injection system that delivers a weighed amount of activated carbon to the duct between the spray dryer and baghouse. The system consists of a storage bin that feeds two carbon-feeding trains. Each train has a rotary valve that periodically feeds carbon from the bin to a hopper mounted on a loss-in-weight scale. The scale feeds an eductor and piping that pneumatically conveys the weighed carbon to the crossover duct between the spray dryer and baghouse. The eductor motive airflow rate is a minimum of 80 actual cubic feet per minute (acfm) as specified by the eductor manufacturer.

In addition to the requirements and conditions listed in this Module and Permit, Clean Harbors Aragonite is also subject to 40 CFR 63 subpart EEE, R307-214-2 of the Utah Admin. Code, and a Title V permit administered by the Division of Air Quality.

### **5.A.            OPERATION AND MAINTENANCE**

- 5.A.1.            The Permittee shall maintain and operate the incineration system in accordance with the drawings and specifications contained in Attachments 10 and 11.
  
- 5.A.2.            Modifications to the drawings and specifications for the incineration system shall be allowed only in accordance with the permit modification requirements in Condition 1.D.
  
- 5.A.3.            All process monitors, required pursuant to Condition 5.E. shall be equipped with alarms operated to warn of deviation or imminent deviation from the limits specified in Condition 5.D.
  
- 5.A.4.            The Permittee shall maintain the incineration system so that when it is operated in accordance with the requirements in this permit, it will meet the performance standards specified in Condition 5.B.
  
- 5.A.5.            The Permittee shall maintain the incinerator and ancillary equipment in good repair. Routine maintenance shall be performed at sufficient frequency to ensure the incinerator remains in good repair. Malfunctions and deterioration shall be corrected as expeditiously as possible as outlined in Attachment 3.
  
- 5.A.6.            The Permittee shall comply with the provisions specified in the Fume Management Plan, Attachment 14.

5.B. PERFORMANCE STANDARDS

5.B.1. The incinerator shall achieve a destruction and removal efficiency (DRE) of at least 99.9999% for polychlorinated biphenyls (PCB). DRE shall be calculated in accordance with the formula given below.

$$DRE = \frac{W_{in} - W_{out}}{W_{in}} * 100$$

Where:  $W_{in}$  = mass feed rate of PCBs in the waste feeding the incinerator  
 $W_{out}$  = mass emission rate of PCB in exhaust emissions prior to release to the atmosphere

The DRE may not be rounded up to meet the required standard of 99.9999%.

5.B.2. The incinerator shall achieve a combustion efficiency (CE) of at least 99.9%. The CE shall be calculated in accordance with the formula given below.

$$CE = \frac{C_{CO2}}{C_{CO2} + C_{CO}} * 100$$

Where:  $C_{CO2}$  = concentration of carbon dioxide in the emissions prior to release to the atmosphere  
 $C_{CO}$  = concentration of carbon monoxide in the emissions prior to release to the atmosphere

The CE may not be rounded up to meet the required standard of 99.9%.

5.B.3. Compliance with the operating conditions specified in Condition 5.D. of this permit shall be regarded as compliance with the required performance standards identified in Conditions 5.B.1. through 5.B.2. However, if it is determined that compliance with the operating conditions in 5.D. is not sufficient to ensure compliance with the performance standards specified in Conditions 5.B.1. through 5.B.2., the permit may be modified, revoked, or reissued, pursuant to R315-270-41.

5.C. PERMITTED AND PROHIBITED WASTES

5.C.1. The Permittee may feed to the incinerator the wastes identified in Condition 2.C.1. only in accordance with the requirements in Condition 2.C.1 and this permit unless prohibited in Condition 5.C.2.

5.C.2. The following shall not be fed to the incinerator at any time:

- a. Any waste or material identified in Condition 2.C.2.

- b. Waste with the codes F020, F021, F022, F023, F026, F027, and F028.

5.C.3. The Permittee may pursue approval to incinerate dioxin-listed wastes (i.e., wastes with the codes F020, F021, F022, F023, F026, F027, and F028), but any such request for approval must comply with the following:

- a. The request for approval shall be considered a class 3 permit modification subject to all applicable procedures in Condition 1.D.2.
- b. The modification request shall include a plan detailing a two-part test burn that must be successfully conducted before final approval to incinerate dioxin-listed wastes can be obtained.
- c. The first portion of the test will demonstrate a DRE equal to or greater than 99.9999% on all POHCs. The designated POHCs shall be those determined to be more difficult to incinerate than tetra-, penta-, and hexachlorodibenzo-p-dioxins and dibenzofurans. The test plan must include all applicable EPA-approved trial burn test methods and procedures in effect at the time of the request.
- d. The Director of the Division of Waste Management and Radiation Control (Director) may require the Permittee to demonstrate compliance with other performance standards contained in this permit when conducting this portion of the test.
- e. The Director may require the Permittee to perform additional risk assessment studies based upon the measured emissions from this portion of the test.
- f. The second portion of the test detailed in the class 3 modification request outlined in Condition 5.C.3.a. will only be approved if the Permittee successfully demonstrates to the Director that at least 99.9999% DRE was obtained on all of the POHCs during the first portion of the test burn. The second portion of the test will be the dioxin risk test. The purpose of the second portion of the dioxin risk test is to demonstrate that, while burning dioxin-listed wastes, the dioxin/furan emissions from the incinerator are below levels that pose an unacceptable risk to human health and the environment. The Permittee may only incinerate dioxin-listed wastes for the purpose of conducting this dioxin risk test.
- g. The description of this dioxin risk test in the modification request must include at a minimum the following:

Details of all applicable EPA-approved test methods and procedures that will be used during the test.

Provisions for ensuring that the dioxin-listed wastes fed during the test are representative of the dioxin-listed wastes that the Permittee expects to feed during routine operation.

Procedures to conduct a risk assessment based upon the measured dioxin/furan emission rates as directed by the Director.

Management procedures for dioxin-listed wastes at the facility prior to incineration.

If applicable, specific incinerator operating conditions when feeding dioxin-listed wastes.

- h. No final approval to incinerate dioxin-listed wastes can be granted unless the Permittee successfully conducts both portions of the test as described in this condition and demonstrates through approved risk assessment procedures that burning dioxin-listed wastes does not pose an unacceptable risk to human health and the environment.

5.D. OPERATING REQUIREMENTS AND FEED RATE LIMITS

The Permittee shall comply with all requirements established in this permit when feeding any wastes to the incinerator, including those which may not carry an EPA waste code or Utah waste code, including infectious waste, industrial waste, exempt hazardous waste, non-hazardous waste, or other wastes.

The feed rate limits established in this Condition shall include contributions from all feed sources, waste and non-waste. (For example, metals feed rates shall include contributions from sources such as slag from slag removal equipment and fluxing agents; weight limits shall include containers, fluxing agents, and other additives fed to the incinerator; etc. However, analysis of additives such as salt or glass which are not likely to have significant levels of metals will not be required.)

All operating requirements and feed rate limits described in this Condition are based upon instantaneous, unsmoothed values unless explicitly indicated otherwise. When two instruments are used to monitor a process variable, one of the instruments will be selected for compliance purposes, unless indicated otherwise below. When three instruments are used to monitor a process variable, the selected value will be the median value of the three instrument readings if all three are on-line, the average of the two if only two are on-line, or the value of the one if only one is on-line. The selected value will be the compliance point.

Where an hourly rolling average (HRA) or a 12-hour rolling average is specified, the calculations shall be in accordance with 40 CFR §63.1209(a)(6) and 40 CFR §63.1209(b)(5).

The Permittee may feed the wastes described in Condition 5.C.1. to the incinerator only under the following conditions:

- 5.D.1. The temperature of the combustion gas at the kiln exit shall not be less than 1783°F on an hourly rolling average basis. The Permittee shall document in the operating record those periods when only one infrared pyrometer is on-line.
- 5.D.2. The kiln rotation shall be maintained at 0.15 rpm or greater.
- 5.D.3. The temperature of the combustion gas at the afterburner hot duct shall not be less than 1972°F on an hourly rolling average basis.
- 5.D.4. The Permittee shall control fugitive emissions from the combustion zone of the incinerator. The pressure in the combustion zone shall not be equal to or above atmospheric pressure for more than 5 seconds.
- 5.D.5. The Permittee shall minimize the emissions from the deslagger by venting the fumes back to the afterburner chamber. The Permittee shall correct malfunctions in the venting system within 72 hours.
- 5.D.6. The concentration of oxygen in the afterburner shall not be less than 3% for more than 2 minutes or less than 2% for more than 15 seconds.
- 5.D.7. The exhaust gas temperature at the exit of the spray dryer shall not exceed 396°F on an hourly rolling average basis. The exhaust gas temperature at the exit of the spray dryer shall not exceed 520°F. The exhaust gas temperature at the exit of the spray dryer shall not be less than 250°F nor be less than 350°F for more than 15 minutes.
- 5.D.8. The pressure drop across the baghouse shall be no less than 1.8 inches W.C.
- 5.D.9. The exhaust gas temperature at the exit of the saturator shall not exceed 225°F.
- 5.D.10. The liquid flowrate to the saturator shall not be less than 300 gallons per minute on an hourly rolling average basis.
- 5.D.11. The pH of the first stage scrubber liquid feed to the packed tower shall not be less than 4.99 on an hourly rolling average basis. Sodium carbonate will be used as the neutralization agent.
- 5.D.12. Scrubber liquid flowrate to the first stage of the packed tower shall not be less than 1873 gallons per minute on an hourly rolling average basis.
- 5.D.13. The pH of the second stage scrubber liquid feed to the packed tower shall not be less than 6.25 on an hourly rolling average basis. Sodium carbonate will be used as the neutralization agent.

- 5.D.14. The pH of the scrubber effluent from the second stage of the packed tower shall not be less than 5.8 on an hourly rolling average basis.
- 5.D.15. Scrubber liquid flowrate to the second stage of the packed tower shall not be less than 1870 gallons per minute on an hourly rolling average basis.
- 5.D.16. The feed rate of activated carbon to the inlet of the baghouse shall not be less than 23.8 pounds per hour on an hourly rolling average basis.
- 5.D.17. Combustion gas velocity, measured as combustion gas flowrate at the stack, shall not exceed 66,804 acfm on an hourly rolling average basis.
- 5.D.18. The Permittee shall comply with all PCB feed rate limitations listed in Section II(2)(i) of Attachment 17 to the Permit.
- 5.D.19. The Permittee shall not feed metals or metal bearing wastes to the incinerator in a manner that would violate Section R315-268 of the Utah Administrative Code. Compliance with the metals feed limitations shall be demonstrated through waste analysis of the incinerator feed in accordance with Conditions 2.D. and 5.D.
- 5.D.20. The Permittee shall operate the incinerator in such a way as to minimize opening the emergency vent.
- 5.D.21. The Permittee shall operate the incinerator in such a way as to minimize bypassing the baghouse.
- 5.D.22. The Permittee shall operate the incinerator in such a way as to minimize the activation of the emergency stop button.
- 5.D.23. Throughout operation, the Permittee shall conduct sufficient analysis of the feed, in accordance with the waste analysis requirements of Conditions 2.D. and 5.D., to verify that the waste fed to the incinerator is within the physical and chemical composition limits specified in this permit.

5.E. MONITORING, RECORDKEEPING, AND CALIBRATION REQUIREMENTS

- 5.E.1. Hazardous wastes may be fed to the incinerator only when all instruments required by this condition are on-line and operating properly.
- 5.E.2. The Permittee shall maintain and operate the monitoring and recording equipment specified in Attachment 16 while incinerating hazardous waste. The data shall be monitored and recorded in accordance with Attachment 16. The monitoring equipment specified in Attachment 16 shall provide accurate data.
- 5.E.3. Alarms generated by the plant control system shall be recorded and made available for review by the Director.

- 5.E.4. The Permittee shall record the date and time of all automatic waste feed cut-offs, including the initiating triggering parameter(s), reason for the cut-off, and corrective action taken.
- 5.E.5. The monitoring instruments shall be calibrated in accordance with Attachment 13.
- 5.E.6. The Permittee shall comply with Attachment 15 and 40 CFR 266 Appendix IX, Section 2.1, which is incorporated by reference in R315-266.
- 5.E.7. The Permittee shall provide access to the data archiving system (Wonderware) for the Director to review. This shall be accomplished by making available a remote link to the computer system and the appropriate query system for accessing the required data. Data to be accessible include the data required to be maintained in Attachment 16.
- 5.E.8. All wastes or materials processed in the incinerator shall be tracked in accordance with the waste tracking provisions of Attachment 8. The Permittee shall provide access to the electronic waste tracking system portion of the operating record for the Director to review. This shall be accomplished by making available a remote link to the computer system and the appropriate query system for accessing the required data. Data to be accessible include manifest information, load sample analyses, weights, current locations, movement histories, and the dates/times incinerated or transferred off-site.

5.F. WASTE FEED CUT-OFF REQUIREMENTS

All waste feed cut-off requirements described in Condition 5.F. are based upon instantaneous, unsmoothed values unless explicitly indicated otherwise.

The Permittee shall maintain systems to automatically cut off the hazardous waste feed to the incinerator as identified in Attachment 12 and under any of the following conditions:

PARAMETER	TYPE OF WFCO*	IMMEDIATE CUTOFF LIMIT	DELAYED CUTOFF LIMIT	DELAY PERIOD
1. Kiln exit gas temperature	2	< 1783°F HRA	N/A	N/A
2. Kiln rotation	2	< 0.15 rpm	N/A	N/A
3. Afterburner exit gas temperature	1	< 1972°F HRA	N/A	N/A
4. Afterburner chamber differential pressure	1	N/A	≥0.0" W.C.	5 seconds
5. Afterburner oxygen concentration	1	N/A	<3%	2 minutes
6. Afterburner oxygen concentration	1	N/A	<2%	15 seconds
7. Spray dryer outlet gas temperature	1	> 396°F HRA	N/A	N/A
8. Spray dryer outlet gas temperature	1	> 520°F	N/A	N/A
9. Spray dryer outlet gas temperature	1	< 250°F	<350°F	15 minutes
10. Pressure drop across the baghouse	1	< 1.8" W.C.	N/A	N/A
11. Saturator outlet gas temperature	1	> 225°F	N/A	N/A
12. Saturator brine flow rate	1	< 300 gpm HRA	N/A	N/A
13. 1st stage packed tower liquid feed pH	1	< 4.99 HRA	N/A	N/A
14. 1st stage packed tower brine flow rate	1	< 1873 gpm HRA	N/A	N/A
15. 2nd stage packed tower liquid feed pH	1	< 6.25 HRA	N/A	N/A
16. 2nd stage packed tower liquid effluent pH	1	< 5.8 HRA	N/A	N/A
17. 2nd stage packed tower brine flow rate	1	< 1870 gpm HRA	N/A	N/A
18. Feed rate of activated carbon	1	< 23.8 lb/hr HRA	N/A	N/A
19. Combustion gas flowrate as measured at the stack	1	> 66,804 acfm HRA	N/A	N/A
20. Combustion efficiency	1	< 99.9%	N/A	60 seconds
21. Shutdown of the A-104 burner management system (BMS)	2	shutdown**	N/A	N/A
22. Shutdown of the A-106A burner management system (BMS)	3	shutdown**	N/A	N/A
23. Shutdown of the A-106B burner management system (BMS)	3	shutdown**	N/A	N/A
24. Shutdown of the A-106A and A-106B burner management systems (BMS)	1	shutdown**	N/A	N/A
25. Emergency stop button	1	activated	N/A	N/A
26. Manual waste feed cutoff button	1	activated	N/A	N/A
27. Utility power failure	1	power failure	N/A	N/A
28. Emergency vent opening	1	vent open	N/A	N/A
29. Baghouse on bypass	1	baghouse bypass	N/A	N/A
30. ID fan off	1	fan off	N/A	N/A

- \* 1 -- total waste feed cutoff  
2 -- total kiln waste feed cutoff only  
3 -- waste feed cutoff to the affected gun/lance/feed mechanism only

- \*\* shutdown of the burner management system (BMS) for any of the following:  
i) Flameout;  
ii) Loss of burner combustion air pressure;  
iii) Loss of pressure on all enabled fuel and waste liquid lines;  
iv) Loss of atomizing air pressure on all enabled fuel and waste liquid lines;  
v) Disabling all fuels and waste liquids;  
vi) Manual shutdown of BMS.



- 5.F.31. In the case of a malfunction of the automatic waste feed cut-off system, the Permittee shall immediately initiate manual waste feed cut-off. The Permittee shall not restart feed to the incinerator until the problem causing the malfunction has been identified and corrected.
- 5.F.32. The Permittee shall test the emergency waste feed cut-off systems and associated alarms at least on a weekly basis (once every 168 hours on waste) in accordance with Attachment 12 to verify operability.
- 5.F.33. For certain feed parameters that require analysis of the waste in addition to a feed rate in order to comply with feed limitations (e.g., metals, chlorine, etc.), the control system shall be programmed to evaluate the impact of feeding the next incremental unit of waste and forecast if the permit limits would still be met. If feeding that particular waste would cause the permit limits to be exceeded, the system shall not allow the material to be fed.

5.G. TESTING REQUIREMENTS

- 5.G.1. The Permittee shall conduct periodic sampling and analysis of the waste and exhaust emissions to verify that the operating requirements established in the permit achieve the performance standards or a subset of the performance standards as approved by the Director in the test plan. This sampling and analysis or subsequent performance testing shall be performed at a minimum of every 30 months in accordance with the MACT Confirmatory and Comprehensive Performance Testing Schedule or more often if requested in writing by the Director.
- 5.G.2. At least six months prior to a scheduled performance test, the Permittee shall submit a test plan describing the parameters to be tested for, the sampling and analytical methods to be used, the quality assurance/quality control procedures to be followed, and any other necessary information for approval from the Director. Within 90 days of the conclusion of the performance test (defined as the last day that samples were collected at the site) a report shall be submitted to the Director. The report will include a copy of all data collected during the performance test and calculations and determinations to show whether the applicable performance standards outlined in Condition 5.B. were met. The calculations and supporting data shall also be submitted electronically.