



CONFIDENTIAL VERSION

1720 Walton Road, Blue Bell, PA 19422 610-828-3078 Fax 610-828-7842

September 24, 2010

EXPRESS MAIL

Fed Ex. No. 8720 7753 0351

Mr. Mark Wejkszner
Environmental Engineering Manager
Air Quality Program
Pennsylvania Department of Environmental Protection
Northeast Regional Office
Two Public Square
Wilkes-Barre, PA 18711

Air Quality	
County:	
SEP 27 2010	
Facility:	
Permit:	
File #:	

Subject: CONFIDENTIAL VERSION - RFD for Energy Production Process
Delta Thermo Energy, Inc.
112 Union Street
Allentown, Pennsylvania
IES Project No. EHS09894.01

Dear Mr. Wejkszner:

On behalf of Delta Thermo Energy, Inc. (DTE), IES Engineers (IES) is pleased to submit an original and two copies of the enclosed Request for Determination of Requirement for Plan Approval (RFD) for the operation of a Research and Development (R&D) Energy Production facility. The facility will utilize municipal solid waste (MSW) and sludge from the City of Allentown Waste Water Treatment Plant (Allentown WWTP) as fuel to generate 2.0 MW (net) of electricity. DTE is interested in leasing an undeveloped parcel of land located adjacent to the Allentown WWTP, at 112 Union Street in Allentown, Pennsylvania, in order to construct and operate this proposed R&D facility.

Please note that the information in this RFD contains proprietary information; release of this information to a third party could jeopardize DTE's competitive position in the industry. The information provided in this application should be treated as "Confidential" under 25 Pa. Code Section 127.12(d), inasmuch as the application contains trade secrets and intellectual property rights, the disclosure of which could potentially adversely impact the competitive position of the applicant. Accordingly, please find enclosed two separate RFD applications. One is marked "Public" and contains only the emission data, and the other is marked "Confidential" and should not be disclosed or made publicly available. In addition to the protections accorded by 25 Pa. Code Section 127.12(d), the application should be considered exempt from public disclosure under Section 708(b)(11) of the Pennsylvania Right-to-Know Law. Under the Right-to-Know Law, the application marked "Confidential" should not be considered a public record because it would reveal trade secrets or other confidential proprietary information.



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Mr. Mark Wejkszner
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We would appreciate the Department's cooperation in approving this RFD so that the project may proceed as soon as possible. Should you have any questions, please let me know.

Very truly yours,

Robert W. Schlosser /e/
Robert W. Schlosser, P.E.
Principal Project Manager

Enclosures

cc: M. Bonilla, DTE
R. Van Naarden, DTE
J. Bolstein, FR, LLP
B. Bakrania, IES
M. Tucci, IES
A. Soni, IES



39-0683

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF AIR QUALITY

Lehigh Cty RFD File.

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Request for Determination of Changes of Minor Significance
and Exemption from Plan Approval/Operating Permit
Under Pa Code §127.14 or §127.449

A. Request for:	
Exemption from Plan Approval	Exemption from Operating Permit
<input type="checkbox"/> Physical changes to sources of minor significance, pursuant to 25 Pa. Code Section 127.14(a)(9)	<input checked="" type="checkbox"/> Other sources and classes of sources of minor significance, pursuant to 25 Pa. Code Section 127.14(a)(8)
<input type="checkbox"/> Additional physical changes of minor significance that do not add new equipment, pursuant to 25 Pa. Code Section 127.14(c)(1)	<input type="checkbox"/> Physical changes to sources of minor significance, pursuant to 25 Pa. Code Section 127.14(a)(9)
<input checked="" type="checkbox"/> Other sources and classes of sources of minor significance, pursuant to 25 Pa. Code Section 127.14(a)(8)	<input type="checkbox"/> Changes due to De Minimis increases in emissions, pursuant to 25 Pa. Code Section 127.449
<input type="checkbox"/> Additional physical changes of minor significance that add new equipment, pursuant to 25 Pa. Code Section 127.14(c)(2)	<input type="checkbox"/> Additional physical changes of minor significance that add new equipment, pursuant to 25 Pa. Code Section 127.14(c)(2)
<input type="checkbox"/> Minor Sources or classes of sources, pursuant to 25 Pa. Code Section 127.14(a)(1)-(7)	<input type="checkbox"/> Additional physical changes of minor significance that do not add new equipment, pursuant to 25 Pa. Code Section 127.14(c)(1)
B. Company/Facility Information	
Company/Facility Name: Delta Thermo Energy, Inc	Plant Name:
Site Address: 112 Union Street Allentown PA 18102	
Mailing Address: 66 Witherspoon Street No. 111 Princeton NJ 08542	
Federal Employer Identification Number (EIN):	
Current Operating Permit No:	NAICS Code: 221110
Name of Person Completing Form: Michael Tucci	Title: Consultant
Address	Telephone: (610) 828-3078
1720 Walton Road	Fax: (610) 828-7842
Blue Bell PA 19422	Email: mtucci@iesengineers.com
Name of Company/Facility Contact Person: Robert Van Naarden	Title: CEO - DTE, Inc
Address	Telephone: (609) 423-6096
66 Witherspoon Street No. 111	Fax:
Princeton NJ 08542	Email: rvannaarden@deltathermo.com
C. Project Description	
Project Type: <input type="checkbox"/> Other <input type="checkbox"/> Remediation <input type="checkbox"/> Modification <input checked="" type="checkbox"/> New Construction	
Total number of sources in project: 1	
Description of project: Delta Thermo Energy, Inc. (DTE) is proposing to construct a new Research and Development (R&D) Energy Production facility in Allentown, Lehigh County, Pennsylvania. It is proposing to utilize municipal solid waste (MSW) and sludge from the City of Allentown Waste Water Treatment Plant (Allentown WWTP) as fuel to generate 2.0 MW (net) of electricity.	



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D. Source Description			
Source Name: 001-Energy Production Process			
Source Category: Research & Development Energy			
Source Location: Delta Thermo Energy, Inc; 112 Union Street, Allentown PA			
Source Type: <input checked="" type="checkbox"/> Stationary <input type="checkbox"/> Portable			
Is equipment existing or proposed? <input type="checkbox"/> Existing <input checked="" type="checkbox"/> Proposed			
Actual or Planned Date of Installation: 10/01/2010			
Municipality: Allentown		County: Lehigh	
Source Description: Delta Thermo Energy, Inc. (DTE) is proposing to construct a new Research and Development (R&D) Energy Production facility in Allentown, Lehigh County, Pennsylvania. It is proposing to utilize municipal solid waste (MSW) and sludge from the City of Allentown Waste Water Treatment Plant (Allentown WWTP) as fuel to generate 2.0 MW (net) of electricity. The process will consist of thermal treatment, steam generation (boiler), and electric power generation (turbine). Off-gas from the boiler will be treated by air pollution control devices prior to being emitted through a stack.			
Pollutant	Calculation Method	Emissions (lbs/hr)	Emissions (tons/year)
Particulate	SEE COMMENT	0.1100	0.4800
PM10	SEE COMMENT	0.1100	0.4800
PM2.5	SEE COMMENT	0.1100	0.4800
SOX	SEE COMMENT	0.1800	0.7800
CO	SEE COMMENT	1.0900	4.7900
NOX	SEE COMMENT	0.4500	1.9700
VOC	SEE COMMENT	0.0000	0.0000
Hazardous Air Pollutants	SEE COMMENT	0.1100	0.4900
Lead	SEE COMMENT	0.0100	0.0600
Will the construction of this source increase emissions from other sources at this facility?			
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Is the construction or modification of the source subject to 25 Pa. Code, Subchapter E, New Source Review (NSR) requirements or prevention of Significant Deterioration (PSD) of Air Quality regulations at Subchapter D?			
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			



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Under Pa Code §127.14 or §127.449

E. Exemption History				
Source Name	Date of Installation	Reason for Exemption		
		RFD	Exemption List	De Mi
F. List of Attached Documents				
Description of Attachment				Confidenti
Delta Thermo Energy, Inc. (DTE) is proposing to construct a new Research and Development (R&D) Energy Production facility in Allentown, Lehigh County, Pennsylvania.				N
G. Signature of Responsible Official or Authorized Representative				
I, Michael Tucci , certify under penalty of law as provided in 18 Pa. C.S.A. § 4904 and 35 P.S. § 4009(b)(2) that based on information and belief formed after reasonable inquiry, the statements and information contained in this form are true, accurate, and complete.				
Michael Tucci	09/24/2010	610-828-3078		
Name	Date	Telephone		
1720 Walton Road Blue Bell PA 19422		mtucci@iesengineers.com		
Address		Email Address		



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REQUEST FOR DETERMINATION OF REQUIREMENT FOR PLAN APPROVAL

ENERGY PRODUCTION PROCESS

**DELTA THERMO ENERGY, INC.
ALLENTOWN, PENNSYLVANIA**

SUBMITTED TO:

**PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST REGIONAL OFFICE
TWO PUBLIC SQUARE
WILKES-BARRE, PENNSYLVANIA 18711**

SUBMITTED BY:

**IES ENGINEERS
1720 WALTON ROAD
BLUE BELL, PENNSYLVANIA 19422**

**IES PROJECT NO. EHS09894.01
SEPTEMBER 2010**



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REQUEST FOR DETERMINATION OF REQUIREMENT FOR PLAN APPROVAL FORM

- 1.0 PROCESS DESCRIPTION
- 2.0 EMISSION CALCULATIONS
- 3.0 REGULATORY ANALYSIS



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1.0 PROCESS DESCRIPTION

Delta Thermo Energy, Inc. (DTE) is proposing to construct a new Research and Development (R&D) Energy Production facility in Allentown, Lehigh County, Pennsylvania. It is proposing to utilize municipal solid waste (MSW) and sludge from the City of Allentown Waste Water Treatment Plant (Allentown WWTP) as fuel to generate 2.0 MW (net) of electricity. DTE is interested in leasing an undeveloped parcel of land located at 112 Union Street in Allentown, Pennsylvania, for the facility.

The purpose of this facility will be to demonstrate that MSW and sludge can be used as an alternative fuel. The facility will be a pilot plant that will use state-of-the-art combustion technology to convert MSW and sludge to fuel which will be combusted to generate steam, which in turn will generate a "green", renewable source of electricity. This particular type of technology has not yet been deployed in the United States and this plant will be the first of its kind in Pennsylvania. The research goals from the pilot plant will be to improve on the current design, improve on the overall process, and design the next generation plant. The process will then be marketed by DTE for use in other parts of Pennsylvania, along with other States as well as other countries.

The pilot plant will be constructed with a laboratory to monitor plant parameters that will provide valuable research data for design and development purposes. The laboratory will monitor efficiency, emissions, and other process parameters.

The process will consist of thermal treatment (RSS), thermal utilization (CCC), steam generation (boiler), and electric power generation (turbine). Off-gas from the boiler will be treated by air pollution control devices prior to being emitted through a stack. These processes are further described below.

Biomass Fuel Processing and Handling

For the first year of operation, the pilot plant will burn only pulverized fuel (PF) composed of MSW at the rate of 110 Gross U.S. tons per day [100 metric tons] (tpd). The MSW will be supplied by various municipal waste disposal companies. For the second year and subsequent years of operation, the plant will add sludge to the fuel stream. The Allentown WWTP will supply approximately 55 Gross U.S. tpd [50 metric tons] of sludge and the proposed plant will have a daily input capacity of 165 Gross U.S. tpd (150 metric tons) of mixed stream (sludge and MSW) to be processed into pulverized fuel (PF). Because of the moisture content and composition of MSW and sludge, DTE expects to have a net input of 85 tpd of MSW and 9 tpd of sludge; emission calculations are based on these net volumes.

The MSW and sludge feedstock will be transported separately by truck to the facility. The plant will have an inside storage capacity for three to five days of feedstock. MSW feedstock will be received by the plant with the majority of the recyclables and unusable material presorted out of the stream. DTE estimates that approximately 14% of the MSW feedstock stream will contain



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recyclables and unusable material that will need to be removed at the facility and transported off site for recycling.

Thermal Treatment (RRS)

The MSW and sludge will be mechanically and thermally treated by a Resource Recycling System (RRS) to create PF. No particulate will be generated from this process since the RRS process will utilize the moisture within the MSW and sludge. This mixture will have a maximum moisture content of 30%. Excess wastewater extracted from the MSW and sludge treatment process will be returned to the Allentown WWTP. Prior to release to the Allentown WWTP, all scrubber blow down water and excess water from the RRS process will be treated to applicable standards (BOD, COD, TN, and TKN) as required by the City of Allentown. Calculations show that this quantity is estimated to be less than 20,000 gallons per day.

Thermal Utilization (CCC)

The PF will feed into the Complete Combustion Chamber (CCC). The CCC is an innovative variation of the stoker-fired boiler design. However, it is neither a moving nor a vibrating grate combustor. DTE's system instead uses a combination of feed speed and air injection systems (over and under-fire air) for combustion. DTE's CCC technology is a unique innovation and viable alternative to a traditional stoker-fired boiler. The CCC is specially designed to provide improved combustion efficiency and lower emissions.

The CCC will be constructed of steel, lined with refractory, and heated directly by a fuel gas burner system. The natural gas burner system will only be used during startup. Natural gas will be used to bring the CCC up to the required operating temperature, which will take approximately 8 hours and will occur at the initial startup and after maintenance activities. The PF will be burned at approximately 1,652 °F (900 °C). The resulting ash will be discharged by a conveyor system, while the resulting off-gas will be transferred to the post-combustion chamber. In the post-combustion chamber, the residence time of the off-gas will be ≥ 2 seconds, and the chamber is safe to operate above 1,562 °F (850 °C). The fuel gas burner will be designed to meet regulations regarding ignition and monitoring devices, automatic firing devices, UV flame monitoring devices, etc. Both the CCC and post-combustion chamber will be equipped with local process measuring, control equipment, and combustion air fans. The outlet of the post-combustion chamber connects to an inlet for the boiler.

Steam Generation (Boiler)

The flue gas from the CCC will be supplied to the fire-tube boiler for the purpose of steam generation. The boiler will be sized to generate 2.0 net megawatts of electricity, and will be insulated with mineral wool matting and covered with galvanized steel.

The water-steam circuit and associated systems, which consist of the steam system, steam turbo set, condensation and feed water system, and cooling system, will be used to generate power for the power supply network needs. The steam generation rates from the boiler to the turbine will be 35,825 lb/hr (16,250 kg/hr), and from the boiler to the RRS will be 8,091 lb/hr (3,670 kg/hr). The steam will also be used to drive the thermal process in the RSS system.



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Electric Power Generation (Turbine)

The superheated steam from the boiler will be used to drive a turbine to produce 2.0 MW (net) of electric power.

Off-Gas Cleaning & Monitoring

After the boiler, the off-gas will pass through a wet flue gas cleaning unit. The cleaning unit will contain a scrubber system. A dry sorbent mixture will be injected into the flue gas stream. The spray injector will be constructed of welded sheet metal with direct water cooling. The temperature-controlled nozzle injection system will inject the water. The wastewater from the scrubber will be transported to the Allentown WWTP and the clean off-gas will be delivered to the stack via the off-gas fan, and emitted to the atmosphere through a free-standing, double-walled, self-supporting, 2-foot diameter stack, which will be approximately 55 feet (17 meters) in height. The proposed stack will be approximately 10 feet (3 meters) above the proposed roof line.

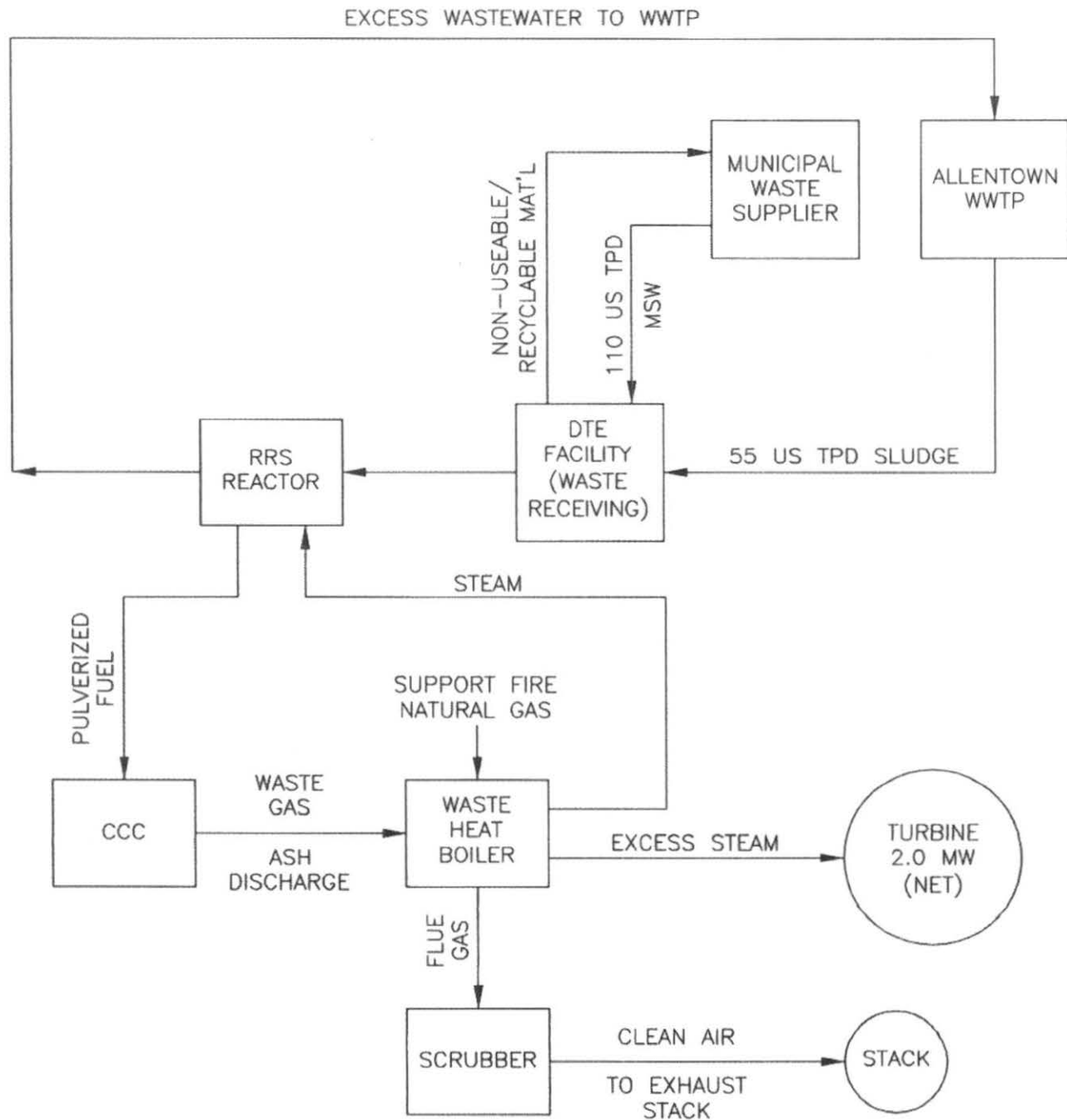
The following parameters and emissions will be monitored:

- CO
- NO_x
- SO₂
- PM
- Flue gas flow
- Flue gas temperature

These parameters will be monitored and analyzed in the plant laboratory. The result of the monitoring and analysis will provide valuable data for the design of the next generation plant.

Figure 1, presented on the following page shows a schematic process diagram.

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2.0 EMISSION CALCULATIONS

This section presents the calculations for the controlled emissions from the combustion process. The entire process will be a closed system. Emissions will only be generated from the combustion of the PF. Emissions will be calculated from the exit of the stack from the scrubber unit.

Controlled emission factors are based on an expected control efficiency that DTE has determined to be applicable based on the design of the control devices and research they have performed. The research and emission factor data were obtained from various sources. Research data originated from independent laboratories in Japan, Germany, and Singapore along with existing plants located in Germany and Japan. Other data were obtained from combustion analysis of MSW and sludge. Additionally, EPA AP-42 factors were used where indicated.



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Emission calculations are based on the plant operating 350 days per year. This will allow DTE to perform planned maintenance activities.

The general equation used to calculate emissions is:

MSW – DTE estimates that the plant will use MSW 7 day per week. The plant will operate 8,400 hours per year or 350 days per year.

$$(85 \text{ tpd} \times \text{Fuel Factor} \times 350 \div 2000) = \text{Tons per Year (tpy)}$$

Sludge – DTE estimates that the plant will use Sludge 7 days per week. The plant will operate 8,400 hours per year or 350 days per year.

$$(9 \text{ tpd} \times \text{Fuel Factor} \times 350 \div 2000) = \text{Tons per Year (tpy)}$$

Estimated net fuel volume per day will be 94 U.S. tons per day.

Additional Equations Used

MSW

- $\text{lb/day} = (\text{Fuel Factor} \times 85)$
- $\text{tons/day} = (\text{lb/day} \div 2000)$
- $\text{lb/hr} = (\text{lb/day} \div 24)$
- $\text{lb/yr} = (\text{lb/hr} \times 8,400)$
- $\text{tpy} = (\text{lb/yr} \div 2000)$

Sludge

- $\text{lb/day} = (\text{Fuel Factor} \times 9)$
- $\text{tons/day} = (\text{lb/day} \div 2000)$
- $\text{lb/hr} = (\text{lb/day} \div 24)$
- $\text{lb/yr} = (\text{lb/hr} \times 8,400)$
- $\text{tpy} = (\text{lb/yr} \div 2000)$

Table 1 presents the calculation results.



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Table 1 – Controlled Emissions and Emission Summary

Controlled Emissions											R&D Limit (tpy)*
MSW - 85 US tpd					Sludge - 9 US tpd				Total		
Pollutants	MSW - Factors (lb/ton)	lb/day	Tons/day	Tons/year (tpy)	Sludge Factors (lb/ton)	lb/day	Tons/day	Tons/year (tpy)	MSW+ Sludge Tons/year (tpy)		
PM	1.52E-02	1.2920	6.46E-04	0.23	1.44E-01	1.30	6.48E-04	0.23	0.46	3.00	
As	1.08E-05	0.0009	4.59E-07	0.00	8.00E-03	0.07	3.60E-05	0.01	0.01	1.00	
Cd	3.32E-05	0.0028	1.41E-06	0.00	3.60E-03	0.03	1.62E-05	0.01	0.01	1.00	
Cr	4.07E-05	0.0035	1.73E-06	0.00	7.80E-02	0.70	3.51E-04	0.12	0.13	1.00	
Hg	2.92E-04	0.0248	1.24E-05	0.00	4.40E-03	0.04	1.98E-05	0.01	0.01	1.00	
Ni	6.30E-05	0.0054	2.68E-06	0.00	4.40E-02	0.40	1.98E-04	0.07	0.07	1.00	
Pb	1.04E-03	0.0884	4.42E-05	0.02	2.58E-02	0.23	1.16E-04	0.04	0.06	0.12	
SO2	2.50E-02	2.1250	1.06E-03	0.37	2.40E-01	2.16	1.08E-03	0.38	0.75	8.00	
HCl	6.97E-03	0.5927	2.96E-04	0.10	6.97E-03	0.06	3.14E-05	0.01	0.12	1.00	
NOX	6.30E-02	5.3550	2.68E-03	0.94	6.00E-01	5.40	2.70E-03	0.95	1.89	10.00	
CO	2.79E-01	23.7071	1.19E-02	4.15	2.79E-01	2.51	1.26E-03	0.44	4.59	20.00	
Dioxins	2.79E-05	0.0024	1.19E-06	0.00	2.79E-05	0.00	1.26E-07	0.00	0.01	1.00	
Cl	6.97E-03	0.5927	2.96E-04	0.10	6.97E-03	0.06	3.14E-05	0.01	0.12	1.00	
As, Cd, Cr, Hg, Ni, Pb Factors Obtained from (EPA AP-42 Section 2.1 Table 4.1)					All Factors Obtained from DTE Research						
PM, SO2, NOX, Cl, CO, HCl, Dioxin Factors Obtained from DTE research											
* = HAP - R&D Limit required less than or equal to one tpy of a single HAP or 2.5 tpy of a combination of HAPs. Pb has separate R&D limit.											



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3.0 REGULATORY ANALYSIS

Under the requirements of Section 127.11, construction of an air contamination source may not be performed unless it has been approved by the Pennsylvania Department of Environmental Protection (Department) through the Plan Approval process. However, certain sources and source categories may be exempted from Plan Approval requirements in accordance with Section 127.14, upon the submission and approval of a Request for Determination of Requirement of Plan Approval (RFD) application.

Under 25 Pa. Code § 127.14(a)(8), the Department may determine sources or classes of sources to be exempt from the Plan Approval requirements of §§ 127.11 and 127.12. For this facility, we are claiming an exemption from the Plan Approval requirements based on Research & Development (R&D) activities.

Under this exemption, the annual projected emission rates from the facility are required to be:

- Less than or equal to 20 tpy of CO
- Less than or equal to 0.12 tpy of lead
- Less than or equal to 3 tpy of PM₁₀
- Less than or equal to 8 tpy of SO₂ or VOC
- Less than or equal to 10 tpy of NO_x
- Less than or equal to one tpy of a single HAP or 2.5 tpy of a combination of HAPs.

The installation of these processes meets the exemption criteria. Therefore, we believe that the proposed project is exempt from the Plan Approval requirement in 25 Pa. Code §127.11 and 127.12.