



**PERMIT APPLICATION
REVIEW SUMMARY**

New Hampshire Department of Environmental Services
Air Resources Division
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Facility:	Hebron Bridgewater Refuse District	Engineer:	Barbara Dorfschmidt
Location:	Bridgewater		
AFS #:	3300900011	Application #:	FY05-0109
		Date:	7/14/05
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APPLICATION & OTHER COMMUNICATION:

<u>Date</u>	<u>Description</u>
5/2/05	Application received
6/29/05	Incompleteness letter sent - signature needed for ARD-1 form
7/7/05	Signed ARD-1 form received

PROJECT DESCRIPTION

This application is for an initial State Permit to Operate for a municipal solid waste incinerator. The Temporary Permit, TP-C-0002, for this process expires on 7/31/05. An application shield applies to this permit.

FACILITY/PROCESS DESCRIPTION

The Hebron Bridgewater Refuse District purchased a solid waste incinerator in 2003 (ACS, Inc. model #CA-750 MSW; serial #8171). The capacity of the device is 750 lbhr of refuse. The incinerator exhaust is directed to a wet scrubber, but in case of a shut down of the scrubber system, the emissions will be vented out the incinerator stack.

POLLUTION CONTROL EQUIPMENT

The incinerator is controlled by a wet scrubber. The permit application for the Temporary Permit stated that the removal efficiency of the scrubber ranges from 94 to 99% depending on the pollutant that is to be removed. Stack testing conducted in October 2004 was unable to verify these removal efficiencies. For pollutants that were measured during the stack test, the actual measured emission rates were used for this review. For hydrogen chloride (HCl) a removal efficiency of 90% was used. The scrubber manufacturer claims that there is a 99% removal efficiency for HCl, but 90% is used in this review for conservatism.

EMISSION CALCULATIONS/AIR TOXICS REVIEW

Stack testing was conducted in October 2004. The emission rates obtained from the stack testing were used for this application review. For pollutants that were not included in the testing, emission factors were used. Emission factors were taken from the USEPA document AP-42 (5th Edition 1/95, updated 10/96), Section 2.1, *Refuse Combustion*, or were determined using stoichiometric combustion calculations. In the cases where the scrubber outlet emission rate was shown to be greater than the inlet rate, the outlet rate was used for both the uncontrolled and controlled emission rate. The following table summarizes the emission rates:

Pollutant	Emission Rate Source	Uncontrolled Emissions (lb/hr)	Controlled Emissions (lb/hr)
NOx	Stack test	1.9	No removal
CO	AP-42	0.11	No removal
SO ₂	Stoichiometric combustion calcs.	1.8	No removal
Particulate	Stack test	0.24	0.088
HCl	Stoichiometric combustion calcs.	0.90	0.09 (assumed 90% removal)
TCDD	AP-42	1.1 x 10 ⁻⁶	No removal
Lead	Stack test	3.11 x 10 ⁻³	2.10 x 10 ⁻³
Arsenic	Stack test	9.59 x 10 ⁻⁵	3.37 x 10 ⁻⁵
Cadmium	Stack test	6.25 x 10 ⁻⁴	4.62 x 10 ⁻⁴
Chromium	Stack test	7.60 x 10 ⁻⁵	5.99 x 10 ⁻⁵
Nickel	Stack test	8.29 x 10 ⁻⁵	No removal
Mercury	Stack test	3.78 x 10 ⁻⁵	No removal

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The facility is a true minor source for criteria pollutants. The following lists the criteria pollutant potential emissions based on 8760 hr/yr.

NOx = 8.32 tpy (note that the emission rate from the stack test is greater than the AP-42 emission rate)

CO = 0.48 tpy

SO₂ = 7.88 tpy

PM₁₀ (assume all particulates are less than 10 microns), uncontrolled potential = 1.05 tpy

Air Toxics Review

The Env-A 1400 Compliance Determination Flow Chart was used to determine the facility's compliance status as well as their need for a State Permit to Operate. The following details the steps of the flow chart and the results for this facility:

1 – Actual, uncontrolled emissions less than de minimus?

Since TCDD (2,3,7,8-Tetrachlorodibenzo-p-dioxin) does not have listed de minimus emission rates, this step was skipped.

2 – Actual adjusted in-stack concentration less than 50% of the AALs?

Since actual operating hours are unknown, this step was skipped.

3 – Potential adjusted in-stack concentration less than the AALs?

Emission rates used are uncontrolled emission rates.

The flow rate from the scrubber stack (1730 acfm is used for the calculation)

Pollutant	In-Stack Conc.	24-hr AAL	% of AAL	Annual AAL	% of AAL
HCl	347	20	1735%	20	1735%
TCDD	0.0004	0.001	40%	0.001	40%
Lead	1.20	0.18	667%	0.12	1000%
Arsenic	0.037	0.036	103%	0.024	154%
Cadmium	0.241	0.036	669%	0.024	1004%
Chromium	0.029	0.036	81%	0.024	121%
Nickel	0.032	3.6	0.88%	2.4	1.3%
Mercury	0.015	0.3	50%	0.3	50%

Based on the above, compliance is shown and no permit is required for the following pollutants: TCDD, Nickel and Mercury.

4- Using dispersion modeling and potential, uncontrolled emission rates, are impacts less than the AALs?

Unit impact factors were developed in May 2005 for both the incinerator and the scrubber stack. For determining permit applicability as well as compliance, the impacts were evaluated using the uncontrolled emission rates out of both of the stacks.

Pollutant	24-hr Impact from Incinerator	24-hr Impact from Scrubber	24-hr AAL	Annual Impact from Incinerator	Annual Impact from Scrubber	Annual AAL
HCl	13.23	50.4	20	2.52	6.84	20
Lead	0.046	0.17	0.18	0.009	0.02	0.12
Arsenic	0.0014	0.0054	0.036	0.0003	0.0007	0.024
Cadmium	0.0092	0.035	0.036	0.002	0.005	0.024
Chromium	0.0011	0.0043	0.036	0.0002	0.0006	0.024

Based on the above, compliance is shown and no permit is required for the following pollutants: Lead, arsenic, cadmium and chromium. Since the 24-hr impact of HCl emitted from the scrubber stack is greater than the AAL, controls are required for this pollutant to show compliance (impact based on controlled emission rate is 5.04). Because controls are required for compliance, a permit is required for the device.

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STACK INFORMATION

The following table details the stack parameters for the source (note that the exhaust flow and temperature listed are those measured during the October 2004 stack test). The scrubber stack currently is 37 feet above ground level. The source has stated that they are planning on installing a sound muffler on the stack which will increase the height to 40.5 ft. The increased stack height was used for the air toxics analysis detailed above.

Stack	Diameter (ft)	Height (ft)	Exhaust Flow (acfm)	Exhaust Temperature (°F)	Stack Configuration
Incinerator	2.3	40	6677	1750	Vertical/unobstructed
Scrubber	1.0	40.5	1730	90	Vertical/unobstructed

MODELING

Modeling was conducted in May 2005 using stack parameters developed from the stack test data. Modeling developed unit impact factors to use for compliance demonstrations. See discussion above for details on the compliance demonstration. Details of the modeling analysis are contained in a memo dated May 25, 2005.

EMISSION TESTING

As mentioned above, stack testing was conducted in October 2004 pursuant to the Temporary Permit. No additional testing will be required at this time.

SITE VISITS/INSPECTIONS

<u>Date</u>	<u>Description</u>
7/11/05	Compliance inspection conducted by David Degler – no issues were found.

ANNUAL EMISSION REPORTS/FEES

The source is up to date with all its annual emission reports and all fees up to and including those owed for 2004 have been paid.

CHANGES FROM PREVIOUS PERMIT

There are a few changes from the Temporary Permit to be incorporated into the State Permit to Operate:

- The Temporary Permit contained a limit on the amount of waste combusted on a 24-hour basis when the scrubber system is not operating. Based on the stack test results, this limit is no longer required in order for the source to be in compliance with Env-A 1400.
- The emission limits for NOx and PM10 were adjusted to account for the results of the stack test.
- The minimum height of the scrubber stack was increased to 40.5 feet.
- The Temporary Permit stated that the scrubber system would be maintained and operated as described in the Operating and Maintenance Instructions provided by ACS, Inc. The State Permit to Operate will prescribe specific maintenance, monitoring and operating requirements.

REVIEW OF REGULATIONS

State Regulations

Env-A 600 – Permitting (effective 7/28/04)

- 607.01(e) – NO – The incinerator has a design rating less than 1000 lb/hr.
- 607.01(n) – NO – The facility is a true minor source.
- 607.01(v) – YES – A permit is required because controls are needed to meet the requirements of Env-A 1400

Env-A 1200 – Prevention, Abatement and Control of Stationary Source Air Pollution (effective 10/31/02)

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- The potential emissions of VOC and NOx are less than any applicable part of this regulation.

Env-A 1400 – Regulated Toxic Air Pollutants (effective 6/11/04)

- 1402 – YES – Controls are required to show compliance for hydrogen chloride.

Env-A 1900 – Incinerators and Wood Waste Burners (effective 2/26/05)

- 1903.01(a)– YES – visible emissions shall not exceed 20%
- 1904.01(b) – YES – particulate emissions limited to 0.2 grains/scf
- 1905.01 – NO – incinerator has a design rating less than 4,000 lb/hr
- 1906 – YES – Nameplate and instruction postings and trained operator required

Federal Regulations

In December 2004, the USEPA published draft rules in the Federal Register. The rules would be codified under 40 CFR 60 Subparts EEEE and FFFF and be titled, *Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Other Solid Waste Incineration Units*. The Hebron Bridgewater incinerator would be covered as an existing source under these rules which are scheduled to be promulgated in November 2005. Once the rules are finalized, the incinerator may become subject to requirements not included in this State Permit to Operate.

SUMMARY AND CONCLUSIONS

In summary, the operations as applied for will be capable of meeting all regulations and standards for air quality. A State Permit to Operate has been drafted.