UTAH DIVISION OF AIR QUALITY
SOURCE PLAN REVIEW

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Project Number: N154460001

RE:	New AO for Hospital, Medical, and Infectious Waste Incinerator Facility Tooele County; CDS B; MACT (Part 63), Attainment Area, NSPS (Part 60)
Review Engineer:	Jon Black
Date:	March 23, 2016
Notice of Intent Submitted:	February 26, 2015
Plant Contact:	Jay Vance
Phone Number:	(801) 936-1260 Ext 17
Fax Number:	
Source Location:	9250 Rowley Road, Tooele, UT Tooele County 4,523,486.7 m Northing, 354,053.5 m Easting, UTM Zone 12 UTM Datum: NAD83

DAQ requests that a company/corporation official read the attached draft/proposed Plan Review with Recommended Approval Order Conditions. If this person does not understand or does not agree with the conditions, the review engineer should be contacted within five days after receipt of the Plan Review. If this person agrees with the Plan Review and Recommended Approval Order Conditions, this person should sign below and return (FAX # 801-536-4099) within 10 days after receipt of the conditions. If the review engineer is not contacted within 10 days, the review engineer shall assume that the company/corporation official agrees with this Plan Review and will process the Plan Review towards final approval. A public comment period will be required before the Approval Order can be issued.

Applicant Contact ____

(Signature & Date)

OPTIONAL: In order for this Source Plan Review and associated Approval Order conditions to be administratively included in your Operating Permit (Application), the Responsible Official as defined in R307-415-3, must sign the statement below and the signature above is not necessary. THIS IS STRICTLY OPTIONAL!

If you do not desire this Plan Review to be administratively included in your Operating Permit (Application), only the Applicant Contact signature above is required. Failure to have the Responsible Official sign below will not delay the Approval Order, but will require a separate update to your Operating Permit Application or a request for modification of your Operating Permit, signed by the Responsible Official, in accordance with R307--415-5a through 5e or R307-415-7a through 7i.

"Based on reasonable inquiry, I certify that the information provided for this Approval Order has been true, accurate and complete and request that this Approval Order be administratively amended to the Operating Permit (Application)."

Responsible Official ____
(Signature & Date)

Print Name of Responsible Official ____

ABSTRACT

Stericycle, Inc., (Stericycle) has requested an AO for a proposed new hospital, medical, and infectious waste incinerator (HMIWI) facility. The new facility will be located at 9250 Rowley Road, Tooele, Utah. The proposal requests operation of a HMIWI facility capable of processing 4,100 pounds per hour total of hospital/medical/infectious waste. Each HMIWI unit will consist of a natural gas fired two stage combustion system, an air pollution control system consisting of a selective non-catalytic reduction system (SNCR), waste heat boiler, evaporative cooler, carbon injection system, dry sorbent injection system, baghouse, wet gas absorber, and a carbon bed system. Additionally an emergency generator, dry sorbent silo with bin vent and tub washer will be operated at the facility. Waste delivery, processing, and unloading activities will also take place at the HMIWI facility.

Stericycle's Tooele facility will be located in Tooele County, parts of which are nonattainment for $PM_{2.5}$ and SO_2. The location of the proposed facility is outside the nonattainment areas of Tooele County. The proposed facility is located within an attainment area for all criteria pollutants. NSPS 40 CFR 60 Subparts A, Ec, and IIII regulations apply. MACT 40 CFR 63 Subparts A and ZZZZ regulations apply to this source. Title V of the 1990 Clean Air Act applies to this source. The Title V Operating Permit program applies to the HMIWI facility.

The controlled potential to emit emissions, in tons per year, will be as follows: Particulate Matter = 1.94, PM_{10} (Subset of PM) = 1.94, $PM_{2.5}$ (Subset of PM_{10}) = 1.94, NO_x = 28.31, SO_2 = 2.36, CO = 1.93, VOC = 1.06, Total HAPs = 2.08 and CO_2e = 47,316.89.

SOURCE SPECIFIC DESIGNATIONS

Applicable Programs:

NSPS (Part 60), Subpart A: General Provisions applies to Tooele HMIWI Facility
NSPS (Part 60), Subpart Ec: Standards of Performance for Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996 applies to Tooele HMIWI Facility
NSPS (Part 60), Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines applies to Tooele HMIWI Facility
MACT (Part 63), Subpart A: General Provisions applies to Tooele HMIWI Facility
MACT (Part 63), Subpart ZZZZ: National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines applies to Tooele HMIWI Facility
Attainment Area applies to Tooele HMIWI Facility

Permit History:

When issued, the approval order shall supersede or will be based on the following documents:

Is Derived From	Notice of Intent Document dated February 26, 2015
Incorporates	Additional Information dated June 5, 2015
Incorporates	Additional Information dated September 23, 2015
Incorporates	Additional Information dated October 8, 2015
Incorporates	Additional Information dated January 28, 2016

SUMMARY OF NOTICE OF INTENT INFORMATION

Description of Proposal:

Stericycle will construct and operate a new HMIWI facility, a 500 kw emergency generator, dry sorbent silo with bin vent and tub washer at the Tooele facility. The proposal requests operation of a HMIWI facility capable of processing 4,100 pounds per hour of hospital/medical/infectious waste.

HMIWI AND WASTE HANDLING

Waste will arrive at the Tooele facility via truck in reusable containers or single-use containers that can be incinerated. Upon delivery, waste containers will be staged for processing or maintained in storage until ready to be processed. Material handlers will unload the waste containers next to the feed system and charge hopper. Each container will be weighed, scanned to document receipt, and monitored/screened for possible radioactivity as outlined in the Solid Waste Permit issued by the Utah Division of Waste Management and Radiation Control. The waste from the container will then be loaded into the feed system and charge hopper.

Each HMIWI unit will have a two stage combustion system. From the charge hopper, material will be fed into the primary stage by a ram feed system equipped with an air lock. Organic materials that are volatized in the primary chamber are destroyed in the secondary chamber. The secondary chamber will be designed with an extended residence time in an excess air environment to support the complete oxidation and combustion of the primary chamber exhaust gas. Residence time of the gas in the secondary chamber will be designed to be at least two seconds above 1,800°F and the minimum secondary chamber temperature will be established during performance testing.

The primary and secondary chambers will each be equipped with one or more natural gas-fired burners with a total rated heat input capacity of approximately 12 MMBtu/hr.The natural gas-fired burners will be utilized, when necessary, to maintain the combustion temperature and to preheat the chambers during startup.

Each HMIWI unit will be equipped with a air pollution control (APC) system. The first control system is the (SNCR) system. SNCR reagent (i.e., ammonia, urea, or equivalent) is injected into the secondary chamber exhaust gas to control NO_x emissions. The exhaust gas will then enter a waste heat boiler and subsequent evaporative cooler to reduce the flue gas temperature prior to the fabric filter (baghouse) further downstream. Steam generated by the waste heat boiler will be utilized to condition the gas stream throughout the APC system and for other ancillary equipment as needed throughout the facility. Upon exiting the evaporative cooler, carbon will be injected to help control and remove dioxin/furans (CDD/CDF) and mercury from the flue gas. Dry sorbent injection (DSI) (i.e., sodium bicarbonate, lime, or equivalent) will also be utilized to neutralize the flue gas. After the baghouse, the flue gas enters the wet gas absorber, where it comes in direct contact with recirculated scrubber liquor. The pH of the scrubber liquor will be monitored and an alkali reagent (i.e., sodium hydroxide or equivalent) will be injected to maintain the pH of the liquor to ensure absorption of acid gases. A carbon bed system will be utilized downstream of the wet gas absorber as a polishing mercury control prior to venting to the atmosphere.

Each HMIWI unit will also be equipped with an emergency bypass stack which, in emergency conditions, during HMIWI operation (i.e. when waste is being combusted), allows gas and heat from the secondary chamber to vent directly to the atmosphere without passing through the APC system. The emergency bypass stack will be used for this purpose only when necessary, due to a significant process upset, or other unforeseeable circumstance causing a process interruption, for employee safety and to prevent damage to the APC equipment. Waste feed to the primary chamber will automatically cease and be prevented by feeder system lockout while the bypass stack is open.

Summary of Emission Totals:

The emissions listed below are an estimate of the total potential emissions from the source. Some rounding of emissions is possible.

Estimated Criteria Pollutant Potential Emissions		
CO_2 Equivalent	47316.89	tons/yr
Carbon Monoxide	1.93	tons/yr
Nitrogen Oxides	28.31	tons/yr
Particulate Matter	1.94	tons/yr
Particulate Matter - PM_{10}	1.94	tons/yr
Particulate Matter - $PM_{2.5}$	1.94	tons/yr
Sulfur Dioxide	2.36	tons/yr
Volatile Organic Compounds	1.06	tons/yr
Estimated Hazardous Air Pollutant Potential Emissions		
2-METHYLNAPHTHALENE (CAS #91576)	0.00494	lbs/yr
7,12-Dimethylbenz(a)anthracene (CAS #57976)	0.0033	lbs/yr
Acenaphthene(TSP) (CAS #83329)	0.0074	lbs/yr
Acenaphthylene(TSP) (CAS #208968)	0.01422	lbs/yr
Acetaldehyde (CAS #75070)	0.0378	lbs/yr
Acrolein (CAS #107028)	0.01182	lbs/yr
Anthracene (CAS #120127)	0.002352	lbs/yr
Antimony (TSP) (CAS #7440360)	3	lbs/yr
Arsenic (TSP) (CAS #7440382)	0.304	lbs/yr
Benzene (Including Benzene From Gasoline) (CAS #71432)	2	lbs/yr
Benzo (K) Fluoranthene (CAS #207089)	0.000698	lbs/yr
Benzo(A)Pyrene (CAS #50328)	0.000632	lbs/yr
Benzo(Ghi)Perylene/Tsp (CAS #191242)	0.001082	lbs/yr
Benzo(j)fluoranthene (CAS #205823)	0.00204	lbs/yr
Beryllium (TSP) (CAS #7440417)	0.0714	lbs/yr
Cadmium (CAS #7440439)	0.0276	lbs/yr
Chlorine (CAS #7782505)	1886	lbs/yr
Chromium Compounds (CAS #CMJ500)	1	lbs/yr
Chrysene (TSP) (CAS #218019)	0.00266	lbs/yr
Cobalt (TSP) (CAS #7440484)	0.01732	lbs/yr
Dibenzo(A,H)Anthracn (CAS #53703)	0.000766	lbs/yr
Dichlorobenzene (CAS #25321226)	0.248	lbs/yr
Dioxin/Furan Toxic Equivalents: 2,3,7,8-Tetrachlorodibenzo-P-Dioxin (CAS #1746016)	0.00198	lbs/yr
Fluoranthene (TSP) (CAS #206440)	0.00666	lbs/yr
Formaldehyde (CAS #50000)	16	lbs/yr
Hexane (CAS #110543)	372	lbs/yr
Hydrochloric Acid (Hydrogen Chloride) (CAS	1630	lbs/yr

#7647010)		
Hydrogen Fluoride (Hydrofluoric Acid) (CAS #7664393)	238	lbs/yr
Indeno(1,2,3-Cd)Pyre (CAS #193395)	0.000992	lbs/yr
Lead (CAS #7439921)	0.1448	lbs/yr
Manganese (TSP) (CAS #7439965)	10	lbs/yr
Mercury (TSP) (CAS #7439976)	0.276	lbs/yr
Naphthalene (CAS #91203)	0.32	lbs/yr
Nickel Compounds (CAS #NDB000)	6	lbs/yr
Phenanthrene (CAS #85018)	0.0648	lbs/yr
Polychlorinated Biphenyls (Aroclors) (CAS #1336363)	1	lbs/yr
Pyrene (CAS #129000)	0.0066	lbs/yr
Selenium (TSP) (CAS #7782492)	0.00494	lbs/yr
Toluene (CAS #108883)	1	lbs/yr
Xylenes (Isomers And Mixture) (CAS #1330207)	0.29	lbs/yr
Total hazardous air pollutants	2.08	tons/yr

Review of Best Available Control Technology:

1. BACT review regarding HMIWI Incinerator

   A BACT evaluation has been conducted for the proposed HMIWIs. This evaluation is also intended to satisfy the siting requirements contained in 40 CFR Part 60, Subpart Ec. Specifically, a siting analysis is required for new HMIWI pursuant to §60.54c(a), which "shall consider air pollution control alternatives that minimize, on a site-specific basis, to the maximum extent practicable, potential risks to public health or the environment. In considering such alternatives, the analysis may consider costs, energy impacts, non-air environmental impacts, or any other factors related to the practicability of the alternatives." §60.54c(b) goes on to state that "analyses of facility impacts prepared to comply with State, local, or other Federal regulatory requirements may be used to satisfy the requirements of this section, as long as they include the consideration of air pollution control alternatives specified in paragraph (a) of this section." Pursuant to §60.54c(c) and §60.58c(a)(1)(iii), the siting analysis must be submitted "prior to commencement of construction.

   HMIWIs

   A 5-step BACT evaluation was performed for each pollutant regulated by 40 CFR Part 60, Subpart Ec for which the proposed air pollution control activities would aid in meeting the emission limitations. In additional the RACT/BACT/LAER Clearinghouse was consulted for further exploration of possible control equipment options. The following air pollution control strategy is proposed to represent BACT, which is consistent with, and in some cases more stringent than, the control technologies identified under 40 CFR Part 60, Subpart Ec and the RACT/BACT/LAER Clearinghouse.

   The following description represents the APC equipment configuration for each HMIWI. The first control system is the selective non-catalytic reduction (SNCR) system. SNCR reagent (i.e., ammonia, urea, or equivalent) is injected into the secondary chamber exhaust gas to control NO_x emissions. The exhaust gas will then enter a waste heat boiler and subsequent evaporative cooler to reduce the flue gas temperature prior to the fabric filter (baghouse) further downstream. Steam generated by the waste heat boiler will be utilized to condition the gas stream throughout the APC system and for other ancillary equipment as needed throughout the facility. Upon exiting the evaporative cooler, carbon will be injected to help control and remove CDD/CDF and mercury from the flue gas. Dry sorbent injection (DSI) (i.e., sodium bicarbonate, lime, or equivalent) will also be utilized to neutralize the flue gas. After the baghouse, the flue gas will enter the wet gas absorber, where it will come in direct contact with recirculated scrubber liquor. The pH of the scrubber liquor will be monitored and an alkali reagent (i.e., sodium hydroxide or equivalent) will be injected as necessary to maintain the pH of the liquor so as to ensure the absorption of acid gases. A carbon bed (or equivalent) system will be utilized downstream of the wet gas absorber as a polishing mercury control prior to the flue gas venting to the atmosphere via a single stack. [Last updated February 17, 2016]

2. BACT review regarding Nitrogen Oxides (NO_x) Emissions
Nitrogen oxides are a product of combustion and can be minimized through post combustion control technologies.

Step 1 - Identify All Available Control Technologies
The following potential technologies have been identified for controlling emissions of NO_x:
A. Good combustion practices
B. Selective Catalytic Reduction
C. Selective Non-Catalytic Reduction
D. Wet Scrubbing
E. Process Design

Step 2 - Eliminate Technically Infeasible Options
The next step in the top-down analysis is to evaluate the technical feasibility of each of the identified control options.

A. Good combustion practices:
Good combustion practices increase efficiency of the combustion process which, in turn, reduces the emissions of NO_x by minimizing incomplete combustion. Based on operations at other similar facilities, minimizing NO_x while simultaneously minimizing CO through good combustion practices causes operational problems. Therefore, good combustion practices is eliminated as a technically feasible option for NO_x control.

B. Selective Catalytic Reduction:
Selective Catalytic Reduction (SCR) utilizes a reagent (i.e., ammonia, urea, or equivalent) in conjunction with a catalyst to convert NO_x to N_2 and H_2O. SCR has been identified as a technically feasible option for NO_x control.

C. Selective Non-Catalytic Reduction:
Selective Non-Catalytic Reduction (SNCR) utilizes reagent (i.e., ammonia, urea, or equivalent) injection into the flue gas to convert NO_x to N_2 and H_2O. SNCR has been identified as a technically feasible option for NO_x control.

D. Wet Scrubbing:
Wet scrubbing controls NO_x by bringing the flue gas into contact with a scrubbing liquid. Wet scrubbing has been identified as a technically feasible option for NO_x control.

E. Process Design
The feasibility of different process designs such as flue gas recycle and/or control of waste feed composition to control emissions of NO_x has been evaluated. However, flue gas recycle is known to cause corrosion in the system. Additionally, Stericycle is not able to further control the waste feed composition since operator safety requirements do not allow waste to be sorted once it reaches the facility. Therefore process design is eliminated as a technically feasible option for NO_x control. [Last updated February 18, 2016]

3. BACT review regarding Nitrogen Oxides (NO_x) - (Continued)
Step 3 - Rank Remaining Control Technologies by Control Effectiveness
Based on the above discussion, the following technologies have been identified as technically feasible, ranked in order of most effective to least effective.
A. Selective Catalytic Reduction
B. Wet Scrubbing
C. Selective Non-Catalytic Reduction

Step 4 - Evaluate Most Effective Controls and Document Results
The technically feasible control technologies above were evaluated for economic, environmental, or energy impacts that are sufficient to justify exclusion of the technology.

A. Selective Catalytic Reduction
The use of SCR is estimated to result in an annualized cost of approximately $22,900 per ton of NO_x controlled for each HMIWI unit. This analysis determined the cost per ton of NO_x removed including the annualized direct and indirect costs. Direct Capital and Annual Costs used in the analysis include purchase equipment costs, operating labor, maintenance (maintenance labor and materials, catalyst replacement, ammonia reagent), utilities (energy use; electricity, as well as additional natural gas usage to achieve the required flue gas temperature). SCR would additionally require a capital investment of approximately $2,160,000, which includes the cost of ID fan and absorber upgrades. Indirect Costs of installation, overhead, administrative fees, taxes, and insurance are also included in this analysis.

The economic impact for SCR is sufficiently high to justify exclusion of the technology, and therefore eliminated SCR as a viable option for NO_x control.

B. Wet Scrubbing
The use of wet scrubbing is estimated to result in an annualized cost of approximately $23,800 per ton of NO_x controlled for each HMIWI unit. This cost includes reagent, labor, energy use, etc. Wet scrubbing is the most complex of the possible control options and would require significant operator labor. Due to the high potential for CO_2 absorption, wet scrubbing would require large quantities of reagent to control NO_x. Wet scrubbing would additionally require a capital investment of approximately $1,200,000. The economic impact for wet scrubbing is sufficiently high to justify exclusion of the technology, and therefore eliminated wet scrubbing as a viable option for NO_x control.

C. Selective Non-Catalytic Reduction
The use of SNCR is estimated to result in an annualized cost of approximately $2,600 per ton of NO_x controlled for each HMIWI unit. This cost includes reagent, labor, energy use, etc. SNCR would additionally require a capital investment of approximately $37,000. The UDAQ does not

foresee any other economic, environmental, or energy impacts regarding SNCR that are sufficient to justify exclusion of the technology. Therefore, SNCR is identified as a viable option for NO_x control.

Step 5 - Identify BACT
Based on the above analysis, the UDAQ proposes SNCR as BACT for control of NO_x emissions. [Last updated February 18, 2016]

4. BACT review regarding Carbon Monoxide (CO) Emissions
Carbon Monoxide (CO) is a product of combustion, and the primary means for minimizing emissions of CO is through combustion control.

The following sections present the BACT evaluation for controlling emissions of CO.

Step 1 - Identify All Available Control Technologies
The following potential technologies have been evaluated for controlling emissions of CO:
A. Good combustion practices
B. CO oxidation catalysts

Step 2 - Eliminate Technically Infeasible Options
The next step in the top-down analysis is to evaluate the technical feasibility of each of the identified control options. Each of the potential control technologies considered is described below along with a discussion of the technical feasibility with respect to controlling emissions of CO.

A. Good Combustion Practices
Good combustion practices serve to increase efficiency of the combustion process which, in turn, reduces the emissions of CO by minimizing incomplete combustion. Good combustion practices have been evaluated as a technically feasible option for CO control.

B. CO Oxidation Catalysts
CO oxidation catalysts provide add-on control for CO emissions and are typically only effective for large emitters of CO such as turbines and power producers. CO catalysts have not been employed in practice in the HMIWI arena. Because CO catalysts have never been applied to HMIWIs and because the uncontrolled CO mass emissions are already very low based on the emission standard (11 ppmdv, corrected to 7% O_2) and limited exhaust gas volumetric flow rate, CO catalysts have been eliminated as a technically feasible option for CO control.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness
Based on the reasons outlined in the above discussion, the following technology was identified as the only technically feasible option.
A. Good combustion practices

Step 4 - Evaluate Most Effective Controls and Document Results
Because Stericycle plans to utilize good combustion practices, the most effective control method for controlling CO emissions, further evaluation is not necessary.

Step 5 - Identify BACT
Based on the above analysis, the UDAQ proposes BACT for CO emissions to be good

combustion practices. [Last updated December 10, 2015]

5. BACT review regarding Particulate Matter ($PM/PM_{10}/PM_{2.5}$), Lead (PB), Cadmium (CD), and Particulate Mercury (HG)

Particulate matter ($PM/PM_{10}/PM_{2.5}$) is a product of combustion and can be minimized through both combustion control and add-on controls. Lead, cadmium, and particulate-phase mercury are constituents of particulate matter that can similarly be minimized through combustion control and add-on controls. Control of gaseous or vapor-phase mercury, which represents a very small percentage of total particulate matter, is addressed in a separate section.

The following sections present the BACT evaluation for controlling emissions of PM, lead, cadmium, and particulate-phase mercury.

Step 1 - Identify All Available Control Technologies

The following technologies have been identified for controlling emissions of PM, lead, cadmium, and particulate-phase mercury:

A. Good combustion practices
B. Baghouse
C. Electrostatic Precipitator (ESP)
D. Wet Venturi Scrubber
E. Cyclone/Multiclone

Step 2 - Eliminate Technically Infeasible Options

Next in the top-down analysis is to evaluate the technical feasibility of each of the identified control options. Each of the potential control technologies considered is described below with a discussion of the technical feasibility with respect to controlling emissions of PM, lead, cadmium, and particulate-phase mercury.

A. Good Combustion Practices

Good combustion practices increase efficiency of the combustion process which, in turn, reduces the emissions of particulate matter by minimizing incomplete combustion. Good combustion practices have been identified as a technically feasible option for PM, lead, cadmium, and particulate-phase mercury control.

B. Baghouse

A baghouse utilizes specially designed bags to capture particulate and heavy metals emissions as the gas passes through the bags. Control efficiency increases as particulate matter accumulates on the outside of the filter bags. A baghouse has been identified as a technically feasible option for PM, lead, cadmium, and particulate-phase mercury control.

C. Electrostatic Precipitator (ESP)

An ESP utilizes the force of an induced electrical charge in order to remove particles from the gas stream. An ESP has been identified as a technically feasible option for PM, lead, cadmium, and particulate-phase mercury control.

D. Wet Venturi Scrubber

A wet venturi scrubber utilizes a specially designed duct shape in conjunction with a scrubbing liquid which contacts the gas stream and removes the pollutants from it. A wet venturi scrubber has been identified as a technically feasible option for PM, lead, cadmium, and particulate-phase mercury control.

E. Cyclone/Multiclone
A cyclone/multiclone removes PM from the gas stream by rotating the gas at speeds that allow gravity to push the PM to the outside and drop out. A cyclone has been identified as a technically feasible option for PM, lead, cadmium, and particulate-phase mercury control.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness
Based on the reasons outlined in the above discussion, the following technologies have been identified as technically feasible, ranked in order of most effective to least effective.
A. Baghouse (Estimated control efficiency: 99.9% +)
B. Electrostatic Precipitator (ESP) (Estimated control efficiency: 95 - 99.9% depending upon application)
C. Wet Venturi Scrubber (Estimated control efficiency: 80 - 95%)
D. Cyclone/Multiclone (Estimated control efficiency: 50% +)
E. Good combustion practices
[Last updated February 17, 2016]

6. BACT review regarding Particulate Matter ($PM/PM_{10}/PM_{2.5}$), Lead (PB), Cadmium (CD), and Particulate Mercury (HG) - (Continued)
Step 4 - Evaluate Most Effective Controls and Document Results
This section provides an evaluation of the technically feasible control technologies above for economic, environmental, or energy impacts that are sufficient to justify exclusion of the technology. All ranked technologies of Step 3 are technically feasible control options. It has been proposed to utilize good combustion practices along with a baghouse for control of PM/PM_{10}/PM2.5, PB, CD, and Particulate Hg emissions. UDAQ's experience with the control options proposed in Step 3 of the BACT review regarding Particulate Matter (PM/PM_{10}/PM2.5), Lead (PB), Cadmium (CD), and Particulate Mercury (HG) has shown that a baghouse is the most effective control option. Baghouses typically achieve 99.9% or greater control of these pollutants. The other control alternatives examined were ESP's, wet venturi scrubbers, and cyclones/multiclone's. While these are effective control options, with estimated control efficiencies ranging from 95 to 50%, they are ruled out as required control options. The proposed good combustion practices and baghouse installation is the highest ranked control technology (99.9% control efficiency). Therefore no further analysis is required.

Step 5 - Identify BACT
Based on this analysis, the UDAQ proposes BACT for PM, lead, cadmium, and particulate phase mercury emissions to be the combination of good combustion practices, followed by a baghouse. [Last updated March 3, 2016]

7. BACT review regarding Gaseous Phase Mercury Emissions
Gaseous or Vapor-Phase Mercury
Emissions of mercury can occur in a gaseous or a particulate matter form. Control of particulate phase mercury was addressed in the previous section. The following presents the BACT analysis for controlling emissions of gaseous mercury.

Step 1 - Identify All Available Control Technologies
The following potential technologies have been identified for controlling emissions of gaseous

mercury:
1. Carbon Injection
2. Carbon Bed System (or equivalent)
3. Wet Scrubbing

Step 2 - Eliminate Technically Infeasible Options
Next in the top-down analysis is to evaluate the technical feasibility of each of the identified control options. Each of the potential control technologies considered is described below along with a discussion of the technical feasibility with respect to controlling emissions of gaseous mercury.

1. Carbon Injection
Carbon injection involves injecting activated carbon into the gas stream in order to adsorb the gaseous mercury. Carbon provides additional surface area for adsorption of gaseous mercury. The activated carbon/mercury is collected later in the process on the outside of the baghouse. Carbon injection has been identified as a technically feasible option for gaseous mercury control, and must be applied in conjunction with a baghouse for dry particulate matter control (i.e., fabric filter).

2. Carbon Bed (or equivalent) System
A carbon bed (or equivalent) system utilizes activated carbon as an adsorption source to control the emissions of gaseous mercury. A carbon bed (or equivalent) system is most effective when processing a "clean" gas stream, that is, after it the gas stream has been processed by a scrubber and/or particulate matter control device. A carbon bed (or equivalent) system has been identified as a technically feasible option for gaseous mercury control.

3. Wet Scrubbing
Wet scrubbing utilizes a scrubbing liquid which contacts the gas stream and remove the pollutants from it. Wet scrubbing has been identified as a technically feasible option for gaseous mercury control.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness
Based on the reasons outlined in the above discussion, the following technologies have been identified as technically feasible, ranked in order of most effective to least effective.

1. Carbon Injection
2. Carbon Bed System (or equivalent)
3. Wet Scrubbing

Step 4 - Evaluate Most Effective Controls and Document Results
This section provides the evaluation of the technically feasible control technologies above for economic, environmental, or energy impacts that are sufficient to justify exclusion of the technology. Because Stericycle plans to utilize carbon injection with a baghouse and a carbon bed (or equivalent) system, the two most effective control methods for gaseous mercury emissions, further evaluation is not necessary.

Step 5 - Identify BACT
Based on the above analysis, the UDAQ proposes BACT for gaseous mercury emissions to be carbon injection with a baghouse and a carbon bed (or equivalent) system. [Last updated

December 10, 2015]

8. BACT review regarding Sulfur Dioxide (SO_2) and Hydrogen Chloride (HCl)

SO_2 and HCl are acid gases that result from the combustion of Sulfur and Chlorine contained in the waste. The following sections present the BACT analysis for controlling emissions of SO_2 and HCl.

Step 1 - Identify All Available Control Technologies
The following have been identified as potential technologies for controlling emissions of SO_2 and HCl:
A. Dry Scrubber/Baghouse
B. Wet Gas Absorber

Step 2 - Eliminate Technically Infeasible Options
The next step in the top-down analysis is to evaluate the technical feasibility of each of the identified control options. Each of the potential control technologies considered is described below along with a discussion of the technical feasibility with respect to controlling emissions of SO_2 and HCl.

A. Dry Scrubber/Fabric Filter
A dry scrubber utilizes the injection of dry sorbent (i.e., sodium bicarbonate, lime, or equivalent) prior to a baghouse, such that the sorbent collects on the outside of the baghouse filter bags and creates a "cake" through which acid gases pass and are neutralized. Dry scrubbing has been determined to be a technically feasible option for SO_2 and HCl control.

B. Wet Gas Absorber
A wet gas absorber utilizes a caustic scrubbing liquid which contacts the gas stream and neutralizes the acid gases. A wet gas absorber is determined to be a technically feasible option for SO_2 and HCl control.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness
Based on the reasons outlined in the above discussion, the following technologies have been determined as technically feasible, ranked in order of most effective to least effective.
A. Dry Scrubber/Baghouse
B. Wet Gas Absorber

Step 4 - Evaluate Most Effective Controls and Document Results
This section provides an evaluation of the technically feasible control technologies above for economic, environmental, or energy impacts that are sufficient to justify exclusion of the technology. Stericycle plans to inject dry sorbent with a fabric filter and utilize a wet gas absorber. This combined train of dry sorbent injection followed by a baghouse followed by a wet gas absorber represents the most effective control methods for SO_2 and HCl, and therefore further evaluation is not necessary.

Step 5 - Identify BACT
Based on the above analysis, the UDAQ proposes BACT for SO_2 and HCl emissions to be dry sorbent injection followed by a dry scrubber/baghouse in series with a wet gas absorber. [Last updated December 10, 2015]

9. BACT review regarding Dioxins/Furans (CDD/CDF)

CDD/CDF are a product of incomplete combustion and are also dependent on the chlorine content of the waste combusted. The 3-T Rule (i.e., time, temperature, and turbulence) is a fundamental principal of all regulated waste combustion sectors and has demonstrated that combustion technology is an effective means to reduce CDD/CDF emissions. Combustion temperature is the primary driver in minimizing CDD/CDF formation. HMIWIs operate at high temperatures where CDD/CDF is destroyed.

The following BACT analysis addresses controlling emissions of CDD/CDF.

Step 1 - Identify All Available Control Technologies

The following have been identified as potential technologies for controlling emissions of CDD/CDF:

A. Good combustion practices
B. Carbon Bed System (or equivalent)
C. Carbon Injection
D. Baghouse with catalyst-impregnated bags
E. Baghouse
F. Wet Scrubbing

Step 2 - Eliminate Technically Infeasible Options

The next step in the top-down analysis is to evaluate the technical feasibility of each of the identified control options. Each of the potential control technologies considered is described below along with a discussion of the technical feasibility with respect to controlling emissions of CDD/CDF.

A. Good Combustion Practices

Good combustion practices serve to increase efficiency of the combustion process which, in turn, reduces the emissions of CDD/CDF by minimizing incomplete combustion. In addition, good combustion practices enable a unit to utilize the 3-T Rule. Good combustion practices have been identified as a technically feasible option for CDD/CDF control.

B. Carbon Bed (or equivalent) System

A carbon bed (or equivalent) system utilizes activated carbon as an adsorption source to control the emissions of CDD/CDF. A carbon bed (or equivalent) system has been identified as a technically feasible option for CDD/CDF control.

C. Carbon Injection

Carbon injection involves injecting activated carbon into the gas stream in order to adsorb CDD/CDF that may be formed. The activated carbon that may bind with CDD/CDF is collected later in the process by the particulate control device (i.e., fabric filter). Carbon injection has been identified as a technically feasible option for CDD/CDF control.

D. Baghouse with Catalyst-Impregnated Bags

A baghouse with catalyst-impregnated bags utilizes specially designed bags entrained with a catalyst to capture particulate matter emissions, including activated carbon containing adsorbed CDD/CDF, as the gas passes through. The inlet temperature to the bags is monitored and maintained to reduce the reformation of CDD/CDF in the gas stream. A baghouse with catalyst-impregnated bags has been identified as a technically feasible option for CDD/CDF control.

E. Baghouse
A baghouse utilizes specially designed bags to capture particulate matter emissions, including activated carbon containing adsorbed CDD/CDF, as the gas passes through. The inlet temperature to the bags is monitored and maintained to reduce the reformation of CDD/CDF in the gas stream. A baghouse has been identified as a technically feasible option for CDD/CDF control.

F. Wet Scrubbing
Wet scrubbing utilizes a caustic scrubbing liquid which contacts the gas stream and remove the pollutants from it. Wet scrubbing has been identified as a technically feasible option for CDD/CDF control. [Last updated December 22, 2015]

10. BACT review regarding Dioxins/Furans (CDD/CDF) - (Continued)
Step 3 - Rank Remaining Control Technologies by Control Effectiveness
Based on the reasons outlined in the above discussion, the following technologies have been identified as technically feasible, ranked in order of most effective to least

A. Good combustion practices
B. Carbon Injection
C. Carbon Bed System (or equivalent)
D. Baghouse with catalyst-impregnated bags
E. Baghouse
F. Wet Scrubbing

Step 4 - Evaluate Most Effective Controls and Document Results
This section provides an evaluation of the technically feasible control technologies above for economic, environmental, or energy impacts that are sufficient to justify exclusion of the technology. Stericycle plans to utilize good combustion practices, carbon injection with a baghouse, and a carbon bed (or equivalent) system. These controls account for the three most effective control methods for CDD/CDF. However, the use of catalyst-impregnated bags is expected to result in an annualized cost of over $280,000,000 per ton of CDD/CDF controlled. Because Stericycle already plans to utilize a baghouse which will incur capital and operational costs, this cost conservatively reflects only the need to replace the catalyst-impregnated bags once per year in order to maintain effectiveness. The economic impact for catalyst-impregnated bags is sufficiently high to justify exclusion of the technology, and therefore eliminated catalyst impregnated bags as a viable option for CDD/CDF control.

Step 5 - Identify BACT
Based on the above analysis, the UDAQ proposes BACT for CDD/CDF emissions to be good combustion practices, carbon injection, followed by a baghouse and a carbon bed (or equivalent) system. [Last updated February 18, 2016]

11. BACT review regarding Emergency Diesel Generator
The UDAQ considers the use of a Tier 4 engine as BACT for emergency generators. Tier 4 engines provide an estimated 90% reduction of PM and NO_x emission and operate under the most stringent standards for diesel engines on the market today. Stericycle's proposed emergency generator will utilize a Tier 4 engine to satisfy BACT. Therefore a full Top Down BACT evaluation for the engine is not required as the best available emergency

generator engine has been selected in the plant design.

The UDAQ proposes the Tier 4 engine as BACT for the associated emergency generator. [Last updated February 18, 2016]

12. BACT review regarding Dry Sorbent Silo
The dry sorbent silo will be periodically filled (pneumatic loading) with sodium bicarbonate, lime, or equivalent material. The silo will be equipped with a small bin vent filter to control emissions of $PM/PM_{10}/PM_{2.5}$ generated during pneumatic loading of the silo.

While a baghouse could be used as a $PM/PM_{10}/PM_{2.5}$ capture option, the excessive cost of the baghouse, cost to operate, intermittent loading requirements, and essentially the same capture efficiency (99%) as the bin vent option; exclude the baghouse as a control option for this plant.

The UDAQ proposes the bin vent filter as BACT for $PM/PM_{10}/PM_{2.5}$ reduction associated with this dry sorbent silo. [Last updated February 18, 2016]

Modeling Results:

The Tooele facility will not have the potential to emit which exceeds any criteria or HAP emission listed in R307-410-4 and R307-410-5. Therefore, modeling is not required for this facility. [Last updated September 10, 2015]

RECOMMENDED APPROVAL ORDER CONDITIONS

The intent is to issue an air quality Approval Order (AO) authorizing the project with the following recommended conditions and that failure to comply with any of the conditions may constitute a violation of the AO. The AO will be issued to and will apply to the following:

Name of Permittee:	**Permitted Location:**
Stericycle Incorporated 28161 North Keith Drive Lake Forest, IL 600450	Stericycle-Tooele County Facility 9250 Rowley Road Tooele, UT 84029

UTM coordinates: 354,053.5 m Easting, 4,523,486.7 m Northing, UTM Zone 12
SIC code: 4953 (Refuse Systems)

Section I: GENERAL PROVISIONS

I.1 All definitions, terms, abbreviations, and references used in this AO conform to those used in the UAC R307 and 40 CFR. Unless noted otherwise, references cited in these AO conditions refer to those rules. [R307-101]

I.2 The limits set forth in this AO shall not be exceeded without prior approval. [R307-401]

I.3 Modifications to the equipment or processes approved by this AO that could affect the emissions covered by this AO must be reviewed and approved. [R307-401-1]

I.4 All records referenced in this AO or in other applicable rules, which are required to be kept by the owner/operator, shall be made available to the Director or Director's representative upon request, and the records shall include the five-year period prior to the date of the request. Unless otherwise specified in this AO or in other applicable state and federal rules, records shall be kept for a minimum of five (5) years. [R307-401-8]

I.5 At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any equipment approved under this AO, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Director which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. All maintenance performed on equipment authorized by this AO shall be recorded. [R307-401-4]

I.6 The owner/operator shall comply with UAC R307-107. General Requirements: Breakdowns. [R307-107]

I.7 The owner/operator shall comply with UAC R307-150 Series. Emission Inventories. [R307-150]

Section II: SPECIAL PROVISIONS

II.A The approved installations shall consist of the following equipment:

II.A.1 **Tooele HMIWI Facility**

II.A.2 **Two (2) HMIWI Units each with its own dedicated Air Pollution Control (APC) System**
Maximum Equipment Rating: 2,050 pounds per hour (lbs/hr) per unit
Combustion System: Two-Stage
Fuel Type: Natural Gas

Each unit is equipped with natural gas-fired auxiliary burners, a bypass stack, automated waste feed system and ash removal system.

II.A.3 **APC System - Two Selective Non-Catalytic Reduction**
SNCR Reagent: Ammonia, Urea, or Equivalent
Equipment Purpose: NO_x Reduction

II.A.4 **APC System - Two (2) Waste Heat Boilers**
Waste Heat Boiler and Associated Evaporative Cooler
Equipment Purpose: Reduce Flue Gas Temperature

II.A.5 **APC System - Two (2) Carbon Injection Systems**
Carbon Injection System
Equipment Purpose: Reduction of Dioxin/Furans

II.A.6 **APC System - Two (2) Dry Sorbent Injection Systems**
System Consists of the Following:

One (1) Storage Silo
Maximum Silo Capacity: TBD upon plant construction.
Particulate Control on Silo: Bin vent filter
Material Stored: Sodium Bicarbonate, Lime, or Equivalent
Equipment Purpose: Flue Gas Neutralization

II.A.7 **APC System - Two (2) Baghouses**
Maximum Flow Rate: 13,800 acfm
Cleaning Mechanism: Pulse Jet
Equipment Purpose: Particulate/PM_{10}/$PM_{2.5}$ Control

II.A.8 **APC System - Two (2) Wet Gas Absorbers**
Maximum Flow Rate: 11,600 acfm
Maximum Liquid Injection Rate: 200 gallons per minute (gpm)
Equipment Purpose: Absorption of Acid Gases

II.A.9 **APC System - Two (2) Carbon Bed Units**
Maximum Flow Rate: 10,000 acfm

Number of Beds per Unit: 2
Equipment Purpose: Polishing Mercury Reduction

II.A.10 **One (1) Generator**
Maximum Equipment Rating: 500 kW
Engine Type: Tier 4i
Fuel Type: Diesel

II.A.11 **Tub Washer**
Equipment Purpose: Utilizes steam from waste heat boiler to clean reusable waste containers.

Noted for informational purposes only.

II.B Requirements and Limitations

II.B.1 **<u>The Tooele County Stericycle Hospital, Medical, and Infectious Waste Incineration Facility shall abide by the following Site-wide Requirements</u>**

II.B.1.a The owner/operator shall notify the Director in writing when the installation of the equipment listed in Condition II.A of this AO have been completed and are operational. To ensure proper credit when notifying the Director, send your correspondence to the Director, attn: Compliance Section.

If installation has not been completed within 18 months from the date of this AO, the Director shall be notified in writing on the status of the construction and/or installation. At that time, the Director shall require documentation of the continuous installation of the operation and may revoke the AO. [R307-401-18]

II.B.1.b The owner/operator shall operate in accordance with 40 CFR 60 Subpart Ec (Standards of Performance for New Stationary Sources: Hospital/Medical/Infectious Waste Incinerators). All requirements of 40 CFR 60 Subpart Ec including but not limited to Emissions Limits, Operator Training and Qualifications, Siting, Waste Management Plan, Compliance and Performance Testing, Monitoring, Reporting, and Recordkeeping, shall apply at all times of source operation. [40 CFR 60 Subpart Ec]

II.B.1.c The owner/operator shall process a maximum of 4,100 pounds per hour of hospital/medical/infectious waste in the two HMIWI units at this facility. Records of the waste feed weight and rate shall be kept at all times of each HMIWI unit operation and made available to the Director upon request. [R307-401-8]

II.B.1.d The owner/operator shall operate the HMIWI below the maximum charge rate on a 3-hour rolling average basis. The maximum charge rate is defined as 110 percent of the lowest 3-hour average charge rate measured during the most recent performance test demonstrating compliance with all applicable emission limits. Records of the waste feed rate shall be kept at all times of incinerator operation and made available to the Director upon request. [40 CFR 60 Subpart Ec, R307-401-8]

II.B.1.e Residence time of the gas in the secondary chamber will be designed to be at least two seconds above 1,800 degrees F. The minimum secondary chamber temperature will be established during performance testing. The secondary chamber temperature shall be monitored and recorded at all times of each HMIWI unit operation. The records shall be made available to the Director upon request. [R307-401-8]

II.B.1.f Emissions to the atmosphere from the indicated emission points shall not exceed the following rates and concentrations. The emission limitations apply to the HMIWI units operations at all times.

Source: Each Incinerator Emission Control System Exhaust Stack (ST01/ST02)

Pollutant	Units (7% Oxygen, dry basis)	Limit
Particulate Matter	Milligrams per dry standard cubic meter (mg/dscm)	18
	Grains per dry standard cubic foot (gr/dscf)	0.0080
Carbon Monoxide	Parts per million by volume (ppmv)	11
Dioxin/Furans	Nanograms per dry standard cubic meter total dioxin/furans (ng/dscm)	9.3
	Grains per billion dry standard cubic feet (gr/10^9 dscf)	4.1
or;		
	ng/dscm TEQ	0.035
	gr/10^9dscf TEQ	0.015
Hydrogen Chloride	ppmv	5.1
Sulfur Dioxide	ppmv	8.1
Nitrogen Oxides	ppmv	140
Lead	mg/dscm	0.00069
	grains per thousand dry standard cubic feet (gr/10^3 dscf)	0.00030
Cadmium	mg/dscm	0.00013
	gr/10^3dscf	0.000057
Mercury	mg/dscm	0.0013
	gr/10^3dscf	0.00057.

[40 CFR 60 Subpart Ec]

II.B.1.g An initial stack test to show compliance with the emission limitations stated in Condition II.B.1.f shall be performed for opacity, fugitive ash, PM, CO, Dioxin/Furan, HCl, SO_2, NO_x, Pb, Cd, and Hg. The stack test shall be performed within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days of the initial startup of the HMIWI units.   Subsequent stack testing shall be performed for annually (no more than 12 months following the previous performance test) for opacity, fugitive ash, PM, CO, and HCl in accordance with 40 CFR 60 Subpart Ec. The annual testing frequency for PM, CO, and HCl can be reduced to once every three years if all three performance tests over a 3-year period indicate compliance with the emission limits for each of the three pollutants. The frequency shall return to annual testing for a particular pollutant if a performance test for that pollutant indicates noncompliance with the respective emission limit. Upon operation of NO_x and CO CEMS as described in Condition II.B.2.a, stack testing for NO_x and CO will not be required. The use of the bypass stack during a stack test shall invalidate the stack test. [40 CFR 60 Subpart Ec]

II.B.1.h Each stack test shall consist of a minimum of three test runs conducted under representative operating conditions. When two or more pollutants are tested in a single test program Dioxin/Furan, Pb, Cd, and Hg shall be tested simultaneously, as applicable, and the minimum sample time shall be 4 hours per test run unless otherwise indicated. When two or more pollutants are tested in a single test program, PM, CO, HCl, SO_2, and NO_x shall be tested simultaneously, and the minimum sample time shall be 1 hour per test run unless otherwise indicated. All stack testing data and results shall be submitted to the Director within 60 days of the testing date(s). [40 CFR 60 Subpart Ec, R307-165, R307-401-8]

II.B.1.i Notification

The Director shall be notified at least 30 days prior to conducting any required emission testing. A source test protocol shall be submitted to DAQ when the testing notification is submitted to the Director.

The source test protocol shall be approved by the Director prior to performing the test(s). The source test protocol shall outline the proposed test methodologies, stack to be tested, and procedures to be used. A pretest conference shall be held, if directed by the Director. [R307-165]

II.B.1.j Sample Location

The emission point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1, or other EPA-approved testing method, as acceptable to the Director. An Occupational Safety and Health Administration (OSHA) or Mine Safety and Health Administration (MSHA) approved access shall be provided to the test location. [R307-165]

II.B.1.k Volumetric Flow Rate

40 CFR 60, Appendix A, Method 2. [R307-165]

II.B.1.l Particulate Matter

40 CFR 60, Method 5 of Appendix A-3, 26A or 29 of Appendix A-8 or other EPA approved method as acceptable to the Director. [40 CFR 60 Subpart Ec, R307-165]

II.B.1.m Carbon Monoxide

40 CFR 60, Method 10 or 10B of Appendix A-4 or other EPA approved method as acceptable to the Director. [40 CFR 60 Subpart Ec, R307-165]

II.B.1.n Dioxins/furans

40 CFR 60, Method 23 of Appendix A-7 or other EPA approved method as acceptable to the Director. [40 CFR 60 Subpart Ec, R307-165]

II.B.1.o Hydrogen Chloride

40 CFR 60, Method 26 or 26A of Appendix A-8 or other EPA approved method as acceptable to the Director. [40 CFR 60 Subpart Ec, R307-165]

II.B.1.p Sulfur Dioxide

40 CFR 60, Method 6 or 6C of Appendix A-4 or other EPA approved method as acceptable to the Director. [40 CFR 60 Subpart Ec, R307-165]

II.B.1.q Nitrogen Oxides

40 CFR 60, Method 7 or 7E of Appendix A-4 or other EPA approved method as acceptable to the Director. [40 CFR 60 Subpart Ec, R307-165]

II.B.1.r Lead, Cadmium and Mercury

40 CFR 60, Method 29 of Appendix A-8 or other EPA approved method as acceptable to the Director. [40 CFR 60 Subpart Ec, R307-165]

II.B.1.s Opacity

40 CFR 60, Method 9 of Appendix A-4. [40 CFR 60 Subpart Ec]

II.B.1.t Fugitive Ash

40 CFR 60, Method 22 of Appendix A-7. [40 CFR 60 Subpart Ec]

II.B.1.u Each HMIWI baghouse shall operate in accordance with the following:

A) The designed pressure drop of each baghouse shall not be less than one (1) inches of water column or more than 10.0 inches of water column.*

B) The baghouse operating parameters shall be monitored with equipment located such that an inspector/operator can safely read the output any time. The pressure drop readings shall be accurate to within plus or minus 0.5 inches of water column.

C) All instruments shall be calibrated according to the manufacturers instructions.

* Any modification to the baghouse pressure drop shall be reviewed and approved in accordance with R307-401-1. [R307-401-8]

II.B.1.v The owner/operator shall not allow visible emissions to exceed the following:

A) Ash conveying system (including conveyor transfer points) - 5% opacity
B) Each HMIWI unit emission point (following carbon bed or equivalent) - 6% opacity
C) All baghouse emission points - 10% opacity
D) Dry sorbent silo bin vent emission point - 10% opacity
E) All diesel generator emission points - 20% opacity
F) All other stationary point or fugitive emission sources on site - 20% opacity*

Note: The 20% opacity limitation does not apply to the by-pass stack during by-pass events. [40 CFR 60 Subpart Ec, R307-201-3]

II.B.1.v.1 If the dry sorbent silo is located outdoors, a visual observation of the dry sorbent silo shall be performed once during each filling operation by an individual trained on the observation procedures of 40 CFR 60, Appendix A, Method 9. The individual is not required to be a certified visible emissions observer (VEO). If any visible emissions are observed, filling operations shall be suspended and the dust control device as well as any associated ducting shall be inspected. Any conditions existing outside of normal operational parameters shall be corrected and filling activities may resume. Upon resumption of filling operations a 40 CFR 60, Appendix A, Method 9 opacity determination of the silo shall be performed by a certified observer.

All other opacity observations of emissions from stationary sources shall be conducted according to 40 CFR 60, Appendix A, Method 9.

For sources that are subject to NSPS, opacity shall be determined by conducting observations in accordance with 40 CFR 60.11(b) and 40 CFR 60, Appendix A, Method 9. [40 CFR 60 Subpart Ec, R307-201-3]

II.B.1.v.2 If the dry sorbent silo is located outdoors, records of visual emission observations shall be kept at all times of silo filling operations. The records shall include the date, time and visual observation value noted. All records shall be kept in accordance with Condition I.4 of this AO. [R307-401-8]

II.B.2 **The Tooele County Stericycle Hospital, Medical, and Infectious Waste Incineration Facility shall abide by the following CEMS and Parametric Monitoring Requirements**

II.B.2.a The owner/operator shall operate CEMS or other alternative monitoring approach approved by the Director to demonstrate compliance with NO_x and CO emissions limits. An O_2 monitor shall also be installed for adjusting the readings to percent O_2. Compliance with the NO_x and CO emission limits shall be demonstrated using a 24-hour block average, calculated as specified in section 12.4.1 of EPA Reference Method 19 of 40 CFR 60 Appendix A-7. While the affected emission unit is operating, hourly NO_x and CO emission rates expressed in ppmv shall be determined in accordance with R307-170 using the appropriate conversion factors. The CEMS shall be installed and operating no later than 18 months from the issuance date of this AO or upon startup of the HMIWIs if more than 18 months from the issuance date of this AO, unless an approved alternative is implemented. Prior to the installation and operation of the NO_x and CO CEMS, compliance with the NO_x and CO emissions limits shall be demonstrated by maintaining the minimum and maximum operating parameters identified in Conditions II.B.2.b and II.B.2.c.1 in accordance with 40 CFR 60 Subpart Ec. CEMS shall be installed, calibrated, operated, and maintained in accordance with R307-170. [R307-170]

II.B.2.b Prior to the installation and operation of the CO CEMS, as described in Condition II.B.2.a, operating above the maximum charge rate (3-hour rolling average) and below the minimum secondary chamber temperature (3-hour rolling average) simultaneously constitutes a violation of the CO emissions limit. [40 CFR 60 Subpart Ec, R307-401-8]

II.B.2.c The SNCR system shall inject ammonia, urea or an equivalent reagent into each of the HMIWI unit's secondary chambers exhaust stream prior to the exhaust gas being fed into the waste heat boilers. All equivalent reagents shall be approved by the Director. [R307-401-8]

II.B.2.c.1 The owner/operator shall establish the minimum reagent flow rate based on performance testing. The minimum reagent flow rate means 90 percent of the highest 3-hour average injection rate (taken, at a minimum, once every minute) measured during the most recent performance test demonstrating compliance with the NO_x emission limit. Prior to the installation and operation of the NO_x CEMS, as described in Condition II.B.2.a, operating above the maximum charge rate (3-hour rolling average), below the minimum secondary chamber temperature (3-hour rolling average), and below the minimum reagent flow rate (3-hour rolling average) simultaneously constitutes a violation of the NO_x emissions limit. [40 CFR 60 Subpart Ec, R307-401-8]

II.B.2.c.2 The owner/operator shall record the amount and type of NO_x reagent used during each hour of operation. [40 CFR 60 Subpart Ec, R307-401-8]

II.B.2.d The owner/operator shall obtain CEMS monitoring data at all times during HMIWI operation in accordance with 40 CFR 60.13. The owner/operator shall monitor and record all emissions data during all phases of source operations, including start-ups, shutdowns, and process malfunctions. Monitor availability shall be defined in UAC R307-170. [40 CFR 60, R307-170]

II.B.2.e The owner/operator shall obtain continuous process operations monitoring data at all times during HMIWI operation in accordance with 40 CFR 60 Subpart Ec. The owner/operator shall obtain continuous process operations monitoring data at all times during HMIWI operation except during periods of monitoring equipment malfunction, calibration, or repair. At a minimum, valid monitoring data shall be obtained for 75 percent of the operating hours per day for 90 percent of the operating days per calendar quarter that the affected facility is combusting hospital waste and/or medical/infectious waste in accordance with 40 CFR 60.57c(e). [40 CFR 60 Subpart Ec]

II.B.2.f The owner/operator shall establish or reestablish site-specific operating parameter values, as applicable, according to the definition of each operating parameter pursuant to 40 CFR 60.51c, upon submittal of performance test results demonstrating compliance with the applicable emissions limits in 40 CFR 60 Subpart Ec, but no later than 60 days following the performance test. [40 CFR 60 Subpart Ec]

II.B.3 **Diesel Generator Requirements**

II.B.3.a The diesel generator shall not exceed 300 hours of operation per rolling 12-month period. [R307-401-8]

II.B.3.a.1 To determine compliance with a rolling 12-month total, the owner/operator shall calculate a new 12-month total for each day of the previous month by the twentieth day of each month using data from the previous 12 months. Hours of operation shall be determined by supervisor monitoring and maintaining of an operations log for the generator. [R307-401-8]

II.B.3.b The sulfur content of any diesel burned shall not exceed 0.0015% by weight. [40 CFR 63 Subpart ZZZZ, R307-203-1]

II.B.3.c For each delivery of fuel, the permittee shall either:

(a) Determine the fuel sulfur content expressed as wt% in accordance with the methods of the American Society for Testing Materials (ASTM); or

(b) Inspect the fuel sulfur content expressed as wt% determined by the vendor using methods of the ASTM; or

(c) Inspect documentation provided by the vendor that indirectly demonstrates compliance with this provision. [R307-201-3]

II.B.3.d All emissions from the diesel engine generators shall be vented vertically unrestricted. [R307-410]

Section III: APPLICABLE FEDERAL REQUIREMENTS

In addition to the requirements of this AO, all applicable provisions of the following federal programs have been found to apply to this installation. This AO in no way releases the owner or operator from any liability for compliance with all other applicable federal, state, and local regulations including UAC R307.

NSPS (Part 60), A: General Provisions
NSPS (Part 60), Ec: Standards of Performance for Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996
NSPS (Part 60), IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
MACT (Part 63), A: General Provisions
MACT (Part 63), ZZZZ: National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

REVIEWER COMMENTS

The AO will be based on the following documents:

Is Derived From	Notice of Intent Document dated February 26, 2015
Incorporates	Additional Information dated June 5, 2015
Incorporates	Additional Information dated September 23, 2015
Incorporates	Additional Information dated October 8, 2015
Incorporates	Additional Information dated January 28, 2016

1. Comment regarding Title V Operating Permit Program:
   The Tooele facility will be located in an attainment or unclassifiable area of Tooele County for all pollutants. Therefore, the Title V emissions threshold is 100 tons per year of any air pollutant subject to regulation. The Tooele facility will not emit any air pollutants subject to regulation in excess of 100 tons per year, and therefore, will not be considered a major source with respect to the emissions thresholds of the Title V Operating Permit program. However, the Tooele facility will be subject to the Title V Operating Permit Program and DAQ's Title V permitting program (R307-415) as a regulated source under 40 CFR Part 60, Subpart Ec pursuant to 40 CFR 60.50c(1) and State Rule R307-222-1(3). [Last updated March 15, 2016]

2. Comment regarding Title V Applicability:
   R307-415 establishes an air quality permitting program as required under Title V of the Clean Air Act Amendments of 1990 and 40 CFR Part 70. The Tooele facility will emit less than 100 tpy for all pollutants and will therefore not be a major source with respect to the emissions thresholds of the Title V Operating Permit program. However, pursuant to Standards of Performance for New Stationary Sources: Hospital/Medical/Infectious Waste Incinerators (40 CFR §60.50c(l), the Tooele facility will be required to operate under a Title V permit issued under a U.S. EPA approved operating permit program. Therefore, Stericycle will be subject to the Title V requirements and will operate pursuant to a Title V Operating Permit. In accordance with R307-415-5a(1)(a), the Tooele facility will submit a Title V operating permit application within one (1) year of
   becoming subject to the Title V permit program. [Last updated September 15, 2015]

3. Comment regarding Applicability of Federal Subparts:
   New Source Performance Standards (NSPS) and Emission Guidelines (EG)

   40 CFR 60 Subpart Ec (Standards of Performance for New Stationary Sources: Hospital/Medical/infectious Waste Incinerators) as amended on October 6, 2009 applies to this facility. This applicability is based upon 40 CFR 60 Subpart 60.50c(a)(3) For which construction is commenced after December 1, 2008.

   40 CFR 60, Subpart Ce (Emission Guidelines and Compliance Times for Hospital/Medical/Infectious Waste Incinerators) does not apply to this facility. The intent of this subpart is to direct states in developing their own State Plans for existing HMIWI facilities and is not directly applicable to the Tooele HMIWI. The Stericycle facility operating in North Salt Lake is subject to Subpart Ce and is operating under the current State HMIWI Plan and 40 CFR 62, Subpart HHH.

40 CFR 62, Subpart HHH (Federal Plan Requirements for Hospital/Medical/Infectious Waste Incinerators Constructed on or Before December 1, 2008) applies to existing facilities in States without a U.S. EPA-approved State Plan. Because the Tooele facility will commence construction after December 1, 2008, the proposed HMIWI units will not be subject to 40 CFR Part 62, Subpart HHH.

40 CFR 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition (CI) Internal Combustion Engines) applies to emergency diesel generators that commenced construction after July 11, 2015 and were manufactured on or after April 1, 2006. The emergency generator will be subject to the emission standards of 40 CFR 60.4205(b). The engine is rated at 500 kW (671 Hp) and meets EPA Tier 4 standards.

National Emission Standards for Hazardous Air Pollutants

40 CFR 63, Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE)) applies to the 500 kW emergency diesel generator. The proposed generator satisfies all requirements of Subpart ZZZZ by meeting the requirements of 40 CFR 60 Subpart IIII. [Last updated March 23, 2016]

4. Comment regarding HMIWI Facility Emission Calculations:
The facility's PTE takes into account air pollution controls, maximum expected operating time, and maximum expected material throughputs.

The PTE of criteria pollutants, GHG pollutants, HAPs, and other non-HAPs from the proposed HMIWI units were calculated using a combination of 40 CFR Part 60, Subpart Ec emission concentration limits, U.S. EPA's "AP-42 Compilation of Air Pollutant Emission Factors," and 40 CFR Part 98 Tables C-1 and C-2 emission factors. The PTE from the proposed HMIWI units was calculated for both normal operating conditions (i.e., HMI waste combustion), as well as startup conditions (i.e., supplemental natural gas firing for purposes of preheating the combustion chambers). The PTE from HMI waste combustion was calculated using engineering design parameters, a maximum HMI waste feed rate of 2,050 pounds per hour per unit, and 8,760 hours per year of operation.

The PTE from supplemental natural gas was calculated based on a combined maximum total burner rating of approximately 12 MMBtu/hr per HMIWI, and conservatively assumes 8,760 hours per year of natural gas combustion. In reality, natural gas will only be utilized when necessary to maintain the combustion temperature and to preheat the chambers during startup.

The PTE from the emergency generator was calculated using a combination of the applicable Tier 4 emission standards, AP-42 emission factors, and 40 CFR Part 98 emission factors. The PTE assumes that the diesel-fired emergency generator, rated at 500 kW, will operate no more than 300 hours per year. [Last updated December 10, 2015]

5. Comment regarding HMIWI Facility Emission Calculations - (Continued):
The following controlled emission factors (EF) were used to calculate the PTE for the Stericycle Tooele Facility's HMI waste combustion units:

Criteria Pollutants	EF	EF Source
$PM/PM_{10}/PM_{2.5}$	0.0080 gr/dscf	40 CFR 60 Subpart Ec
CO	11 ppmv	40 CFR 60 Subpart Ec
SO_2	8.1 ppmv	40 CFR 60 Subpart Ec
NO_x	140 ppmv	40 CFR 60 Subpart Ec
VOC	0.047 lb/ton	AP-42 Chapter 2.3
CO_2e (summation of CO_2, CH4, N_2O)		
CO_2	199.96 lb/MMBtu	40 CFR Part 98 - Table C-1
CH_4	0.07 lb/MMBtu	40 CFR Part 98 - Table C-2
N_2O	0.01 lb/MMBtu	40 CFR Part 98 - C-2

HAPs	EF	EF Source
Hydrogen Chloride	5.1 ppmv	40 CFR 60 Subpart Ec
Dioxins/Furans	4.1 gr/10^9 dscf	40 CFR 60 Subpart Ec
Lead	0.00030 gr/10^3 dscf	40 CFR 60 Subpart Ec
Cadmium	0.000057 gr/10^3 dscf	40 CFR 60 Subpart Ec
Mercury	0.00057 gr/10^3dscf	40 CFR 60 Subpart Ec
Chlorine	1.05E-01 lb/ton	AP-42 Chapter 2.3
Antimony	1.51E-04 lb/ton	AP-42 Chapter 2.3
Arsenic	1.46E-5 lb/ton	AP-42 Chapter 2.3
Beryllium	3.84E-06 lb/ton	AP-42 Chapter 2.3
Chromium	3.96E-05 lb/ton	AP-42 Chapter 2.3
Hydrogen Flouride	1.33E-02 lb/ton	AP-42 Chapter 2.3
Manganese	5.67E-04 lb/ton	AP-42 Chapter 2.3
Nickel	2.84E-04 lb/ton	AP-42 Chapter 2.3
Total PCBs	4.65E-05 lb/ton	AP-42 Chapter 2.3

Additional Non-HAPs	EF	EF Source
Aluminum	2.99E-03 lb/ton	AP-42 Chapter 2.3
Barium	7.39E-05 lb/ton	AP-42 Chapter 2.3
Copper	2.75E-04 lb/ton	AP-42 Chapter 2.3
Hydrogen Bromide	4.42E-03 lb/ton	AP-42 Chapter 2.3
Iron	1.44E-02 lb/ton	AP-42 Chapter 2.3
Silver	7.19E-05 lb/ton	AP-42 Chapter 2.3
SO_3	9.07E-03 lb/ton	AP-42 Chapter 2.3
Thallium	1.10E-03 lb/ton	AP-42 Chapter 2.3
Ammonia	1.0 ppm	Engineering Estimate

[Last updated March 23, 2016]

6. Comment regarding HMIWI Facility Emission Calculations - (Continued):
The emissions associated with the combustion of natural gas at this facility were calculated using AP-42 Chapters 1.4 (Natural Gas Combustion) Tables 1.4-2, 1.4-3, and 1.4-4.

Emissions of PM, PM_{10}, $PM_{2.5}$, CO, SO_2, NO_x, Lead, Cadmium, and Mercury are accounted for through the implementation of 40 CFR 60 Subpart Ec. GHG emissions from the combustion of natural gas were calculated using 40 CFR Part 98 Tables C-1 and C-2. [Last updated March 23, 2016]

7. Comment regarding HMIWI Facility Emission Calculations - (Continued):
The emissions associated with the combustion of diesel fuel in the emergency generator at this facility were calculated using Tier 4 emission standards for engines with a power rating of 450<kW<560 and AP-42 Chapter 3.4 (Large Stationary Diesel and All Stationary Dual-fuel Engines) Tables 3.4-1, 3.4-3, and 3.4-4. [Last updated March 23, 2016]

8. Comment regarding Emission Offset Requirements:
Currently parts of Tooele County are classified as nonattainment with respect to the NAAQS for the 2006 24-hour $PM_{2.5}$ standard and for the 1971 SO_2 primary and secondary standards. However, the location of the proposed Tooele facility is not located within the nonattainment portions of Tooele County. Therefore, offset requirements are not required.

Actual plant location can be viewed in the NOI document. Refer to Figures F-1 and F-2 for maps depicting the location of the proposed Tooele facility with respect to nonattainment areas for pollutants for which Tooele County is in partial nonattainment. [Last updated September 15, 2015]

9. Comment regarding Waste Heat Boilers:
The waste heat boiler does not have any fuel combustion burners. The boilers recovers the heat generated in the primary and secondary combustion chambers. Therefore there is no additional combustion source associated with the waste heat boilers. [Last updated October 1, 2015]

10. Comment regarding Primary and Secondary chamber Residence Time:
Residence time in the primary chamber will vary depending on the waste feed rate, heat content, moisture content, volume, etc. Organic materials that are volatilized are destroyed in the secondary chamber. Solid waste (including pathological components) that is incinerated for sterilization or other purposes in the primary chamber is regulated by the Utah Division of Waste Management and Radiation Control. The HMIWI air quality regulations do not establish a residence time or minimum temperature for the primary chamber; however, temperatures of gases fed from the primary chamber into the oxygen-rich secondary chamber must be high enough to sustain the required secondary-chamber temperature, which is established during performance testing. Based on historic operation, secondary chamber temperatures are typically greater than 1,800 degrees F. Therefore, residence time of the gas in the secondary chamber will be designed to be at least two (2) seconds above 1,800 degrees F. [Last updated February 18, 2016]

11. Comment regarding Emergency Bypass Stack:
The bypass stack (emergency release of hot flue gasses prior to passing through the air pollution control system (APCS) is used during HMIWI operations (i.e., when waste is being combusted) when one or both of the following two conditions occur in the incinerator process:

1) high temperatures in the APCS, and
2) loss of system pressure in the incinerator.

There are a number of scenarios that can lead to these two conditions, including a loss of power. The bypass stack is used to protect plant personnel, process systems, and property from the effects of a catastrophic event that may otherwise occur when bypass conditions are experienced. Use of the bypass stack, including date, time, duration, and cause will be reported to the DAQ for each occurrence. Records will be kept on site indicating any preventative measures taken before or after any bypass event to address the cause of the event. Additionally, the bypass stack is open during maintenance outages, when the HMIWI is not in operation. [Last updated February 18, 2016]

12. Comment regarding Siting and Waste Management Plan Requirements:
40 CFR 60.54c requires an analysis of the impacts of the affected facility. The analysis considers air pollution control alternatives that minimize, on a site-specific basis, the maximum extent practicable, potential risks to public health or the environment. The Siting requirement has been fulfilled through the BACT analysis which considers the potential control equipment options for this proposed facility.

40 CFR 60.55c requires the preparation of a Waste Management Plan. This plan shall identify both the feasibility and the approach to separate certain components of solid waste from the health care waste stream in order to reduce the amount of toxic emissions from incinerated waste. A waste management plan may include, but is not limited to, elements such as segregation and recycling of paper, cardboard, plastics, glass, batteries, food waste, and metals (e.g., aluminum cans, metals-containing devices); segregation of non-recyclable wastes (e.g., polychlorinated biphenyl-containing waste, pharmaceutical waste, and mercury-containing waste, such as dental waste); and purchasing recycled or recyclable products. The Waste Management Plan requirements will be met through the solid waste permit. [Last updated March 23, 2016]

ACRONYMS

The following lists commonly used acronyms and associated translations as they apply to this document:

40 CFR	Title 40 of the Code of Federal Regulations
AO	Approval Order
BACT	Best Available Control Technology
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CDS	Classification Data System (used by EPA to classify sources by size/type)
CEM	Continuous emissions monitor
CEMS	Continuous emissions monitoring system
CFR	Code of Federal Regulations
CMS	Continuous monitoring system
CO	Carbon monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent - 40 CFR Part 98, Subpart A, Table A-1
COM	Continuous opacity monitor
DAQ/UDAQ	Division of Air Quality
DAQE	This is a document tracking code for internal UDAQ use
EPA	Environmental Protection Agency
FDCP	Fugitive dust control plan
GHG	Greenhouse Gas(es) - 40 CFR 52.21 (b)(49)(i)
GWP	Global Warming Potential - 40 CFR Part 86.1818-12(a)
HAP or HAPs	Hazardous air pollutant(s)
ITA	Intent to Approve
LB/HR	Pounds per hour
MACT	Maximum Achievable Control Technology
MMBTU	Million British Thermal Units
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOI	Notice of Intent
NO_x	Oxides of nitrogen
NSPS	New Source Performance Standard
NSR	New Source Review
PM_{10}	Particulate matter less than 10 microns in size
$PM_{2.5}$	Particulate matter less than 2.5 microns in size
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
R307	Rules Series 307
R307-401	Rules Series 307 - Section 401
SO_2	Sulfur dioxide
Title IV	Title IV of the Clean Air Act
Title V	Title V of the Clean Air Act
TPY	Tons per year
UAC	Utah Administrative Code
VOC	Volatile organic compounds

Marty Gray <martygray@utah.gov>

Fwd: Stericycle Review

1 message

Jon Black <jlblack@utah.gov> Wed, Mar 23, 2016 at 4:18 PM
To: Marty Gray <martygray@utah.gov>

---------- Forwarded message ----------
From: **Lindsey W. Kroos** <lkroos@all4inc.com>
Date: Wed, Apr 1, 2015 at 5:23 PM
Subject: RE: Stericycle Review
To: Jon Black <jlblack@utah.gov>

Hi Jon – hope all is going well with you too. Please find attached an Excel version of the emission calculations.

Should you have any questions please don't hesitate to contact me – thank you!

Lindsey

Lindsey W. Kroos | Project Manager

lkroos@all4inc.com | 610.933.5246 x122 | Profile | LinkedIn | Twitter

All4 Inc. | Philadelphia | Atlanta | Houston

Website | Blog | Newsletter | LinkedIn | Twitter | Facebook | Awards

From: Jon Black [mailto:jlblack@utah.gov]
Sent: Thursday, March 26, 2015 1:35 PM
To: Lindsey W. Kroos
Subject: Stericycle Review

Hi Lindsey,

The Stericycle review is going great. I was wondering if you could provide me with an excel version of the emission calculations for my own verification sake.

Hope all is going well there.

Thanks,

Jon

Tooele NOI Application Emissions Calculations.xlsx
156K

Table C-1
Stericycle, Inc. - Tooele, UT Facility
Summary of Proposed Incinerator Potential to Emit from HMI Waste Combustion (2 HMIWI)

Pollutant	Uncontrolled Emission Factor	Units	Emission Factor Source	Controlled Emission Factor	Units	Emission Factor Source	Uncontrolled Potential to Emit[e]		Controlled Potential to Emit[e]	
							(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
Criteria Pollutants										
PM[c][d]	4.67	lb/ton	AP-42 Chapter 2.3[b]	0.0080	gr/dscf @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	9.57	41.93	0.44	1.93
PM_{10}[c]	4.67	lb/ton	AP-42 Chapter 2.3[b]	0.0080	gr/dscf @ 7% O_2	Engineering Estimate[c]	9.57	41.93	0.44	1.93
$PM_{2.5}$[c]	4.67	lb/ton	AP-42 Chapter 2.3[b]	0.0080	gr/dscf @ 7% O_2	Engineering Estimate[c]	9.57	41.93	0.44	1.93
CO[d]	11	ppmv @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	11	ppmv @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	0.31	1.35	0.31	1.35
SO_2[d]	2.17	lb/ton	AP-42 Chapter 2.3[b]	8.1	ppmv @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	4.45	19.48	0.52	2.28
NO_X[d]	7.32	lb/ton	Engineering Estimate	140	ppmv @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	15.00	65.68	6.45	28.24
VOC	0.299	lb/ton	AP-42 Chapter 2.3[b]	4.71E-02	lb/ton	AP-42 Chapter 2.3[b]	0.61	2.68	9.66E-02	0.42
GHGs										
CO_2e[g]	-	-	-	-	-	-	7,964.58	34,884.84	7,964.58	34,884.84
CO_2	199.96	lb/MMBtu	40 CFR Part 98 - Table C-1	199.96	lb/MMBtu	40 CFR Part 98 - Table C-1	7,788.40	34,113.21	7,788.40	34,113.21
CH_4	0.07	lb/MMBtu	40 CFR Part 98 - Table C-2	0.07	lb/MMBtu	40 CFR Part 98 - Table C-2	2.75	12.04	2.75	12.04
N_2O	0.01	lb/MMBtu	40 CFR Part 98 - Table C-2	0.01	lb/MMBtu	40 CFR Part 98 - Table C-2	0.36	1.58	0.36	1.58
HAPs										
Hydrogen Chloride[d]	33.5	lb/ton	AP-42 Chapter 2.3[b]	5.1	ppmv @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	68.68	300.80	0.19	0.82
Dioxins/Furans (as Total CDD)[d]	2.13E-05	lb/ton	AP-42 Chapter 2.3[b]	4.1	gr/10^9 dscf @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	4.37E-05	1.91E-04	2.26E-07	9.90E-07
Lead[d]	7.28E-02	lb/ton	AP-42 Chapter 2.3[b]	0.00030	gr/10^3 dscf @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	1.49E-01	0.65	1.65E-05	7.24E-05
Cadmium[d]	5.48E-03	lb/ton	AP-42 Chapter 2.3[b]	0.000057	gr/10^3 dscf @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	1.12E-02	4.92E-02	3.14E-06	1.38E-05
Mercury[d]	7.66E-04	lb/ton	Engineering Estimate	0.00057	gr/10^3 dscf @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	1.57E-03	6.88E-03	3.14E-05	1.38E-04
Chlorine	1.05E-01	lb/ton	AP-42 Chapter 2.3[b]	1.05E-01	lb/ton	AP-42 Chapter 2.3[b]	0.22	0.94	2.15E-01	9.43E-01
Antimony	1.28E-02	lb/ton	AP-42 Chapter 2.3[b]	1.51E-04	lb/ton	AP-42 Chapter 2.3[b]	2.62E-02	1.15E-01	3.10E-04	1.36E-03
Arsenic	2.42E-04	lb/ton	AP-42 Chapter 2.3[b]	1.46E-05	lb/ton	AP-42 Chapter 2.3[b]	4.96E-04	2.17E-03	2.99E-05	1.31E-04
Beryllium	6.25E-06	lb/ton	AP-42 Chapter 2.3[b]	3.84E-06	lb/ton	AP-42 Chapter 2.3[b]	1.28E-05	5.61E-05	7.87E-06	3.45E-05
Chromium	7.75E-04	lb/ton	AP-42 Chapter 2.3[b]	3.96E-05	lb/ton	AP-42 Chapter 2.3[b]	1.59E-03	6.96E-03	8.12E-05	3.56E-04
Hydrogen Fluoride	0.149	lb/ton	AP-42 Chapter 2.3[b]	1.33E-02	lb/ton	AP-42 Chapter 2.3[b]	3.05E-01	1.34E+00	2.73E-02	1.19E-01
Manganese	5.67E-04	lb/ton	AP-42 Chapter 2.3[b]	5.67E-04	lb/ton	AP-42 Chapter 2.3[b]	1.16E-03	5.09E-03	1.16E-03	5.09E-03
Nickel	5.90E-04	lb/ton	AP-42 Chapter 2.3[b]	2.84E-04	lb/ton	AP-42 Chapter 2.3[b]	1.21E-03	5.30E-03	5.82E-04	2.55E-03
Total PCBs	4.65E-05	lb/ton	AP-42 Chapter 2.3[b]	4.65E-05	lb/ton	AP-42 Chapter 2.3[b]	9.53E-05	4.18E-04	9.53E-05	4.18E-04
Total HAPs	-	-	-	-	-	-	69.39	303.92	0.43	1.89
Other Non-HAPs										
Aluminum	1.05E-02	lb/ton	AP-42 Chapter 2.3[b]	2.99E-03	lb/ton	AP-42 Chapter 2.3[b]	2.15E-02	9.43E-02	6.13E-03	2.68E-02
Barium	3.24E-03	lb/ton	AP-42 Chapter 2.3[b]	7.39E-05	lb/ton	AP-42 Chapter 2.3[b]	6.64E-03	2.91E-02	1.51E-04	6.64E-04
Copper	1.25E-02	lb/ton	AP-42 Chapter 2.3[b]	2.75E-04	lb/ton	AP-42 Chapter 2.3[b]	2.56E-02	1.12E-01	5.64E-04	2.47E-03
Hydrogen Bromide	4.33E-02	lb/ton	AP-42 Chapter 2.3[b]	4.42E-03	lb/ton	AP-42 Chapter 2.3[b]	8.88E-02	3.89E-01	9.06E-03	3.97E-02
Iron	1.44E-02	lb/ton	AP-42 Chapter 2.3[b]	1.44E-02	lb/ton	AP-42 Chapter 2.3[b]	2.95E-02	1.29E-01	2.95E-02	1.29E-01
Silver	2.26E-04	lb/ton	AP-42 Chapter 2.3[b]	7.19E-05	lb/ton	AP-42 Chapter 2.3[b]	4.63E-04	2.03E-03	1.47E-04	6.46E-04
SO_3	9.07E-03	lb/ton	AP-42 Chapter 2.3[b]	9.07E-03	lb/ton	AP-42 Chapter 2.3[b]	1.86E-02	8.14E-02	1.86E-02	8.14E-02
Thallium	1.10E-03	lb/ton	AP-42 Chapter 2.3[b]	1.10E-03	lb/ton	AP-42 Chapter 2.3[b]	2.26E-03	9.88E-03	2.26E-03	9.88E-03
Ammonia	1.00	ppm	Engineering Estimate	1.00	ppm	Engineering Estimate	1.71E-02	7.47E-02	1.71E-02	7.47E-02

[a] Emission factors equivalent to emission limitations pursuant to 40 CFR Part 60, Subpart Ec - *Standards of Performance for New Stationary Sources: Hospital/Medical/Infectious Waste Incinerators.*

[b] Emission factors from Chapter 2.3 (Medical Waste Incineration), Tables 2.3-1 through 2.3-11 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, July 1993.

[c] Stericycle has conservatively assumed that $PM=PM_{10}=PM_{2.5}$.

[d] 40 CFR Part 60, Subpart Ec HMIWI regulated pollutants.

[e] Emission calculations are based on the following:

Exhaust Gas Parameters		
9,508	dscfm (total)	
11.50	% O_2	
Operating Parameters		
8,760	hr/year	
2,000	lb/ton	
2.20462	lb/kg	
2	number of incinerators	
9,500	BTU/lb waste[f]	
18,000	tons of waste/year (total)	
4,100	lb waste/hr (total)	
Molecular Weight		
CO	28.00	lb/lbmole
SO_2	64.06	lb/lbmole
NO_2	46.01	lb/lbmole
HCl	36.45	lb/lbmole
NH_3	17.03	lb/lbmole

[f] Waste heating value based on engineering experience.

[g] CO_2e is carbon dioxide equivalent, calculated according to 40 CFR Part 98 Equation A-1:

$$CO_2e = \sum_{i=1}^{n} GHG_i \times GWP_i$$

where GHG_i = annual mass emissions of greenhouse gas i (metric tons/year)
GWP_i = global warming potential of greenhouse gas i from Table A-1 (below)

Table A-1	
Pollutant	*GWP (100 year)*
CO_2	1
CH_4	25
N_2O	298

Table C-2 (continued)

Table C-2
Stericycle, Inc. - Tooele, UT Facility
Summary of Proposed Incinerator Potential to Emit from Auxiliary Natural Gas Combustion

Pollutant	Emission Factor	Potential to Emit[g]	
		(lb/hr)	(tons/yr)
Criteria Pollutants			
PM	- -	See Footnote (e)	
PM_{10}	- -	See Footnote (e)	
$PM_{2.5}$	- -	See Footnote (e)	
CO	- -	See Footnote (e)	
SO_2	- -	See Footnote (e)	
NO_X	- -	See Footnote (e)	
VOC	5.5 lb/MMCF [a]	0.13	0.57
GHGs			
CO_2e[f]	- -	2,810.35	12,309.34
CO_2	53.06 kg CO_2/MMBtu [b]	2,807.45	12,296.64
CH_4	1.00E-03 kg CH_4/MMBtu [b]	5.29E-02	2.32E-01
N_2O	1.00E-04 kg N_2O/MMBtu [b]	5.29E-03	2.32E-02
HAPs			
Lead	- -	See Footnote (e)	
Cadmium	- -	See Footnote (e)	
Mercury	- -	See Footnote (e)	
2-Methylnaphthalene	2.40E-05 lb/MMCF [c]	5.65E-07	2.47E-06
3-Methylchloranthrene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05 lb/MMCF [c]	3.76E-07	1.65E-06
Acenaphthene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Acenaphthylene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Anthracene	2.40E-06 lb/MMCF [c]	5.65E-08	2.47E-07
Benz(a)anthracene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Benzene	2.10E-03 lb/MMCF [c]	4.94E-05	2.16E-04
Benzo(a)pyrene	1.20E-06 lb/MMCF [c]	2.82E-08	1.24E-07
Benzo(b)fluoranthene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Benzo(g,h,i)perylene	1.20E-06 lb/MMCF [c]	2.82E-08	1.24E-07
Benzo(k)fluoranthene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Chrysene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Dibenzo(a,h)anthracene	1.20E-06 lb/MMCF [c]	2.82E-08	1.24E-07
Dichlorobenzene	1.20E-03 lb/MMCF [c]	2.82E-05	1.24E-04
Fluoranthene	3.00E-06 lb/MMCF [c]	7.06E-08	3.09E-07
Fluorene	2.80E-06 lb/MMCF [c]	6.59E-08	2.89E-07
Formaldehyde	7.50E-02 lb/MMCF [c]	1.76E-03	7.73E-03
Hexane	1.80E+00 lb/MMCF [c]	4.24E-02	1.86E-01
Indeno(1,2,3-cd)pyrene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Naphthalene	6.10E-04 lb/MMCF [c]	1.44E-05	6.29E-05
Phenanathrene	1.70E-05 lb/MMCF [c]	4.00E-07	1.75E-06
Pyrene	5.00E-06 lb/MMCF [c]	1.18E-07	5.15E-07
Toluene	3.40E-03 lb/MMCF [c]	8.00E-05	3.50E-04

Table C-2 (continued)

Pollutant	Emission Factor	Potential to Emit[g] (lb/hr)	Potential to Emit[g] (tons/yr)
Arsenic	2.00E-04 lb/MMCF [d]	4.71E-06	2.06E-05
Beryllium	1.20E-05 lb/MMCF [d]	2.82E-07	1.24E-06
Chromium	1.40E-03 lb/MMCF [d]	3.29E-05	1.44E-04
Cobalt	8.40E-05 lb/MMCF [d]	1.98E-06	8.66E-06
Manganese	3.80E-04 lb/MMCF [d]	8.94E-06	3.92E-05
Nickel	2.10E-03 lb/MMCF [d]	4.94E-05	2.16E-04
Selenium	2.40E-05 lb/MMCF [d]	5.65E-07	2.47E-06
Total HAPs	- -	4.44E-02	1.94E-01
Other Non-HAPs			
Butane	2.10E+00 lb/MMCF [c]	4.94E-02	2.16E-01
Ethane	3.10E+00 lb/MMCF [c]	7.29E-02	3.19E-01
Pentane	2.60E+00 lb/MMCF [c]	6.12E-02	2.68E-01
Propane	1.60E+00 lb/MMCF [c]	3.76E-02	1.65E-01
Barium	4.40E-03 lb/MMCF [d]	1.04E-04	4.53E-04
Copper	8.50E-04 lb/MMCF [d]	2.00E-05	8.76E-05
Molybdenum	1.10E-03 lb/MMCF [d]	2.59E-05	1.13E-04
Vanadium	2.30E-03 lb/MMCF [d]	5.41E-05	2.37E-04
Zinc	2.90E-02 lb/MMCF [d]	6.82E-04	2.99E-03

[a] Emission factors from Chapter 1.4 (Natural Gas Combustion), Table 1.4-2 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, July 1998.

[b] Emission factors from 40 CFR Part 98 Tables C-1 and C-2.

[c] Emission factors from Chapter 1.4 (Natural Gas Combustion), Table 1.4-3 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, July 1998.

[d] Emission factors from Chapter 1.4 (Natural Gas Combustion), Table 1.4-4 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, July 1998.

[e] Emissions of these pollutants are regulated by 40 CFR Part 60, Subpart Ec - *Standards of Performance for New Stationary Sources: Hospital/Medical/Infectious Waste Incinerators* and are accounted for in Table C-1.

[f] CO_2e is carbon dioxide equivalent, calculated according to 40 CFR Part 98 Equation A-1:

$$CO_2e = \sum_{i=1}^{n} GHG_i \times GWP_i$$

where GHG_i = annual mass emissions of greenhouse gas i (metric tons/year)
GWP_i = global warming potential of greenhouse gas i from Table A-1 (below)

Table A-1	
Pollutant	*GWP (100 year)*
CO_2	1
CH_4	25
N_2O	298

[g] Emission calculations are based on the following information:

Unit Parameters	
24.00	MMBtu/hr
1,020	MMBtu/MMCF
23.53	MCF/hr
8,760	hrs/year
206.12	MMCF/year

Table C-3

Stericycle, Inc. - Tooele, UT Facility

Summary of Proposed Emergency Generator Potential to Emit

Pollutant	Emission Factor	Potential to Emit	
		(lb/hr)[(a)]	(tons/yr)[(b)]
Criteria Pollutants			
PM	0.02 g/kW-hr[(g)]	0.02	3.31E-03
PM_{10}	0.02 g/kW-hr[(h)]	0.02	3.31E-03
$PM_{2.5}$	0.02 g/kW-hr[(h)]	0.02	3.31E-03
CO	3.50 g/kW-hr[(g)]	3.86	0.58
SO_2	8.09E-04 lb/hp-hr [(c)]	0.54	0.08
NO_X	0.40 g/kW-hr[(g)]	0.44	0.07
VOC	7.05E-04 lb/hp-hr [(c)]	0.47	0.07
GHGs			
CO_2e[(i)]	- -	818.07	122.71
CO_2	73.96 kg CO_2/MMBtu [(d)]	815.27	122.29
CH_4	3.00E-03 kg CH_4/MMBtu [(d)]	0.03	4.96E-03
N_2O	6.00E-04 kg N_2O/MMBtu [(d)]	0.01	9.92E-04
HAPs			
Benzene	7.76E-04 lb/MMBtu[(e)]	3.88E-03	5.82E-04
Toluene	2.81E-04 lb/MMBtu[(e)]	1.41E-03	2.11E-04
Xylenes	1.93E-04 lb/MMBtu[(e)]	9.65E-04	1.45E-04
Formaldehyde	7.89E-05 lb/MMBtu[(e)]	3.95E-04	5.92E-05
Acetaldehyde	2.52E-05 lb/MMBtu[(e)]	1.26E-04	1.89E-05
Acrolein	7.88E-06 lb/MMBtu[(e)]	3.94E-05	5.91E-06
Naphthalene	1.30E-04 lb/MMBtu[(f)]	6.50E-04	9.75E-05
Acenaphthylene	9.23E-06 lb/MMBtu[(f)]	4.62E-05	6.92E-06
Acenaphthene	4.68E-06 lb/MMBtu[(f)]	2.34E-05	3.51E-06
Fluorene	1.28E-05 lb/MMBtu[(f)]	6.40E-05	9.60E-06
Phenanthrene	4.08E-05 lb/MMBtu[(f)]	2.04E-04	3.06E-05
Anthracene	1.23E-06 lb/MMBtu[(f)]	6.15E-06	9.23E-07
Fluoranthene	4.03E-06 lb/MMBtu[(f)]	2.02E-05	3.02E-06
Pyrene	3.71E-06 lb/MMBtu[(f)]	1.86E-05	2.78E-06
Benzo(a)anthracene	6.22E-07 lb/MMBtu[(f)]	3.11E-06	4.67E-07
Chrysene	1.53E-06 lb/MMBtu[(f)]	7.65E-06	1.15E-06
Benzo(b)fluoranthene	1.11E-06 lb/MMBtu[(f)]	5.55E-06	8.33E-07
Benzo(k)fluoranthene	2.18E-07 lb/MMBtu[(f)]	1.09E-06	1.64E-07
Benzo(a)pyrene	2.57E-07 lb/MMBtu[(f)]	1.29E-06	1.93E-07
Indeno(1,2,3-cd)pyrene	4.14E-07 lb/MMBtu[(f)]	2.07E-06	3.11E-07
Dibenz(a,h)anthracene	3.46E-07 lb/MMBtu[(f)]	1.73E-06	2.60E-07
Benzo(g,h,i)perylene	5.56E-07 lb/MMBtu[(f)]	2.78E-06	4.17E-07
Total HAPs	- -	7.87E-03	1.18E-03
Other Non-HAPs			
Propylene	2.79E-03 lb/MMBtu[(e)]	0.01	2.09E-03

[(a)] Short term emission rates calculated assuming that a 500 ekW, 671 HP emergency generator operates at full capacity. Non-criteria pollutants assume a heat input of 5.0 MMBtu per hour of diesel fuel.

[(b)] Annual emissions calculated assuming 300 hours of operation per year.

[(c)] Emission factors from Chapter 3.4, Table 3.4-1 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, October 1996. SO_2 emissions were developed using a fuel sulfur content of 0.1%.

[(d)] Emission factors from 40 CFR Part 98 Tables C-1 and C-2.

[(e)] Emission factors from Chapter 3.4, Table 3.4-3 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, October 1996.

[(f)] Emission factors from Chapter 3.4, Table 3.4-4 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, October 1996.

[(g)] Emission factors equivalent to Tier 4 Emission Standards for 450≤kW<560 power rating.

[(h)] Stericycle conservatively assumes that $PM=PM_{10}=PM_{2.5}$.

[(i)] CO_2e is carbon dioxide equivalent, calculated according to 40 CFR Part 98 Equation A-1:

$$CO_2e = \sum_{i=1}^{n} GHG_i \times GWP_i$$

where GHG_i = annual mass emissions of greenhouse gas i (metric tons/year)

GWP_i = global warming potential of greenhouse gas i from Table A-1 (below)

Table A-1

Pollutant	*GWP (100 year)*
CO_2	1
CH_4	25
N_2O	298

Table C-4

Stericycle, Inc. - Tooele, UT Facility

Summary of Proposed Potential to Emit Fugitive PM from the Dry Sorbent Silo

Pollutant	Emission Factor	Potential to Emit[c]	
		(lb/hr)	(tons/yr)
Criteria Pollutants			
PM[b]	0.02 gr/dscf[a]	0.11	0.01
PM_{10}[b]	0.02 gr/dscf[a]	0.11	0.01
$PM_{2.5}$[b]	0.02 gr/dscf[a]	0.11	0.01

[a] Engineering estimate.

[b] Stericycle has conservatively assumed that $PM=PM_{10}=PM_{2.5}$.

[c] Emission calculations are based on the following information:

Unit Parameters	
7,000	gr/lb
650	dscfm
60	min/hr
2,000	lbs/ton
100	hrs/year

Table D-1
Stericycle, Inc. - Tooele, UT Facility
Summary of Proposed Facility Potential to Emit (NOI Form 1a)

Pollutants	Permitted Emissions (tons/year)		Emissions Increases (tons/year)		Proposed Emissions (tons/year)		Uncontrolled Emissions (tons/year)	
Criteria Pollutants								
PM	0.00		1.94		1.94		41.94	
PM_{10}	0.00		1.94		1.94		41.94	
$PM_{2.5}$	0.00		1.94		1.94		41.94	
CO	0.00		1.93		1.93		1.93	
SO_2	0.00		2.36		2.36		19.57	
NO_X	0.00		28.31		28.31		65.75	
VOC	0.00		1.06		1.06		3.32	
Greenhouse Gases[(a)]	**Mass Basis**	**CO_2e**	**Mass Basis**	**CO_2e**	**Mass Basis**	**CO_2e**	**Mass Basis**	**CO_2e**
CO_2	0.00	0.00	46,532.14	46,532.14	46,532.14	46,532.14	46,532.14	46,532.14
CH_4	0.00	0.00	12.27	306.81	12.27	306.81	12.27	306.81
N_2O	0.00	0.00	1.60	477.94	1.60	477.94	1.60	477.94
HFCs	N/A		N/A		N/A		N/A	
PFCs	N/A		N/A		N/A		N/A	
SF_6	N/A		N/A		N/A		N/A	
Total HAPs	0.00		2.08		2.08		304.12	
Hydrogen Chloride	0.00		8.15E-01		8.15E-01		3.01E+02	
Dioxins/Furans	0.00		9.90E-07		9.90E-07		1.91E-04	
Lead	0.00		7.24E-05		7.24E-05		6.54E-01	
Cadmium	0.00		1.38E-05		1.38E-05		4.92E-02	
Mercury	0.00		1.38E-04		1.38E-04		6.88E-03	
Chlorine	0.00		9.43E-01		9.43E-01		9.43E-01	
Antimony	0.00		1.36E-03		1.36E-03		1.15E-01	
Arsenic	0.00		1.52E-04		1.52E-04		2.19E-03	
Beryllium	0.00		3.57E-05		3.57E-05		5.74E-05	
Chromium	0.00		5.00E-04		5.00E-04		7.10E-03	
Hydrogen Fluoride	0.00		1.19E-01		1.19E-01		1.34E+00	
Manganese	0.00		5.13E-03		5.13E-03		5.13E-03	
Nickel	0.00		2.77E-03		2.77E-03		5.51E-03	
Total PCBs	0.00		4.18E-04		4.18E-04		4.18E-04	
2-Methylnaphthalene	0.00		2.47E-06		2.47E-06		2.47E-06	
3-Methylchloranthrene	0.00		1.86E-07		1.86E-07		1.86E-07	
7,12-Dimethylbenz(a)anthracene	0.00		1.65E-06		1.65E-06		1.65E-06	
Acenaphthene	0.00		3.70E-06		3.70E-06		3.70E-06	
Acenaphthylene	0.00		7.11E-06		7.11E-06		7.11E-06	
Anthracene	0.00		1.17E-06		1.17E-06		1.17E-06	
Benz(a)anthracene	0.00		6.52E-07		6.52E-07		6.52E-07	
Benzene	0.00		7.98E-04		7.98E-04		7.98E-04	
Benzo(a)pyrene	0.00		3.16E-07		3.16E-07		3.16E-07	
Benzo(b)fluoranthene	0.00		1.02E-06		1.02E-06		1.02E-06	
Benzo(g,h,i)perylene	0.00		5.41E-07		5.41E-07		5.41E-07	
Benzo(k)fluoranthene	0.00		3.49E-07		3.49E-07		3.49E-07	
Chrysene	0.00		1.33E-06		1.33E-06		1.33E-06	
Dibenzo(a,h)anthracene	0.00		3.83E-07		3.83E-07		3.83E-07	
Dichlorobenzene	0.00		1.24E-04		1.24E-04		1.24E-04	
Fluoranthene	0.00		3.33E-06		3.33E-06		3.33E-06	
Fluorene	0.00		9.89E-06		9.89E-06		9.89E-06	
Formaldehyde	0.00		7.79E-03		7.79E-03		7.79E-03	
Hexane	0.00		1.86E-01		1.86E-01		1.86E-01	
Indeno(1,2,3-cd)pyrene	0.00		4.96E-07		4.96E-07		4.96E-07	
Naphthalene	0.00		1.60E-04		1.60E-04		1.60E-04	
Phenanathrene	0.00		3.24E-05		3.24E-05		3.24E-05	
Pyrene	0.00		3.30E-06		3.30E-06		3.30E-06	
Toluene	0.00		5.61E-04		5.61E-04		5.61E-04	
Cobalt	0.00		8.66E-06		8.66E-06		8.66E-06	
Selenium	0.00		2.47E-06		2.47E-06		2.47E-06	
Xylenes	0.00		1.45E-04		1.45E-04		1.45E-04	
Acetaldehyde	0.00		1.89E-05		1.89E-05		1.89E-05	
Acrolein	0.00		5.91E-06		5.91E-06		5.91E-06	

[(a)] CO_2e is carbon dioxide equivalent, calculated according to 40 CFR Part 98 Equation A-1:

$$CO_2e = \sum_{i=1}^{n} GHG_i \times GWP_i$$

where GHG_i = annual mass emissions of greenhouse gas i (metric tons/year)
GWP_i = global warming potential of greenhouse gas i from Table A-1 (below)

Table A-1	
Pollutant	*GWP (100 year)*
CO_2	1
CH_4	25
N_2O	298

Table J-1
Stericycle, Inc. - Tooele, UT Facility
Criteria Pollutant Modeling Threshold Evaluation

Pollutant[a]	Emission Threshold Value[a] (tons/yr)	Facility-Wide Maximum Annual Emissions (tons/yr)	Modeling Requirement
PM_{10} - fugitive emissions	5	0.01	No
PM_{10} - non-fugitive emissions	15	1.93	No
CO	100	1.93	No
SO_2	40	2.36	No
NO_2	40	28.31	No
Lead	0.6	7.24E-05	No

[a] Emission thresholds are displayed pursuant to R307-410-4.

Table J-2

Stericycle, Inc. - Tooele, UT Facility

HAP Modeling Threshold Evaluation

Pollutant[(a)]	Emission Threshold Value[(b)] (lb/hr)	Facility-Wide Maximum Short-Term Emissions (lb/hr)	Modeling Requirement
Acetaldehyde	13.96	1.26E-04	No
Acrolein	0.07	3.94E-05	No
Formaldehyde	0.11	2.16E-03	No
Hydrogen Chloride	0.92	0.19	No
Hydrogen fluoride (Hydrofluoric acid)	0.51	0.03	No
m-Xylenes	0.03	9.65E-04	No
Arsenic Compounds (inorg. incl. arsinec)	3.68E-03	3.46E-05	No
Benzene (incl.benzene for gas)	0.59	3.93E-03	No
Beryllium Compounds	1.84E-05	8.15E-06	No
Cadium Compounds	2.46E-04	3.14E-06	No
Chromium Compounds	1.23E-03	1.14E-04	No
Nickel Compounds	1.23E-02	6.32E-04	No
Antimony Compounds	0.18	3.10E-04	No
Chlorine	0.53	0.22	No
Cobalt Compounds	7.36E-03	1.98E-06	No
1,4-Dichlorobenzene(p)	22.13	2.82E-05	No
Hexane	64.86	0.04	No
Manganese Compounds	0.07	1.17E-03	No
Mercury Compounds	3.68E-03	3.14E-05	No
Naphthalene	19.29	6.64E-04	No
Polychlorinated biphenyls (Aroclors)	0.18	9.53E-05	No
Selenium Compounds	0.07	5.65E-07	No
Toluene	27.73	1.49E-03	No
Xylenes (isomers and mixture)	159.78	9.65E-04	No

(a) Pollutants identified are from the list of pollutants provided by the Utah Division of Air Quality in the *2014 ACGIH - TLVs and UDAQ - TSLs and ETVs* spreadsheet. Only pollutants that are potentially emitted by the facility are included in this table.

(b) Emission thresholds are obtained from the Utah Division of Air Quality in the 2014 ACGIH - TLVs and UDAQ - TSLs and ETVs spreadsheet and are based on Stericycle's design plan for vertical, unrestricted stack(s) greater than 100 meters away from the property line.

2011 ACGIH Threshold Limit Values (TLVS), Toxic Screening Levels (TSLs) and Emission Threshold Values (ETVs)

ACUTE Hazardous Air Pollutants	Health Classification	Applicable Factor Safety	TLV-Ceiling 1-Hour (ug/m3)	TLV-Ceiling 1-Hour (ppm)	Molecular Weight	Toxic Screening Level (TSL) 1-Hour Average ug/m3	Acute Emission Threshold Values (in lb/hr) — Distance to Property Boundary and Emission Threshold Factors — Vertically Restricted/Fugitive Releases <20 m 0.038	20-50 m 0.051	50-100 m 0.092	>100 m 0.180	Vertically Unrestricted Releases <50 m 0.154	50-100 m 0.224	>100 m 0.310
Acetaldehyde	Acute	10	45041	25.0	44.05	4504	1.7116	2.2971	4.1438	8.1074	6.9363	10.0892	13.9627
Acrolein	Acute	10	229	0.1	56.06	23	0.0087	0.0117	0.0211	0.0413	0.0353	0.0514	0.0711
Benzotrichloride	Acute/Carc.	10	800	0.1	195.50	80	0.0304	0.0408	0.0736	0.1439	0.1231	0.1791	0.2479
Ethylene glycol	Acute	10	100000	39.4	62.07	10000	3.8000	5.1000	9.2000	18.0000	15.4000	22.4000	31.0000
Formaldehyde	Acute/Carc.	10	368	0.3	30.03	37	0.0140	0.0188	0.0339	0.0663	0.0567	0.0825	0.1142
Hydrogen Chloride	Acute	10	2983	2.0	36.47	298	0.1134	0.1521	0.2745	0.5370	0.4594	0.6682	0.9248
Hydrogen Cyanide / Cyanide Salts	Acute	10	5196	4.7	27.03	520	0.1974	0.2650	0.4780	0.9353	0.8002	1.1639	1.6107
Hydrogen fluoride (Hydrofluoric acid)	Acute	10	1637	2.0	20.01	164	0.0622	0.0835	0.1506	0.2946	0.2521	0.3666	0.5074
Isophorone	Acute	10	28262	5.0	138.20	2826	1.0739	1.4413	2.6001	5.0871	4.3523	6.3306	8.7611
m-Xylenes	Acute	10	100	0.018	136.20	10	0.0038	0.0051	0.0092	0.0180	0.0154	0.0224	0.0310
1,2,4-Trichlorobenzene	Acute	10	37,108	5.0	181.46	3711	1.4101	1.8925	3.4140	6.6795	5.7147	8.3123	11.5036

Are emissions below the threshold?

ACUTE Hazardous Air Pollutants	Tooele Emission Rates (lb/hr) Incinerator	NG	EGen	Total	Distance to Property Boundary and Emission Threshold Factors — Vertically Restricted/Fugitive Releases <20 m 0.038	20-50 m 0.051	50-100 m 0.092	>100 m 0.180	Vertically Unrestricted Releases <50 m 0.154	50-100 m 0.224	>100 m 0.310
Acetaldehyde			1.26E-04	0.000126							Yes
Acrolein			3.94E-05	3.94E-05							Yes
Benzotrichloride				---							
Ethylene glycol				---							
Formaldehyde		1.76E-03	3.95E-04	0.002159							Yes
Hydrogen Chloride	0.19			0.186185							Yes
Hydrogen Cyanide / Cyanide Salts				---							
Hydrogen fluoride (Hydrofluoric acid)	2.73E-02			0.027265							Yes
Isophorone				---							
m-Xylenes			9.65E-04	0.000965							Yes
1,2,4-Trichlorobenzene				---							

CARCINOGENIC Hazardous Air Pollutants	Health Classification	Applicable Factor Safety	TLV-TWA 8-Hour (ug/m3)	TLV-TWA 8-Hour (ppm)	Molecular Weight	Toxic Screening Level (TSL) 24-Hour Average ug/m3	Carcinogenic Emission Threshold Values (in lb/hr) — Distance to Property Boundary and Emission Threshold Factors — Vertically Restricted/Fugitive Releases <20 m 0.017	20-50 m 0.022	50-100 m 0.041	>100 m 0.090	Vertically Unrestricted Releases <50 m 0.066	50-100 m 0.081	>100 m 0.123
Arsenic Compounds (inorg. incl. arsinec	A1 Carc.	90	10.0	0.003	74.92	0.11	0.0005	0.0007	0.0012	0.0027	0.0020	0.0024	0.0037
Benzene (incl.benzene for gas)	A1 Carc.	90	1,597	0.5	78.11	18	0.0815	0.1054	0.1965	0.4297	0.3163	0.3898	0.5878
Beryllium Compounds	A1 Carc.	90	0.05	0.0001	9.01	0.001	0.000003	0.000003	0.000006	0.000013	0.000010	0.000012	0.000018
Bis(chloromethyl)ether	A1 Carc.	90	4.7	0.001	114.96	0.052	0.0001	0.0001	0.0002	0.0004	0.0003	0.0004	0.0006
1,3-Butadiene	A2 Carc.	90	4425	2.00	54.09	49	0.0752	0.0973	0.1814	0.3982	0.2920	0.3584	0.5442
Cadium Compounds	A2 Carc.	90	2	na	Various MWs	0.022	0.0000	0.0000	0.0001	0.0002	0.0001	0.0002	0.0002
Carbon tetrachloride	A2 Carc.	90	31460	5.00	153.84	350	0.5348	0.6921	1.2899	2.8314	2.0764	2.5483	3.8696
Chromium Compounds	A1 Carc.	90	10	na	Various MWs	0.11	0.0002	0.0002	0.0004	0.0009	0.0007	0.0008	0.0012
Diazomethane	A2 Carc.	90	344	0.20	42.04	4	0.0058	0.0076	0.0141	0.0309	0.0227	0.0279	0.0423
Dimethyl carbamoyl chloride	A2 Carc.	90	22	0.005	107.54	0.24	0.0004	0.0005	0.0009	0.0020	0.0015	0.0018	0.0027
Ethylene oxide	A2 Carc.	90	1802	1.00	44.05	20	0.0919	0.1189	0.2216	0.4846	0.3567	0.4396	0.6630
4,4-Methylene bis(2-chloraniline)	A2 Carc.	90	109	0.01	267.17	1.21	0.0019	0.0024	0.0045	0.0098	0.0072	0.0089	0.0134
Nickel Compounds	A1 Carc.	90	100	na	Various MWs	1.11	0.0017	0.0022	0.0041	0.0090	0.0066	0.0081	0.0123
Trichloroethylene	A2 Carc.	90	53742	10.00	131.40	597	0.9136	1.1823	2.2034	4.8368	3.5470	4.3531	6.6103
Vinyl chloride	A1 Carc.	90	2556	1.00	62.50	28	0.0435	0.0562	0.1048	0.2301	0.1687	0.2071	0.3144

Are emissions below the threshold?

CARCINOGENIC Hazardous Air Pollutants	Tooele Emission Rates (lb/hr) Incinerator	NG	EGen	Total	Distance to Property Boundary and Emission Threshold Factors — Vertically Restricted/Fugitive Releases <20 m 0.017	20-50 m 0.022	50-100 m 0.041	>100 m 0.090	Vertically Unrestricted Releases <50 m 0.066	50-100 m 0.081	>100 m 0.123
Arsenic Compounds (inorg. incl. arsinec	2.99E-05	4.71E-06		3.46E-05							Yes
Benzene (incl.benzene for gas)		4.94E-05	3.88E-03	0.003929							Yes
Beryllium Compounds	7.87E-06	2.82E-07		8.15E-06							Yes
Bis(chloromethyl)ether				---							
1,3-Butadiene				---							
Cadium Compounds	3.14E-06			3.14E-06							Yes
Carbon tetrachloride				---							
Chromium Compounds	8.12E-05	3.29E-05		0.000114							Yes
Diazomethane				---							
Dimethyl carbamoyl chloride				---							
Ethylene oxide				---							
4,4-Methylene bis(2-chloraniline)				---							
Nickel Compounds	5.82E-04	4.94E-05		0.000632							Yes
Trichloroethylene				---							
Vinyl chloride				---							

UNCLASSIFIED	Carcinogenic	Hazardous	Air	Pollutants	
4-Aminobiphenyl	A1 Carc.	Benzidine	A1 Carc.	4-Nitrobiphenyl	A2 Carc.
Asbestos	A1 Carc.	Chloromethyl methyl ether	A2 Carc.	2,3,7,8-Tetrachlorodibenzo-p-dioxin	A1 Carc.

CHRONIC Hazardous Air Pollutants	Health Classification	Applicable Factor Safety	TLV-TWA 8-Hour (ug/m3)	TLV-TWA 8-Hour (ppm)	Molecular Weight	Toxic Screening Level (TSL) 24-Hour Average ug/m3	Chronic Emission Threshold Values (in lb/hr) — Distance to Property Boundary and Emission Threshold Factors — Vertically Restricted/Fugitive Releases <20 m 0.051	20-50 m 0.066	50-100 m 0.123	>100 m 0.269	Vertically Unrestricted Releases <50 m 0.198	50-100 m 0.244	>100 m 0.368
Acetonitrile	Chronic	30	33,579	20	41.05	1,119	1.713	2.216	4.130	9.033	6.649	8.193	12.357
Acetophenone	Chronic	30	49,141	10	120.15	1,638	2.506	3.243	6.044	13.219	9.730	11.990	18.084
Acrylamide	Chronic	30	30	0.010	71.08	1.00	0.002	0.002	0.004	0.008	0.006	0.007	0.011
Acrylic acid	Chronic	30	5,894	2	72.06	196	0.301	0.389	0.725	1.586	1.167	1.438	2.169
Acrylonitrile	Chronic	30	4339	2.00	53.05	145	0.221	0.286	0.534	1.167	0.859	1.059	1.597
Allyl chloride	Chronic	30	3,129	1	76.50	104	0.160	0.207	0.385	0.842	0.620	0.763	1.151
Aniline	Chronic	30	7,617	2	93.12	254	0.388	0.503	0.937	2.049	1.508	1.859	2.803
Antimony Compounds	Chronic	30	500	0.1004	121.75	17	0.026	0.033	0.062	0.135	0.099	0.122	0.184
Benzyl chloride	Chronic	30	5,177	1	126.58	173	0.264	0.342	0.637	1.393	1.025	1.263	1.905
Biphenyl	Chronic	30	1,261	0.2	154.20	42	0.064	0.083	0.155	0.339	0.250	0.308	0.464
Bis(2-ethylhexyl)phthalate (DEHP)	Chronic	30	5,000	0.31	390.54	167	0.255	0.330	0.615	1.345	0.990	1.220	1.840
Bromoform	Chronic	30	5,170	0.5	252.80	172	0.264	0.341	0.636	1.391	1.024	1.261	1.902
Calcium cyanamide	Chronic	30	500	0.15	80.11	17	0.026	0.033	0.062	0.135	0.099	0.122	0.184
Caprolactam	Chronic	30	5,000	1.08	113.16	167	0.255	0.330	0.615	1.345	0.990	1.220	1.840
Captan	Chronic	30	5,000	0.41	300.60	167	0.255	0.330	0.615	1.345	0.990	1.220	1.840
Carbaryl	Chronic	30	500	0.06	201.20	17	0.026	0.033	0.062	0.135	0.099	0.122	0.184
Carbon disulfide	Chronic	30	3,114	1	76.14	104	0.159	0.206	0.383	0.838	0.617	0.760	1.146
Carbonyl sulfide	Chronic	30	12,286	5	60.08	410	0.627	0.811	1.511	3.305	2.433	2.998	4.521
Catechol	Chronic	30	22,517	5	110.11	751	1.148	1.486	2.770	6.057	4.458	5.494	8.286
Chloroacetic acid	Chronic	30	1,933	0.50	94.50	64	0.099	0.128	0.238	0.520	0.383	0.472	0.711
Chlordane	Chronic	30	500	0.030	409.80	17	0.026	0.033	0.062	0.135	0.099	0.122	0.184
2-Chloracetophenone	Chronic	30	316	0.05	154.59	11	0.016	0.021	0.039	0.085	0.063	0.077	0.116
Chlorine	Chronic	30	1,450	0.50	70.91	48	0.074	0.096	0.178	0.390	0.287	0.354	0.534
Chlorobenzene	Chronic	30	46,037	10.00	112.56	1,535	2.348	3.038	5.663	12.384	9.115	11.233	16.942
Chloroform	Chronic	30	48,826	10.00	119.38	1,628	2.490	3.223	6.006	13.134	9.668	11.914	17.968
Chloroprene	Chronic	30	36,213	10.00	88.54	1,207	1.847	2.390	4.454	9.741	7.170	8.836	13.326
Cobalt Compounds	Chronic	30	20	na	Various MWs	0.67	0.001	0.001	0.002	0.005	0.004	0.005	0.007
Cresols/Cresylic acid	Chronic	30	88,458	20.00	108.14	2,949	4.511	5.838	10.880	23.795	17.515	21.584	32.553
Cumene	Chronic	30	245,787	50.00	120.19	8,193	12.535	16.222	30.232	66.117	48.666	59.972	90.450
DDT	Chronic	30	1,000	0.07	354.50	33	0.051	0.066	0.123	0.269	0.198	0.244	0.368
Dibutyl phthalate	Chronic	30	5,000	0.44	278.34	167	0.255	0.330	0.615	1.345	0.990	1.220	1.840
Dichlorethyl ether (Bis(2-chloroethyl)ethe	Chronic	30	29,284	5.00	143.20	976	1.493	1.933	3.602	7.877	5.798	7.145	10.777
1,4-Dichlorobenzene(p)	Chronic	30	60,127	10.00	147.01	2,004	3.066	3.968	7.396	16.174	11.905	14.671	22.127
1,3-Dichloropropene	Chronic	30	4,539	1.00	110.98	151	0.231	0.300	0.558	1.221	0.899	1.108	1.670
Dichlorvos	Chronic	30	100	0.01	220.98	3.3	0.005	0.007	0.012	0.027	0.020	0.024	0.037
Diethanolamine	Chronic	30	1,000	0.23	105.14	33	0.051	0.066	0.123	0.269	0.198	0.244	0.368
Dimethyl formamide	Chronic	30	29,894	10.00	73.09	996	1.525	1.973	3.677	8.041	5.919	7.294	11.001
1,1-Dimethyl hydrazine	Chronic	30	25	0.01	60.12	0.82	0.001	0.002	0.003	0.007	0.005	0.006	0.009
Dimethyl phthalate	Chronic	30	5,000	0.63	194.19	167	0.255	0.330	0.615	1.345	0.990	1.220	1.840
Dimethyl sulfate	Chronic	30	516	0.10	126.10	17	0.026	0.034	0.063	0.139	0.102	0.126	0.190
4,6-Dinitro-o-cresol, and salts	Chronic	30	200	0.025	198.13	6.67	0.010	0.013	0.025	0.054	0.040	0.049	0.074
2,4-Dinitrotoluene	Chronic	30	200	0.03	182.15	6.7	0.010	0.013	0.025	0.054	0.040	0.049	0.074
1,4-Dioxane (1,4-Diethyleneoxide)	Chronic	30	72,065	20.00	88.10	2,402	3.675	4.756	8.864	19.386	14.269	17.584	26.520
Epichlorohydrin (1-Chloro-2,3-epoxyprop	Chronic	30	1,892	0.50	92.53	63	0.097	0.125	0.233	0.509	0.375	0.462	0.696

Are emissions below the threshold?

CHRONIC Hazardous Air Pollutants	Tooele Emission Rates (lb/hr) Incinerator	NG	EGen	Total	Distance to Property Boundary and Emission Threshold Factors — Vertically Restricted/Fugitive Releases <20 m 0.051	20-50 m 0.066	50-100 m 0.123	>100 m 0.269	Vertically Unrestricted Releases <50 m 0.198	50-100 m 0.244	>100 m 0.368
Acetonitrile				---							
Acetophenone				---							
Acrylamide				---							
Acrylic acid				---							
Acrylonitrile				---							
Allyl chloride				---							
Aniline				---							
Antimony Compounds	3.10E-04			0.00031							Yes
Benzyl chloride				---							
Biphenyl				---							
Bis(2-ethylhexyl)phthalate (DEHP)				---							
Bromoform				---							
Calcium cyanamide				---							
Caprolactam				---							
Captan				---							
Carbaryl				---							
Carbon disulfide				---							
Carbonyl sulfide				---							
Catechol				---							
Chloroacetic acid				---							
Chlordane				---							
2-Chloracetophenone				---							
Chlorine	2.15E-01			0.21525							Yes
Chlorobenzene				---							
Chloroform				---							
Chloroprene				---							
Cobalt Compounds		1.98E-06		1.98E-06							Yes
Cresols/Cresylic acid				---							
Cumene				---							
DDT				---							
Dibutyl phthalate				---							
Dichlorethyl ether (Bis(2-chloroethyl)ethe				---							
1,4-Dichlorobenzene(p)		2.82E-05		2.82E-05							Yes
1,3-Dichloropropene				---							
Dichlorvos				---							
Diethanolamine				---							
Dimethyl formamide				---							
1,1-Dimethyl hydrazine				---							
Dimethyl phthalate				---							
Dimethyl sulfate				---							
4,6-Dinitro-o-cresol, and salts				---							
2,4-Dinitrotoluene				---							
1,4-Dioxane (1,4-Diethyleneoxide)				---							
Epichlorohydrin (1-Chloro-2,3-epoxyprop				---							

Ethyl acrylate	Chronic	30	20472	5.00	100.11	682	0.3480	0.4504	0.8394	1.8425	1.3512	1.6583	2.5181				---							
Ethyl benzene	Chronic	30	86,838	20.00	106.16	2,895	4.429	5.731	10.681	23.360	17.194	21.189	31.957				---							
Ethyl chloride (Chloroethane)	Chronic	30	263,885	100.00	64.52	8,796	13.458	17.416	32.458	70.985	52.249	64.388	97.110				---							
Ethylene dichloride (1,2-Dichloroethane)	Chronic	30	40,474	10.00	98.96	1,349	2.064	2.671	4.978	10.888	8.014	9.876	14.895				---							

CHRONIC Hazardous Air Pollutants	Health Classification	Applicable Factor Safety	TLV-TWA 8-Hour (ug/m3)	TLV-TWA 8-Hour (ppm)	Molecular Weight	Toxic Screening Level (TSL) 24-Hour Average ug/m3	Chronic Emission Threshold Values (in lb/hr) Distance to Property Boundary and Emission Threshold Factors Vertically Restricted/Fugitive Releases				Vertically Unrestricted Releases			Tooele Emission Rates (lb/hr)				Are emissions below the threshold? Distance to Property Boundary and Emission Threshold Factors Vertically Restricted/Fugitive Releases				Vertically Unrestricted Releases		
							<20 m 0.051	20-50 m 0.066	50-100 m 0.123	>100 m 0.269	<50 m 0.198	50-100 m 0.244	>100 m 0.368	Incinerator	NG	EGen	Total	<20 m 0.051	20-50 m 0.066	50-100 m 0.123	>100 m 0.269	<50 m 0.198	50-100 m 0.244	>100 m 0.368
Ethylene imine (Aziridine)	Chronic	30	88	0.05	43.08	3	0.004	0.006	0.011	0.024	0.017	0.021	0.032				---							
Ethylidene dichloride (1,2-Dichloroethan	Chronic	30	40,474	10.00	98.96	1,349	2.064	2.671	4.978	10.888	8.014	9.876	14.895				---							
Fine mineral fibers/3/	Chronic	30	1,000	na	Various MWs	33	0.051	0.066	0.123	0.269	0.198	0.244	0.368				---							
Heptachlor	Chronic	30	50	0.0033	373.32	1.7	0.003	0.003	0.006	0.013	0.010	0.012	0.018				---							
Hexachlorobenzene	Chronic	30	2	0.0002	260.76	0.067	0.000	0.000	0.000	0.001	0.000	0.000	0.001				---							
Hexachlorobutadiene	Chronic	30	213	0.02	260.76	7.1	0.011	0.014	0.026	0.057	0.042	0.052	0.078				---							
Hexachlorocyclopentadiene	Chronic	30	112	0.01	272.75	3.7	0.006	0.007	0.014	0.030	0.022	0.027	0.041				---							
Hexachloroethane	Chronic	30	9,683	1.00	236.74	323	0.494	0.639	1.191	2.605	1.917	2.363	3.563				---							
Hexamethylene-1,6-diisocyanate	Chronic	30	34	0.005	168.22	1.15	0.002	0.002	0.004	0.009	0.007	0.008	0.013				---							
Hexane	Chronic	30	176,237	50.00	86.18	5,875	8.988	11.632	21.677	47.408	34.895	43.002	64.855		4.24E-02		0.042353							Yes
Hydrazine	Chronic	30	13	0.01	32.05	0.44	0.001	0.001	0.002	0.004	0.003	0.003	0.005				---							
Hydrogen sulfide	Chronic	30	1,394	1.00	34.08	46	0.071	0.092	0.171	0.375	0.276	0.340	0.513				---							
Hydroquinone	Chronic	30	1,000	0.22	110.11	33	0.051	0.066	0.123	0.269	0.198	0.244	0.368				---							
Lindane (all isomers)	Chronic	30	500	0.04	290.85	17	0.026	0.033	0.062	0.135	0.099	0.122	0.184				---							
m-Cresol	Chronic	30	88,458	20.00	108.14	2,949	4.511	5.838	10.880	23.795	17.515	21.584	32.553				---							
Maleic anhydride	Chronic	30	401	0.10	98.06	13	0.020	0.026	0.049	0.108	0.079	0.098	0.148				---							
Manganese Compounds	Chronic	30	200	na	Various MWs	6.7	0.010	0.013	0.025	0.054	0.040	0.049	0.074	1.16E-03	8.94E-06		0.001171							Yes
Mercury Compounds	Chronic	30	10	na	Various MWs	0.33	0.001	0.001	0.001	0.003	0.002	0.002	0.004	3.14E-05			3.14E-05							Yes
Methanol	Chronic	30	278,446	200.00	34.04	9,282	14.201	18.377	34.249	74.902	55.132	67.941	102.468				---							
Methoxychlor	Chronic	30	10,000	0.7074	345.65	333	0.510	0.660	1.230	2.690	1.980	2.440	3.680				---							
Methyl bromide (Bromomethane)	Chronic	30	3,883	1.00	94.95	129	0.198	0.256	0.478	1.045	0.769	0.948	1.429				---							
Methyl chloride (Chloromethane)	Chronic	30	103,252	50.00	50.49	3,442	5.266	6.815	12.700	27.775	20.444	25.193	37.997				---							
Methyl chloroform (1,1,1-Trichloroethane	Chronic	30	1,909,898	350.00	133.42	63,663	97.405	126.053	234.917	513.762	378.160	466.015	702.842				---							
Methyl ethyl ketone (2-Butanone)	Chronic	30	589,775	200.00	72.10	19,659	30.079	38.925	72.542	158.649	116.775	143.905	217.037				---							
Methyl hydrazine	Chronic	30	19	0.01	46.07	0.63	0.001	0.001	0.002	0.005	0.004	0.005	0.007				---							
Methyl iodide (Iodomethane)	Chronic	30	11,611	2.00	141.95	387	0.592	0.766	1.428	3.123	2.299	2.833	4.273				---							
Methyl isobutyl kentone (Hexone)	Chronic	30	93,415	20.00	114.20	3,114	4.764	6.165	11.490	25.129	18.496	22.793	34.377				---							
Methyl isocyanate	Chronic	30	47	0.02	57.05	1.6	0.002	0.003	0.006	0.013	0.009	0.011	0.017				---							
Methyl methacrylate	Chronic	30	204,765	50.00	100.13	6,825	10.443	13.514	25.186	55.082	40.543	49.963	75.353				---							
Methyl tert butyl ether	Chronic	30	180,307	50.00	88.17	6,010	9.196	11.900	22.178	48.503	35.701	43.995	66.353				---							
Methylene chloride (Dichloromethane)	Chronic	30	173,681	50.00	84.93	5,789	8.858	11.463	21.363	46.720	34.389	42.378	63.915				---							
4,4'-Methylene dianiline	Chronic	30	811	0.10	198.26	27	0.041	0.054	0.100	0.218	0.161	0.198	0.298				---							
Methylene diphenyl diisocyanate (MDI)	Chronic	30	51	0.01	250.26	1.7	0.003	0.003	0.006	0.014	0.010	0.012	0.019				---							
N,N-Diethyl aniline (N,N-Dimethylaniline	Chronic	30	25,000	5.00	121.18	833	1.275	1.650	3.075	6.725	4.950	6.100	9.200				---							
2-Nitropropane	Chronic	30	36,438	10.00	89.09	1,215	1.858	2.405	4.482	9.802	7.215	8.891	13.409				---							
Naphthalene	Chronic	30	52,429	10.00	128.19	1,748	2.674	3.460	6.449	14.104	10.381	12.793	19.294		1.44E-05	6.50E-04	0.000664							Yes
Nitrobenzene	Chronic	30	5,035	1.00	123.11	168	0.257	0.332	0.619	1.354	0.997	1.229	1.853				---							
o-Anisidine	Chronic	30	500	0.10	123.15	17	0.026	0.033	0.062	0.135	0.099	0.122	0.184				---							
o-Cresol	Chronic	30	88,458	20.00	108.14	2,949	4.511	5.838	10.880	23.795	17.515	21.584	32.553				---							
o-Toluidine	Chronic	30	8,765	2.00	107.15	292	0.447	0.578	1.078	2.358	1.735	2.139	3.225				---							
o-Xylenes	Chronic	30	434,192	100.00	106.16	14,473	22.144	28.657	53.406	116.798	85.970	105.943	159.783				---							
p-Cresol	Chronic	30	88,458	20.00	108.14	2,949	4.511	5.838	10.880	23.795	17.515	21.584	32.553				---							
p-Phenylenediamine	Chronic	30	100	0.02	108.05	3.3	0.005	0.007	0.012	0.027	0.020	0.024	0.037				---							
p-Xylenes	Chronic	30	434,192	100.00	106.16	14,473	22.144	28.657	53.406	116.798	85.970	105.943	159.783				---							
Parathion	Chronic	30	50	0.0042	291.27	1.7	0.003	0.003	0.006	0.013	0.010	0.012	0.018				---							
Pentachloronitrobenzene (Quintobenzer	Chronic	30	500	0.041	295.36	17	0.026	0.033	0.062	0.135	0.099	0.122	0.184				---							
Pentachlorophenol	Chronic	30	500	0.046	266.35	17	0.026	0.033	0.062	0.135	0.099	0.122	0.184				---							

CHRONIC Hazardous Air Pollutants	Health Classification	Applicable Factor Safety	TLV-TWA 8-Hour (ug/m3)	TLV-TWA 8-Hour (ppm)	Molecular Weight	Toxic Screening Level (TSL) 24-Hour Average ug/m3	Chronic Emission Threshold Values (in lb/hr) Distance to Property Boundary and Emission Threshold Factors Vertically Restricted/Fugitive Releases				Vertically Unrestricted Releases			Tooele Emission Rates (lb/hr)				Are emissions below the threshold? Distance to Property Boundary and Emission Threshold Factors Vertically Restricted/Fugitive Releases				Vertically Unrestricted Releases		
							<20 m 0.051	20-50 m 0.066	50-100 m 0.123	>100 m 0.269	<50 m 0.198	50-100 m 0.244	>100 m 0.368	Incinerator	NG	EGen	Total	<20 m 0.051	20-50 m 0.066	50-100 m 0.123	>100 m 0.269	<50 m 0.198	50-100 m 0.244	>100 m 0.368
Phenol	Chronic	30	19,245	5.00	94.11	642	0.982	1.270	2.367	5.177	3.811	4.696	7.082				---							
Phosgene	Chronic	30	405	0.10	98.92	13	0.021	0.027	0.050	0.109	0.080	0.099	0.149				---							
Phosphine	Chronic	30	417	0.30	34.00	14	0.021	0.028	0.051	0.112	0.083	0.102	0.154				---							
Phosphorus	Chronic	30	100	0.020	123.92	3.3	0.005	0.007	0.012	0.027	0.020	0.024	0.037				---							
Phthalic anhydride	Chronic	30	6,058	1.00	148.11	202	0.309	0.400	0.745	1.630	1.199	1.478	2.229				---							
Polychlorinated biphenyls (Aroclors)	Chronic	30	500			17	0.026	0.033	0.062	0.135	0.099	0.122	0.184	9.53E-05			9.53E-05							Yes
1,2-Propylenimine (2-Methyl aziridine)	Chronic	30	4,670	2.00	57.09	156	0.238	0.308	0.574	1.256	0.925	1.139	1.719				---							
beta-Propiolactone	Chronic	30	1,474	0.50	72.06	49	0.075	0.097	0.181	0.396	0.292	0.360	0.542				---							
Propoxur (Baygon)	Chronic	30	500	0.058	209.24	17	0.026	0.033	0.062	0.135	0.099	0.122	0.184				---							
Propylene dichloride (1,2-Dichloropropa	Chronic	30	46,213	10.00	112.99	1,540	2.357	3.050	5.684	12.431	9.150	11.276	17.006				---							
Propylene oxide	Chronic	30	4,751	2.00	58.08	158	0.242	0.314	0.584	1.278	0.941	1.159	1.748				---							
Quinone	Chronic	30	442	0.10	108.09	15	0.023	0.029	0.054	0.119	0.088	0.108	0.163				---							
Selenium Compounds	Chronic	30	200	0.062	78.96	6.7	0.010	0.013	0.025	0.054	0.040	0.049	0.074		5.65E-07		5.65E-07							Yes
Styrene	Chronic	30	85,202	20.00	104.16	2,840	4.345	5.623	10.480	22.919	16.870	20.789	31.355				---							
Styrene oxide	Chronic	30	85,202	20.00	104.16	2,840	4.345	5.623	10.480	22.919	16.870	20.789	31.355				---							
1,1,2,2-Tetrachloroethane	Chronic	30	6,865	1.00	167.86	229	0.350	0.453	0.844	1.847	1.359	1.675	2.526				---							
Tetrachloroethylene (Perchloroethylene)	Chronic	30	169,530	25.00	165.80	5,651	8.646	11.189	20.852	45.603	33.567	41.365	62.387				---							
Toluene	Chronic	30	75,362	20.00	92.13	2,512	3.843	4.974	9.270	20.272	14.922	18.388	27.733		8.00E-05	1.41E-03	0.001485							Yes
2,4-Toluene diisocyanate	Chronic	30	36	0.005	174.05	1.2	0.002	0.002	0.004	0.010	0.007	0.009	0.013				---							
Toxaphene (chlorinated camphene)	Chronic	30	500	0.030	414.00	17	0.026	0.033	0.062	0.135	0.099	0.122	0.184				---							
1,1,2-Trichloroethane	Chronic	30	54,560	10.00	133.40	1,819	2.783	3.601	6.711	14.677	10.803	13.313	20.078				---							
Triethylamine	Chronic	30	4,139	1.00	101.19	138	0.211	0.273	0.509	1.113	0.819	1.010	1.523				---							
Vinyl acetate	Chronic	30	35,211	10.00	86.09	1,174	1.796	2.324	4.331	9.472	6.972	8.591	12.958				---							
Vinyl bromide	Chronic	30	2,187	0.50	106.96	73	0.112	0.144	0.269	0.588	0.433	0.534	0.805				---							
Vinylidene chloride (1,1-Dichloroethylen	Chronic	30	19,826	5.00	96.95	661	1.011	1.309	2.439	5.333	3.926	4.838	7.296				---							
Xylenes (isomers and mixture)	Chronic	30	434,192	100.00	106.16	14,473	22.144	28.657	53.406	116.798	85.970	105.943	159.783			9.65E-04	0.000965							Yes

UNCLASSIFIED	Chronic	Hazardous	Air	Pollutants		
Acetamide	Chlorobenzilate		3,3-Dichlorobenzidine	3,3'-Dimethyl benzidine	Ethyl carbamate (Urethane)	Hexamethyl phosphoramide

2-Acetlaminofluorene	Coke Oven Emissions	Diethyl sulfate	2,4-Dinitrophenol	Ethylene dibromide (Dibromoethane)	4-Nitrophenol
Chloramben	Dibenzofurans	Dimethyl aminoazobenze	1,2-Diphenylhydrazine	Ethylene thiourea	N-Nitrosodimethylamine
	1,2-Dibromo-3-chloropropane	3,3-Dimethoxybenzidine	1,2-Epoxybutane	Glycol ethers/2/	N-Nitrosomorpholine
					N-Nitroso-N-methylurea

Marty Gray <martygray@utah.gov>

Fwd: Stericycle Tooele Facility Peer Review Comments

1 message

Jon Black <jlblack@utah.gov> Wed, Mar 23, 2016 at 4:20 PM
To: Marty Gray <martygray@utah.gov>

---------- Forwarded message ----------
From: **Lindsey W. Kroos** <lkroos@all4inc.com>
Date: Thu, Oct 8, 2015 at 4:38 PM
Subject: RE: Stericycle Tooele Facility Peer Review Comments
To: Jon Black <jlblack@utah.gov>
Cc: "Vance, Jay (Jay.Vance@STERICYCLE.com)" <Jay.Vance@stericycle.com>

Hi Jon – thank you for providing the proposed Engineering Review, we will review with the Stericycle team and get back to you with questions or comments.

Stericycle's responses to your earlier questions are provided below – should you have any additional questions please don't hesitate to reach out.

Thank you,

Lindsey

1) In your HMIWI and Waste Handline section of the NOI it is stated that Prior to loading the HMIWI's charge hopper, each container will be weighed, scanned to document receipt, and monitored for possible radioactivity. (What process, equipment, etc is being used to monitor for possible radioactivity?)

Stericycle screens for radioactivity as outlined in the Solid Waste Permit.

2) Additionally residence time is addressed as follows: "Residence time of the waste in the primary chamber will be approximately 4-8 hours at temperatures sufficient to ensure that organic material is combusted and pathological components are destroyed." (What are the temperatures sufficient to ensure that this happens for both organic and pathological materials?)

Residence time in the primary chamber will be at least 2 hours, and normally 4-6 hours, depending on the waste feed rate. Organic materials that are volatilized are destroyed in the secondary chamber. Solid waste (including pathological components) that is incinerated for sterilization or other purposes in the primary chamber is regulated by the Utah Division of Waste Management and Radiation Control. The HMIWI air quality regulations do not establish a minimum temperature for the primary chamber; however, temperatures of gases fed from the primary chamber into the oxygen-rich secondary chamber must be high enough to sustain the required secondary-chamber temperature, which is established during performance testing. Based on historic operation, secondary chamber temperatures are typically greater than 1,800 deg F.

3) Regarding the emergency bypass stack; It is stated that "The emergency bypass stack will be utilized only when necessary, due to a significant process upset, or other unforeseeable circumstance causing a process interruption..." (Can you define what a significant process upset may consist of and what Stericycle is proposing regarding reporting requirements to the state for upset and breakdowns?)

The bypass stack (emergency release of hot flue gasses prior to passing through the air pollution control system (APCS)) is used when one or both of the following two conditions occur in the incinerator process: 1) high temperatures in the APCS, and 2) loss of system pressure in the incinerator. There are a number of scenarios that can lead to these two conditions, including a loss of power. The bypass stack is used to protect plant personnel, process systems, and property from the effects of a catastrophic event that may otherwise occur when bypass conditions are experienced. Use of the bypass stack, including date, time, duration, and cause will be reported to the DAQ for each occurrence. Records will be kept on site indicating any preventative measures taken before or after any bypass event to address the cause of the event. Please note that the bypass stack is open during maintenance outages, when the HMIWI is not in operation.

4) Is it possible to limit the amount of hours per year of by-pass events?

Our goal is to operate and maintain our facility to prevent, minimize, and eliminate, where possible, bypass events.

Lindsey W. Kroos | Project Manager

lkroos@all4inc.com | 610.933.5246 x122 | Profile | LinkedIn | Twitter

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From: Jon Black [mailto:jlblack@utah.gov]
Sent: Monday, October 05, 2015 12:53 PM
To: Lindsey W. Kroos
Cc: Vance, Jay (Jay.Vance@STERICYCLE.com)
Subject: Re: Stericycle Tooele Facility Peer Review Comments

Hi Lindsey and Jay,

While DAQ is waiting to hear back on the above questions; please take a look at the proposed Engineering Review for the Stericycle Tooele facility. If you have any questions or concerns please let me know. As soon as I can address the questions posed we should be ready to get this project under way and out to public comment.

Thanks for all of your help.

Jon

On Wed, Sep 23, 2015 at 5:13 PM, Lindsey W. Kroos <lkroos@all4inc.com> wrote:

Hi Jon – I've been in touch with the Stericycle folks about these questions and we will get back to you.

Thanks,

Lindsey

Lindsey W. Kroos | Project Manager

lkroos@all4inc.com | 610.933.5246 x122 | Profile | LinkedIn | Twitter

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From: Jon Black [mailto:jlblack@utah.gov]
Sent: Tuesday, September 22, 2015 5:18 PM
To: Lindsey W. Kroos
Cc: Vance, Jay (Jay.Vance@STERICYCLE.com)
Subject: Stericycle Tooele Facility Peer Review Comments

Hi Lindsey,

I am reaching out to see if you could address questions which have arose based upon New Source Review and Compliance Sections initial review of the proposed Stericycle Tooele facility Engineering Review.

The issues that need to be clarified are as follows:

1) In your HMIWI and Waste Handline section of the NOI it is stated that Prior to loading the HMIWI's charge hopper, each container will be weighed, scanned to document receipt, and monitored for possible radioactivity. (What process, equipment, etc is being used to monitor for possible radioactivity?)

2) Additionally residence time is addressed as follows: "Residence time of the waste in the primary chamber will be approximately 4-8 hours at temperatures sufficient to ensure that organic material is combusted and pathological components are destroyed." (What are the temperatures sufficient to ensure that this happens for both organic and pathological materials?)

3) Regarding the emergency bypass stack; It is stated that "The emergency bypass stack will be utilized only when necessary, due to a significant process upset, or other unforeseeable circumstance causing a process

interruption..." (Can you define what a significant process upset may consist of and what Stericycle is proposing regarding reporting requirements to the state for upset and breakdowns?)

4) Is it possible to limit the amount of hours per year of by-pass events?

Let me know if you have any questions regarding this issues.

I look forward to your responses to the above request.

Thank you,

Jon

Marty Gray <martygray@utah.gov>

Fwd: Stericycle Questions and Update

1 message

Jon Black <jlblack@utah.gov> Wed, Mar 23, 2016 at 4:20 PM
To: Marty Gray <martygray@utah.gov>

---------- Forwarded message ----------
From: **Lindsey W. Kroos** <lkroos@all4inc.com>
Date: Wed, Sep 23, 2015 at 5:12 PM
Subject: RE: Stericycle Questions and Update
To: Jon Black <jlblack@utah.gov>
Cc: "Vance, Jay (Jay.Vance@STERICYCLE.com)" <Jay.Vance@stericycle.com>

Hi Jon – the waste heat boiler does not have any burners. Rather, it recovers the heat generated in the primary and secondary combustion chambers. The potential capacity of the dry sorbent silo is expected to be approximately 2,500 ft^3. However, this value is an estimate and may change as the design is finalized.

Should you have any additional questions please don't hesitate to contact me – thank you!

Lindsey

Lindsey W. Kroos | Project Manager

lkroos@all4inc.com | 610.933.5246 x122 | Profile | LinkedIn | Twitter

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From: Lindsey W. Kroos
Sent: Tuesday, September 15, 2015 6:25 AM
To: Jon Black
Subject: RE: Stericycle Questions and Update

Hi Jon – thanks for the update. I'll reach out to the Stericycle folks about your questions and get back to you.

Thanks,

Lindsey

Lindsey W. Kroos | Project Manager

lkroos@all4inc.com | 610.933.5246 x122 | Profile | LinkedIn | Twitter

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From: Jon Black [mailto:jlblack@utah.gov]
Sent: Monday, September 14, 2015 12:57 PM
To: Lindsey W. Kroos
Subject: Stericycle Questions and Update

Hi Lindsey,

I wanted to ask two questions and give you an update regarding the Stericycle Engineering Review. First I just needed to know the potential capacity of the dry sorbent silo and the burner rating of the waste heat boiler. I just need to list these in the equipment list.

The Engineering Review should be ready for you to review within the next week. The review is just going to peer review so that will be a couple of days.

Please let me know if you have any questions or concerns.

Thank you,

Jon

Marty Gray <martygray@utah.gov>

Fwd: Final Engineering Review Document

1 message

Jon Black <jlblack@utah.gov> Wed, Mar 23, 2016 at 4:16 PM
To: Marty Gray <martygray@utah.gov>

---------- Forwarded message ----------
From: **Lindsey W. Kroos** <lkroos@all4inc.com>
Date: Tue, Mar 8, 2016 at 11:14 AM
Subject: RE: Final Engineering Review Document
To: Jon Black <jlblack@utah.gov>, "Vance, Jay (Jay.Vance@STERICYCLE.com)" <Jay.Vance@stericycle.com>

Hi Jon – please find attached the signed first page of the Engineering Review document dated March 3, 2016.

Thanks,

Lindsey

Lindsey W. Kroos | Project Manager

lkroos@all4inc.com | 610.933.5246 x122 | Profile | LinkedIn | Twitter

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From: Jon Black [mailto:jlblack@utah.gov]
Sent: Thursday, March 03, 2016 7:28 PM
To: Lindsey W. Kroos; Vance, Jay (Jay.Vance@STERICYCLE.com)
Subject: Fwd: Final Engineering Review Document

Hi Lindsey and Jay,

Attached is an updated version of the Engineering Review. If you want to sign Page 1 and/or 2 of the Engineering Review and either send it back to me via e-mail or fax it to (801) 536-4099 that would be great!

Thank you,

Jon

---------- Forwarded message ----------
From: **Lindsey W. Kroos** <lkroos@all4inc.com>
Date: Thu, Mar 3, 2016 at 4:05 PM
Subject: RE: Final Engineering Review Document
To: Jon Black <jlblack@utah.gov>, "Vance, Jay (Jay.Vance@STERICYCLE.com)" <Jay.Vance@stericycle.com>

Hi Jon – thanks for the opportunity to review this document again prior to the public comment period. Stericycle proposes the following changes to the control efficiencies identified for the particulate matter control devices in the BACT section of the Engineering Review to be consistent with the NOI application:

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

Based on the reasons outlined in the above discussion, the following technologies have been identified as technically feasible, ranked in order of most effective to least effective.

*A. Baghouse (Estimated control efficiency: ~~99.9% +~~ **> 99%**)*

*B. Electrostatic Precipitator (ESP) (Estimated control efficiency: 95 - ~~99.9%~~ **99%** depending upon application)*

C. Wet Venturi Scrubber (Estimated control efficiency: 80 - 95%)

D. Cyclone/Multiclone (Estimated control efficiency: 50% +)

E. Good combustion practices

Per your email below, Stericycle will provide any additional comments during the public comment period.

Should you have any questions please don't hesitate to contact me – thank you,

Lindsey

Lindsey W. Kroos | Project Manager

lkroos@all4inc.com | 610.933.5246 x122 | Profile | LinkedIn | Twitter

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From: Lindsey W. Kroos
Sent: Thursday, March 03, 2016 1:01 PM
To: Jon Black; Vance, Jay (Jay.Vance@STERICYCLE.com)
Subject: RE: Final Engineering Review Document

Hi Jon – thanks for the update. We understand that today marks the 10th business day since receipt of the updated Engineering Review/Approval Order, and we are planning to provide any comments to you by the end of the day.

Thanks,

Lindsey

Lindsey W. Kroos | Project Manager

lkroos@all4inc.com | 610.933.5246 x122 | Profile | LinkedIn | Twitter

All4 Inc. | Philadelphia | Atlanta | Houston | Washington DC

Website | Blog | Newsletter | LinkedIn | Twitter | Facebook | Awards

From: Jon Black [mailto:jlblack@utah.gov]
Sent: Thursday, March 03, 2016 12:14 PM
To: Lindsey W. Kroos; Vance, Jay (Jay.Vance@STERICYCLE.com)
Subject: Re: Final Engineering Review Document

Hi Lindsey and Jay,

Because I have not received any comments back to date our Director has authorized us to prepare the Engineering Review document for public comment.

If you could please get me a signed cover sheet to the Engineering Review document, submitted to you on February 18, 2016, it would be appreciated. If you have comments to that Engineering Review or associated proposed Approval Order conditions please let me know now or comments to the Intent To Approve document can be made during the Public Comment period.

Please let me know if you have any questions or concerns.

Thank you,

Jon

On Thu, Feb 18, 2016 at 12:48 PM, Jon Black <jlblack@utah.gov> wrote:

Hi Lindsey and Jay,

Attached is the updated Engineering review document for your review. Please take a look at it and let me know of any questions or concerns you may have. Our Director Bryce Bird would like to rap this process up quickly so if you could take a look at this and get back with me within 10 business days I would appreciate it.

Thanks for your assistance,

Jon

1663_001.pdf
59K

UTAH DEPARTMENT OF
ENVIRONMENTAL QUALITY

FEB 26 2015

DIVISION OF AIR QUALITY

NOTICE OF INTENT APPLICATION
STERICYCLE, INC.

TOOELE COUNTY, UTAH FACILITY

Submitted By:

Stericycle – Tooele County
9250 Rowley Road
Tooele County, Utah 84029

Submitted To:

Utah Department of Environmental Quality
Division of Air Quality
P.O. Box 144820
Salt Lake City, Utah 84114-4820

Prepared by:

Stericycle, Inc. and

All4 Inc.
2393 Kimberton Road
P.O. Box 299
Kimberton, PA 19442
www.all4inc.com

Kristin M Gordon
2015.02.22
16:37:17 -06'00'

Submitted: February 2015

INTRODUCTION AND APPLICATION ORGANIZATION

Stericycle, Inc. (Stericycle) is proposing to construct, own, and operate a hospital, medical, and infectious waste incinerator (HMIWI) facility in Tooele County, Utah (Tooele facility). The incinerator operation will be subject to the U.S. Environmental Protection Agency's (U.S. EPA's) Standards of Performance for New Stationary Sources: Hospital/Medical/Infectious Waste Incinerators codified at 40 CFR Part 60, Subpart Ec as amended on October 6, 2009. Subpart Ec contains emission limitations for particulate matter (PM), carbon monoxide (CO), dioxins/furans (CDD/CDF), hydrogen chloride (HCl), sulfur dioxide (SO_2), nitrogen oxides (NO_X), lead (Pb), cadmium (Cd), and mercury (Hg).

Stericycle is submitting this Notice of Intent (NOI) application for the construction and operation of a minor source pursuant to R307-401.

APPLICATION ORGANIZATION

The remainder of this application is organized according to the Utah Division of Air Quality's (UDAQ's) Notice of Intent form (Form 1) as follows:

- Attachment A – Form 1: Notice of Intent Application
- Appendix A – Process Description and Flow Diagram (including UDAQ Forms 2, 12, and 17)
- Appendix B – Site Plan
- Appendix C – Emissions Calculations
- Appendix D – UDAQ Form 1a (Emissions Comparison)
- Appendix E – Source Size Determination
- Appendix F – Offset Requirements
- Appendix G – Best Available Control Technology (BACT) Analysis
- Appendix H – Control Device Information (including UDAQ Forms 5, 9, and 10)
- Appendix I – Federal/State Requirement Applicability
- Appendix J – Emissions Impact Assessment

ATTACHMENT A
FORM 1: NOTICE OF INTENT APPLICATION

Utah Division of Air Quality
New Source Review Section

Date 2/25/15

Form 1
Notice of Intent (NOI)

Application for: ☒Initial Approval Order ☐Approval Order Modification

APPROVAL ORDER MUST BE ISSUED BEF ORE ANY CONSTRUCTION OR INSTALLATION CAN BEGIN. This is not a stand alone document; please refer to UAC R307 -401and the published NOI guidebo ok for i nformation on requirements of the specified information below. Please print or type all information requested. All outlined information requested must be accurate and completed before DAQ can determine that an NOI is complete and an engineering review can be initiated. If you h ave any questions, contact the Division of Air Quality at (801) 536-4000 and ask to speak with a New Source Review Engineer. Written inquiries may be addressed to: Division of Air Quality, New Source Review Section, P.O. Box 144820, Salt Lake City, Utah 84114-4820.

General Owner and Facility Information

R307-401-5(2)(k)

1. Filing Fee Paid*	2. Application Fee Paid*
3. Company name and address: Stericycle - Tooele County Facility 9250 Rowley Road Tooele County, UT 84029 Phone No.: TBD Fax No.:	4. Company** contact for environmental matters: Jay K. Vance, P.E. Environmental Quality Manager Phone no.: (801)936-1260 Email: jay.vance@stericycle.com *** Company contact only; consultant or independent contractor contact information can be provided in a cover letter*
5. Facility name and address (if different from above): N/A Phone no.: Fax no.:	6. Owners name and address: Stericycle Incorporated 28161 North Keith Drive Lake Forest, IL 60045 Phone no.: 1-(866)783-7422 Fax no.:
7. Property Universal Transverse Mercator coordinates (UTM), including System and Datum: Easting: 354053.5 Northing: 4523486.7 System: UTM Zone 12 Datum: NAD83	8. County where the facility is located in: Tooele County 9. Standard Industrial Classification Code: 4953

10. Designation of facility in an attainment, maintenance, or nonattainment area(s):

Attainment area

11. If request for modification, AO# to be modified: DAQE#N/A Date:

12. Identify any current Approval Order(s) for the facility **not** being modified with this request:

AO# N/A Date

AO# Date

AO# Date

AO# Date

13. Application for:

☒New construction
☐Existing equipment operating without permit
☐Change of permit condition
☐Modification
☐Permanent site for Portable Approval Order
☐Change of location

14. Construction or modification estimated start date:2015 Estimated completion date:2018

R307-401-5(2)(h)

15. Does this application contain justifiable confidential data? ☐Yes ☒ No

16. Current Title V (Operating Permit) Identification: N/A Date

☐Requesting an enhanced Title V permit with this AO modification

17. Brief (50 words or less) description of project to post on DAQ web for public awareness

Stericycle is submitting this Notice of Intent application in order to obtain approval to construct and operate a hospital/medical/infectious waste incinerator facility.

Process Information

18. Appendix A: Detailed description of project including process flow diagram (See Forms 2-23)

☒Fuels and their use ☒Equipment used in process ☐Description of product(s)
☒Raw materials used ☐Description of changes to process (if applicable) ☒Stack parameters
☒Operation schedules ☒Production rates (including daily/seasonal variances)

R307-401-5(2)(a)

19. Appendix B: Site plan of facility with all emission points and elevations, building dimensions, stack parameters included

R307-401-5(2)(e)

Emissions Information

20. Appendix C: Emission Calculations that must include:
    - ☒ Emissions per new/modified unit for each of the following: PM_{10}, $PM_{2.5}$, NO_x, SO_x, CO, VOC, and HAPs
    - ☒ Designation of fugitive and non fugitive emissions
    - N/A ☐ Major GHG Sources: Emissions per new/modified unit for GHGs (in CO_2e short tons per year)
    - ☒ References/assumptions for each Emission Factor used in calculating Criteria pollutant, HAP, and GHG emissions
    - ☒ HAP emissions (in pounds per hour and tons per year) broken out by specific pollutant and summed as a total

    R307-401-5(2)(b)

21. Appendix D: DAQ Form 1a or equivalent (comparison of existing emissions to proposed emission and resulting new total emissions)

22. Appendix E: Source Size determination (Minor, Synthetic Minor, Major, or PSD)
    - N/A ☐ If an Existing Major Source: Determination of Minor, Major or PSD modification

23. Appendix F: Offset requirements (nonattainment/maintenance areas)
    - N/A ☐ Acquired required offsets — R307-401-420 & R307-401-421

Air Pollution Control Equipment Information

24. Appendix G: Best Available Control Technology (BACT) analysis for the proposed source or modification

    R307-401-5(2)(d)

25. Appendix H: Detailed information on all new/modified equipment controls. It is strongly recommended using DAQ forms as they outline required information, but something equivalent to the DAQ forms is acceptable.

    R307-401-5(2)(c)

26. Appendix I: Discussion of Federal/State requirement applicability (NAAQS, SIP, NSPS, NESHAP, etc)

Modeling Information

27. Appendix J: Emissions Impact Analysis (if applicable) — R307-410-4

Electronic NOI

28. A complete and accurate electronic NOI submitted

    R307-401-5(1)

I hereby certify that the information and data submitted in and with this application is completely true, accurate and complete, based on reasonable inquiry made by me and to the best of my knowledge and belief.

Signature: [signature] Title: Regional Operations Director - Incinerators

Name (print)	Telephone Number:	Date:
Dale Rich	(704) 787-3134	2/25/15

with the exception of Federal Agencies who will be billed at completion of the project

APPENDIX A
PROCESS DESCRIPTION AND FLOW DIAGRAM (INCLUDING UDAQ FORMS 2, 12, AND 17)

PROCESS DESCRIPTION

Stericycle is proposing to construct and operate two HMIWI units, an emergency generator, and ancillary equipment at the Tooele facility. This section addresses the proposed facility configuration and operational parameters during typical operations.

HMIWI AND WASTE HANDLING

Waste will arrive at the Tooele facility via truck in either reusable containers or single-use containers that can be incinerated. Upon delivery at the Tooele facility, waste containers will either be staged for processing or maintained in storage until ready to be processed. Only assigned material handlers will unload the waste containers. The containers will then be staged next to the feed system and charge hopper. Prior to loading the HMIWI's charge hopper, each container will be weighed, scanned to document receipt, and monitored for possible radioactivity. The waste from the container will then be loaded into the feed system and charge hopper.

Stericycle plans to construct and operate two HMIWI units, which will be equipped with an automated waste feed system and will meet the regulatory definition of "continuous HMIWI" (40 CFR §60.51c). Each HMIWI will be designed and sized to process up to 2,050 pounds per hour of hospital/medical/infectious (HMI) waste (i.e., 4,100 pounds per hour total). On an as-received container basis, the heat content of HMI waste can vary from less than 1,000 Btu/lb to more than 10,000 Btu/lb. Stericycle has conservatively assumed an average heat content of approximately 9,500 Btu/lb for the purpose of determining the design charge rate.

Each HMIWI will have a two stage combustion system to ensure complete destruction of the waste. From the charge hopper, material will be fed into the primary stage via a ram feed system equipped with an air lock. Residence time of the waste in the primary chamber will be approximately 4-8 hours at temperatures sufficient to ensure that organic material is combusted and pathological components are destroyed. The secondary chamber will be designed with an extended residence time in an excess air environment to support the complete oxidation and combustion of the primary chamber exhaust gas. Residence time of the gas in the secondary chamber will be at least two seconds above 1,800°F. Chamber temperatures will be monitored and recorded. The primary and secondary chambers will each be equipped with one or more natural gas-fired burners with a total rated heat input capacity of approximately 12 MMBtu/hr. The natural gas-fired burners will be utilized, when necessary, to maintain the combustion temperature and to preheat the chambers during startup.

Each HMIWI will be equipped with a dedicated air pollution control (APC) system, which is further described in Appendix H. The following description represents the APC equipment configuration for each HMIWI. The first control system is the selective non-catalytic reduction (SNCR) system. SNCR reagent (i.e., ammonia, urea, or equivalent) is injected into the secondary chamber exhaust gas to control NO_X emissions. The exhaust gas will then enter a waste heat boiler and subsequent evaporative cooler to reduce the flue gas temperature prior to the fabric filter (baghouse) further downstream. Steam generated by the waste heat boiler will be utilized to condition the gas stream throughout the APC system and for other ancillary equipment as needed throughout the facility. Upon exiting the evaporative cooler, carbon will be injected to help control and remove CDD/CDF and mercury from the flue gas. Dry sorbent injection (DSI) (i.e., sodium bicarbonate, lime, or equivalent) will also be utilized to neutralize the flue gas. After the baghouse, the flue gas will enter the wet gas absorber, where it will come in direct contact with recirculated scrubber liquor. The pH of the scrubber liquor will be monitored and an alkali reagent (i.e., sodium hydroxide or equivalent) will be injected as necessary to maintain the pH of the liquor so as to ensure the absorption of acid gases. A carbon bed (or equivalent) system will be utilized downstream of the wet gas absorber as a polishing mercury and CDD/CDF control prior to venting to the atmosphere via a single stack. Please refer to Appendix H for additional information on the APC system.

Each HMIWI will also be equipped with an emergency bypass stack which, in emergency conditions, allows gas from the secondary chamber to vent directly to the atmosphere without passing through the APC equipment. The emergency bypass stack will be utilized only when necessary, due to a significant process upset, or other unforeseeable circumstance causing a process interruption, for employee safety and to prevent catastrophic damage to the APC equipment. Waste feed to the primary chamber will automatically cease and be prevented by feeder system lockout while the bypass stack is open.

Two types of ash are generated from the incineration process: bottom ash and fly ash. Bottom ash consists of non-combustible materials such as metallic components of medical devices, glassware, etc., which exits the primary combustion chamber and is collected in a water quench. Fly ash consists of non-combustible material entrained in the flue gas and is captured in the baghouse and collected in a covered hopper. Collected bottom and fly ash will be sampled and analyzed for hazardous compounds prior to being transported and disposed of in a certified landfill.

MONITORING

Stericycle will utilize continuous parametric and pollutant monitoring, as applicable, to ensure ongoing compliance with the emission limitations contained in 40 CFR Part 60, Subpart Ec. Pursuant to 40 CFR §60.56c(d), Stericycle will establish appropriate maximum and minimum operating parameters for each HMIWI APC system during the initial performance test to demonstrate compliance with the emissions limits for PM, CO, CDD/CDF, HCl, SO_2, NO_X, Pb, Cd, and Hg. Following the initial performance test, Stericycle will ensure that each HMIWI does not operate above any of the applicable maximum operating parameters or below any of the applicable minimum operating parameters, measured as 3-hour rolling averages (calculated each hour as the average of the previous three (3) operating hours). Waste feed will automatically cease if an operating parameter value is outside of an established limit.

Pursuant to 40 CFR §60.56c(c)(4), compliance with the CO emissions limit will be determined using a CO continuous emissions monitoring system (CEMS) based on a 24-hour block average.

A summary of the applicable operating parameters and pollutants to be monitored is provided in Table 1.

Table 1
Monitoring Requirements

Monitoring Requirement	Minimum Frequency	
	Data measurement	Data recording
Operating Parameter Monitoring		
Maximum waste charge rate	Continuous	Once per hour
Maximum fabric filter inlet temperature	Continuous	Once per minute
Maximum flue gas temperature at the inlet to the carbon bed (or equivalent) system*	Continuous	Once per minute
Minimum secondary chamber temperature	Continuous	Once per minute
Minimum dioxin/furan and mercury sorbent flow rate	Hourly	Once per hour
Minimum HCl sorbent flow rate	Hourly	Once per hour
Minimum pressure drop across, or minimum horsepower or amperage to the wet scrubber (wet gas absorber)**	Continuous	Once per minute
Minimum scrubber (wet gas absorber) liquor flow rate	Continuous	Once per minute
Minimum scrubber (wet gas absorber) liquor pH	Continuous	Once per minute
Minimum SNCR reagent flow rate	Hourly	Once per hour
Bypass stack position	Continuous	Once per minute
Pollutant Monitoring		
Carbon monoxide (CO) CEMS	Continuous	Once per 15 minutes

* Since the carbon bed (or equivalent) system is an air pollution control device other than those systems specifically outlined in 40 CFR Part 60, Subpart Ec, Stericycle will petition U.S. EPA for other site-specific operating parameters to be established during the initial performance test and continuously monitored thereafter pursuant to §60.56c(j).

** Stericycle intends to petition U.S. EPA to eliminate the requirement to monitor minimum pressure drop across, or minimum horsepower or amperage to the wet scrubber (wet gas absorber), as these parameters are associated with a wet scrubber used for control of particulate matter rather than acid gases.

A process flow diagram of the proposed HMIWI, APC equipment configuration, and monitoring locations is presented in Figure A-1.

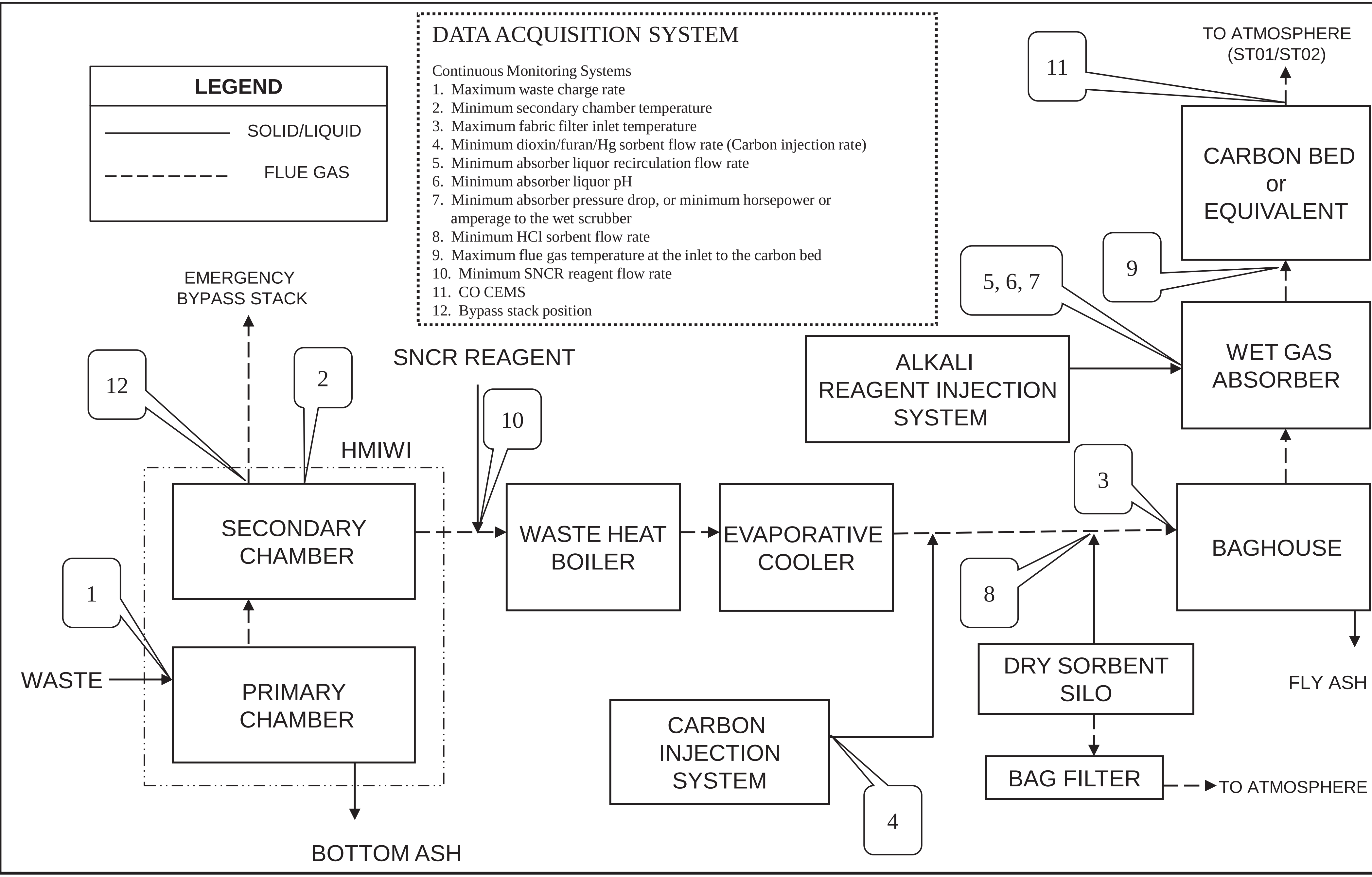

Figure A-1
Proposed Configuration (each HMIWI)
Tooele County, Utah - Process Flow Diagram
Stericycle, Inc.

EMERGENCY GENERATOR

Stericycle will utilize a 500 kW (671 hp) diesel-fired emergency generator to supply emergency power to the critical components of the HMIWI operation in the event of a power supply interruption. The emergency generator will be permitted to operate no more than 300 hours per year, and is expected to operate only a fraction of that time for both emergency power supply and maintenance purposes. Use of the emergency generator is intended to minimize the use of the emergency bypass stack due to power supply interruptions.

ANCILLARY EQUIPMENT

As described above and in Appendix H, each HMIWI's APC system will include dry sorbent injection (DSI). The combined DSI system will be equipped with a storage silo to store and inject the dry sorbent (i.e., sodium bicarbonate, lime, or equivalent) into the flue gas of each HMIWI. The silo will be equipped with a small bin vent filter to control emissions of particulate matter generated during pneumatic loading of the silo.

Reusable waste containers will be washed and disinfected in a tub washer. The tub washer will utilize steam generated by the waste heat boiler. Reclaimed water from the washing process that may contain organic material may be injected into the primary chamber to be combusted and to destroy the organic material.

Waste and other deliveries to the facility will be delivered by truck. All roadways within the facility and the entrance from Rowley Road will be paved to minimize fugitive emissions.

Utah Division of Air Quality
New Source Review Section

Company Stericycle
Site/Source Tooele County, Utah
Date February 2015

Form 2
Process Information

The proposed facility will consist of two (2) HMIWI units. The values presented here represent one (1) unit unless otherwise noted.

Process Data

1. Name of process: Hospital, medical, and infectious waste incineration
2. End product of this process: N/A

3. Primary process equipment: Incinerator
   Manufacturer: TBD
   Make or model: TBD
   Identification #: TBD
   Capacity of equipment (lbs/hr):
   Year installed: TBD
   Rated 4,100 (two units) Max. 4,100 (two units)
   (Add additional sheets as needed)

4. Method of exhaust ventilation:
   ☒ Stack ☐ Window fan ☐ Roof vent ☐ Other, describe ______

   Are there multiple exhausts: ☒ Yes ☐ No

Operating Data

5. Maximum operating schedule:
   24 hrs/day
   7 days/week
   52 weeks/year

6. Percent annual production by quarter:
   Winter 25% Spring 25%
   Summer 25% Fall 25%

7. Hourly production rates (lbs.):
   Average 4,100 (two units) Maximum 4,100 (two units)

8. Maximum annual production (indicate units):
   18,000 tons/year (two units)
   Projected percent annual increase in production:
   0%

9. Type of operation: ☒ Continuous ☐ Batch ☐ Intermittent

10. If batch, indicate minutes per cycle N/A
    Minutes between cycles N/A

11. Materials used in process Hospital, Medical Infectious Waste

Raw Materials	Principal Use	Amounts (Specify Units)
Hospital/Medical/Infectious Waste	N/A	4,100 lbs/hour (two units)

Process
Form 2 (Continued)

12. Control equipment (attach additional pages if necessary)

Item	Primary Collector	Secondary Collector
a. Type		
b. Manufacturer		
c. Model		
d. Year installed		
e. Serial or ID#		
f. Pollutant controlled		
g. Controlled pollutant emission rate (if known)		
h. Pressure drop across control device		
i. Design efficiency		
j. Operating efficiency		

Each HMIWI will be equipped with SNCR, dry sorbent injection (lime, sodium bicarbonate or equivalent), carbon injection, a fabric filter, a wet gas absorber, and a carbon bed (or equivalent) system.

Stack Data

(attach additional pages if necessary)

13. Stack identification: ST01, ST02

14. Height: Above roof ~6 ft
Above ground ~75 ft

15. Are other sources vented to this stack:
☐ Yes ☒ No

If yes, identify sources:

16. ☒ Round, top inside diameter dimension ~2.5 ft

☐ Rectangular, top inside dimensions
length ________ x width ________

17. Exit gas: Temperature ~140-170 °F Volume ~8,500 acfm Velocity ~1,730 ft/min

18. Continuous monitoring equipment: ☒ yes ☐ no
If yes, indicate: Type TBD Manufacturer TBD

Make or Model TBD Pollutant(s) monitored CO

Emissions Calculations (PTE)

19. Calculated emissions for this device

PM Tons/yr

NO Tons/yr

CO Tons/yr

CO

N_2

HA

See Appendix C

Submit calculations as an appendix. If other pollutants are emitted, include the emissions in the appendix.

Instructions

Note: 1. **Submit this form in conjunction with Form 1.**
2. Call the Division of Air Quality (DAQ) at **(801) 536-4000** if you have problems or questions in filling out this form. Ask to speak with a New Source Review engineer. We will be glad to help!

This is a general form regarding processes and should be completed by all sources.

Please answer all questions. If the item does not apply to the source operations write "n/a". If the answer is not known write "unknown".

1. Indicate the generally accepted name for the process (i.e., asphalt batching, glass manufacturing, oil refining, etc.).
2. Specify the end product of this process (i.e., asphaltic concrete, benzene, soaps, etc.).
3. Indicate the specific process equipment for this form along with the manufacturer, model number, identifying name or code year it was or will be installed, and rated (normal) and maximum capacity of equipment.
4. Indicate the method of exhaust ventilation and indicate if there are more than one exhausts.
5. Complete the process equipment's normal operating schedule in hours per day, days per week, and weeks per year.
6. Complete the percent annual production by season for a year's production of finished units. The four seasons should total to 100%.
7. Specify the average and maximum hourly production rates in pounds. The average is the year's production rate divided by the total yearly hours of production or operation.
8. Specify the annual production for this process equipment and indicate the appropriate units. Estimate the annual increase in production.
9. Check whether the process is continuous, intermittent, or batch. A batch operation normally has significant down time between completion and startup of each operation or cycle.
10. If batch, complete the minutes per production cycle and minutes between the production cycles. A "cycle" refers to the time the equipment is in operation.
11. List all general types of raw materials employed in the process, indicate the principle use (i.e., product, binder, catalyst, fuel, etc.) and specify the normal amount used in pounds per hours, tons per year, etc.
12. If your control device is not listed below complete items a through j. If your process includes any of the control devices listed below, please indicate which ones and submit the associated forms with your application. The primary collector and secondary collector refer to separate control devices or equipment for collecting similar or different air pollutants. If there is a third collector, complete the same data for that collector on a separate sheet. Addition information may be attached.

    Complete the proper form listed below for any air pollution control device:

___	Form 3	Afterburners
___	Form 4	Flares
___	Form 5	Adsorption Unit
___	Form 6	Cyclone
___	Form 7	Condenser
___	Form 8	Electrostatic Precipitators
___	Form 9	Scrubber
___	Form 10	Fabric Filter (Baghouse)

13. Indicate the company's identification for the stack or exhaust.
14. Specify the stack's or exhaust's height, in feet (ft.) above ground and above the attached roof.
15. Indicate if other sources are also vented to this same stack or exhaust and identify those sources.
16. Specify the inside dimensions of the stack or exhaust at the outlet to the atmosphere.
17. Complete the specifications of the stack's or exhaust's exit gas. (Temperature in degrees Fahrenheit, volume flow rate in actual cubic feet per minute, and velocity in feet per minute.) If the properties of the exit gas vary, use the average values.
18. Indicate if the stack or exhaust is equipped with air pollution monitoring equipment. If so, specify the type, manufacturer, make or model, and the pollutant or pollutants monitored.
19. Supply calculations for all criteria pollutants and HAPs. Use manufacturers' data or AP-42 to complete your calculations.

Utah Division of Air Quality
New Source Review Section

Form 12
Incinerators

Company Stericycle
Site/Source Tooele County, Utah
Date February 2015

The proposed facility will consist of two (2) HMIWI units. The values presented here represent one (1) unit unless otherwise noted.

General Information

1. Attach process diagrams of the incinerators described on this form See Figure A-1

2. Describe the source of waste:
Hospital/medical/infectious waste

3. Manufacturer of incinerator: TBD	4. Model name and number: TBD
5. Type of incinerator: ☐ Flue ☐ Single Chamber ☒ Multiple Chamber	6. Maximum amount of waste to be incinerated: 4,100 (two units) lb/hr
7. Estimated daily amount of waste to be incinerated: 98,400 (two units) lb	8. Height of stack above grade: ~75 ft
9. Height of tallest structures within 150 feet: N/A Feet	10. Primary burner used: ■ Yes ☐ No Maximum rating ~4 MM BTU/hr (natural gas)

11. Secondary Burner used: ☒ Yes ☐ No Maximum rating ~8 MM BTU/hr (natural gas)

Description of Typical Waste to Be Incinerated

12. Type of waste to be incinerated:

- ☒ Type 0 Trash with 8,500 BTU/lb 85% moisture, 5% incombustible
- ☒ Type 1 Rubbish with 6,500 BTU/lb 25% moisture, 10% incombustible
- ☒ Type 2 Refuse with 4,300 BTU/lb 50% moisture, 7% incombustible
- ☒ Type 3 Garbage with 2,500 BTU/lb 70% moisture, 5% incombustible
- ☒ Type 4 Human and animal parts, with 1,000 BTU/lb 10% moisture, 5% incombustible
- ☐ Type 5 Industrial by-product wastes which are gaseous, liquid, & semi-liquid
- ☐ Type 6 Industrial solid byproduct waste rubber, plastic, wood wastes
- ☐ Type 7 Municipal sewage sludge wastes residue from processing of raw sludge

Incinerator
Form 12 (Continued)

Operational Information

13. Average operation time of incinerator: 24 hrs/day 7 days/week 52 weeks/year

14. Maximum operation time of incinerator: 24 hrs/day 7 days/week 52 weeks/year

15. Average Temperature: Primary ~1,400-1,600 °F Secondary >1,800 °F

16. Residence time: Primary: 4-8 hours ~~seconds~~ (waste) Secondary: >2 seconds (gas)

17. Type of feed to incinerator: ☐ Manual ☒ Ram ☐ Other ______

18. Proposed Control Technology:
- ☐ Quench Tower
- ☐ Heat Exchanger
- ☒ Dry Scrubber (attach DAQ Form 9)
- ☒ Wet Scrubber (attach DAQ Form 9)
- ☒ Baghouse (attach DAQ Form 10)

Each HMIWI will be equipped with SNCR, dry sorbent injection (lime, sodium bicarbonate or equivalent), carbon injection, a fabric filter, a wet gas absorber, and a carbon bed (or equivalent) system.

Emission Information

19. Number of identical sources (describe)

Two (2) identical HMIWI units will be installed at the Tooele County facility.

20. **Average Operation**

Pollutants	Concentration or emission rate per identical source	Method used to determine concentration or emission rate
Pa (P	See Appendix C	
Pa (P		
Ca (C		
Ni (N		
Vo Co		
Su		
Ca (C		
Me		
Ni		

Incinerator
Form 12 (Continued)

Maximum Operation		
Contaminant	Concentration or Emission Rate per Identical Source	Method used to determine concentration or emission rate

See Appendix C

Metals (Maximum Operation)

See Appendix C

21. **Exhaust Point Information**	
Flow diagram designation(s) of exhaust point(s): ST01, ST02	
Description of exhaust point (location in relation to buildings, direction, hooding, etc.): Vertical, unrestricted	
Exhaust height above grade: ~75 Feet	Exhaust diameter: ~30 Inches
Greatest height of nearby buildings: N/A Feet	Exhaust distance from nearest plant boundary: >330 Feet
Average Operation	**Maximum Operation**

Exhaust gas temperature: ~140-170 °F	Exhaust gas temperature: ~170 °F
Gas flow rate through each exhaust point: ~8,500 acfm	Gas flow rate through each exhaust point: ~10,200 acfm

Instructions - Form 12 Incinerator

NOTE: 1. **Submit this form in conjunction with Form 1 and Form 2.**
2. Call the Division of Air Quality (DAQ) at **(801) 536-4000** if you have problems or questions in filling out this form. Ask to speak with a New Source Review engineer. We will be glad to help!

1. Attach flow diagram of the described incinerator.
2. Please describe the source of waste to be incinerated.
3. Supply the name of the manufacturer of the incinerator.
4. Supply the model and number of the incinerator.
5. Indicate the type of incinerator.
6. Specify the maximum amount of waste to be incinerated.
7. Specify the daily amount of waste to be incinerated.
8. Indicate the height of the stack above ground level.
9. Indicate the height of tallest structure within 150 feet.
10. Supply the specifications for primary burner used.
11. Supply the specifications for secondary burner used.
12. Indicate the type of typical waste to be incinerated.
13. Supply the average operation time of the incinerator.
14. Supply the maximum operation time of the incinerator.
15. Supply the average temperature in the primary and secondary chambers.
16. Supply the residence time in the primary and secondary chambers.
17. Indicate what type of feed is used to load the incinerator.
18. Indicate the control technology to be use. Submit the corresponding form, if available, for the control technology. Submit specifications for control technology which a form is not available for. Forms available are the following:

    Form 3 Afterburners
    Form 4 Flares
    Form 5 Adsorption Unit
    Form 6 Cyclone
    Form 7 Condenser
    Form 8 Electrostatic Precipitators
    Form 9 Scrubber
    Form 10 Fabric Filter

19. Indicate how many incinerators units are being used.
20. Specify the concentration or emission rate of the listed contaminants for both the average and maximum feed rate.
21. Supply the exhaust specifications listed.

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Revised 12/20/10

Utah Division of Air Quality
New Source Review Section

Form 17
Diesel Powered Standby Generator

Company: Stericycle
Site/Source: Tooele County, Utah
Date: February 2015

Company Information

1. Company Name and Address:
Stericycle
28161 North Keith Drive
Lake Forest, IL 60045

Phone Number: 1-866-783-7422
Fax Number:

2. Company Contact:
Jay K. Vance, P.E.
Environmental Quality Manager

Phone Number: 801-936-1260
Fax Number:

3. Installation Address:
Stericycle - Tooele County Facility
9250 Rowley Road
Tooele County, UT 84029

Phone Number: TBD
Fax Number: TBD

County where facility is located: Tooele County

Latitude, Longitude and UTM Coordinates of Facility
Easting: 354053.5 Northing: 4523486.7
System: UTM Zone 12 Datum: NAD83

Standby Generator Information

4. Engines:

Manufacturer	Model	Maximum Rated Horsepower or Kilowatts	Maximum Hours of Operation	Emission Rate Rate of NO_x grams/BHP-HR	Date the engine was constructed or reconstructed
TBD	TBD	500 kw/671 bhp	300 hr/yr	EPA Tier 4	TBD

Attach Manufacturer-supplied information

5. Calculated emissions for this equipment:

See Appendix C

Submit calculations as an appendix. If other pollutants are emitted, include the emissions in the appendix.

Instructions Form 17 - Diesel Powered Standby Generator

Call the Division of Air Quality (DAQ) at (801) 536-4000 if you have problems or questions in filling out this form. Ask to speak with a New Source Review engineer. We will be glad to help!

Lines 1 and 2: Fill in the name, address, phone number, and fax number of the business applying for the permit exemption.

Line 3 Fill in the address where the equipment will be located. Directions to business if needed for remote locations, i.e., five miles south of Deseret on highway 101, turn left at farmhouse, go 1.5 miles. Identify the county the equipment will be located. Also enter the latitude, longitude and UTM coordinates of the facility.

Line 4 Fill in the manufacturer, model, maximum rated horsepower or kilowatts, maximum hours of operation, emission rate for NO_x in grams/BHP-hr, and the date the engine was constructed or reconstructed. Attach manufacturer emission information.
Note: Maximum rated horsepower not to exceed 1000hp or 750 kilowatts. Also maximum hours not to exceed 300 hours.

Line 5 Supply calculations for all criteria pollutants, greenhouse gases and hazardous air pollutants. Use EPA AP-42 or manufacturers' data to complete your calculations. Fill in the name, address, phone number, and fax number of the business applying for the

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Revised 12/20/10

APPENDIX B
SITE PLAN

SITE PLAN

Stericycle has attached Figure B-1 which depicts the layout and building dimensions for the Tooele facility. The exact location of each emission point is not yet known; however, all emission points will be at least 100 meters from the facility property line. The primary emission point (i.e., stack) for each HMIWI is expected to be approximately 75 feet from ground level, with a diameter of approximately 30 inches and exhaust flow rate of approximately 4,800 dscfm. Figure B-2 is a GIS map of the Tooele County Facility.

The facility will be situated north of Interstate 80 and west of the Great Salt Lake, off Rowley Road in Tooele County. The facility will include an approximately 4,000 sq. ft. office, attached to an approximately 24,000 sq. ft. fully-enclosed processing and trailer storage area. Exact final dimensions of these footprints will be determined during final building design for construction. The perimeter of the facility will be paved and landscaped with a secured, fenced enclosure surrounding the waste receiving areas.

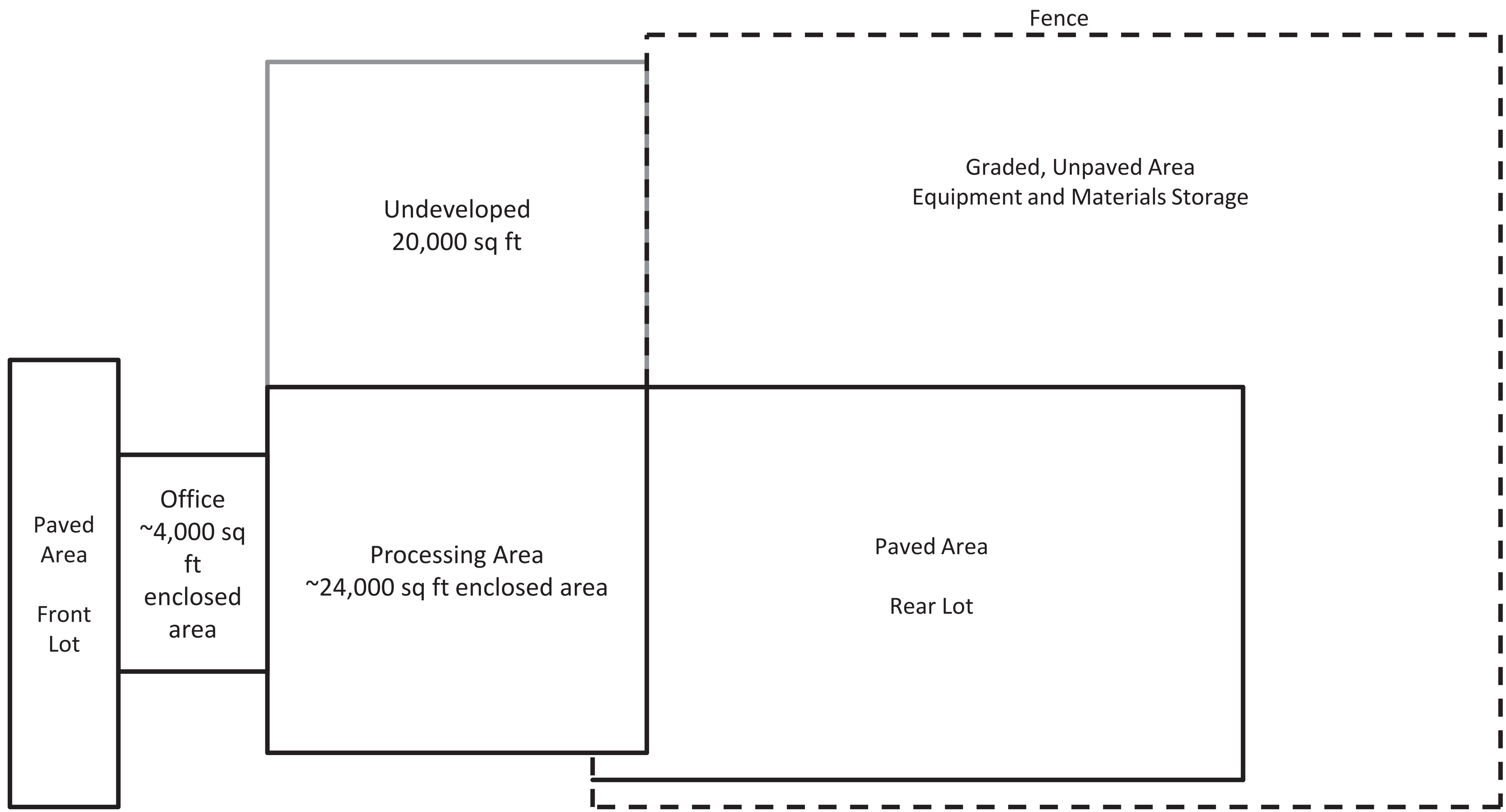
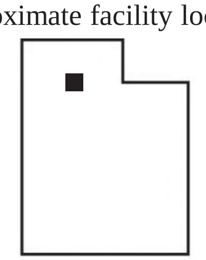


Figure B-1 – Tooele County Facility Site Plan
Stericycle, Inc. – Tooele County, UT

Approximate facility location



2 miles

N

Based on a Google Earth screenshot taken 1/29/2015.

Stericycle, Inc.
Tooele County, Utah

Figure B-2
Facility Location Map

APPENDIX C
EMISSIONS CALCULATIONS

EMISSIONS INVENTORY

This section provides an overview of the emissions data developed and relied upon for this NOI application. The facility's potential to emit (PTE) takes into account air pollution controls, maximum expected operating time, and maximum expected material throughputs.

The PTE of criteria pollutants, greenhouse gas (GHG) pollutants, hazardous air pollutants (HAPs), and other non-HAPs from the proposed HMIWI units were calculated using a combination of 40 CFR Part 60, Subpart Ec emission concentration limits, U.S. EPA's "AP-42 Compilation of Air Pollutant Emission Factors," 40 CFR Part 98 Tables C-1 and C-2 emission factors, and engineering judgment. The PTE from the proposed HMIWI units was calculated for both normal operating conditions (i.e., HMI waste combustion), as well as startup conditions (i.e., supplemental natural gas firing for purposes of preheating the combustion chambers). The PTE from HMI waste combustion was calculated using engineering design parameters, a maximum HMI waste feed rate of 2,050 pounds per hour per unit, and 8,760 hours per year of operation. The PTE from supplemental natural gas was calculated based on a combined maximum total burner rating of approximately 12 MMBtu/hr per HMIWI, and conservatively assumes 8,760 hours per year of natural gas combustion. In reality, natural gas will only be utilized when necessary to maintain the combustion temperature and to preheat the chambers during startup.

Calculations for uncontrolled emission rates from the proposed HMIWI units as specified in R307-401-5(2)(b) are also provided. Uncontrolled emissions are based on AP-42 emission factors unless otherwise noted.

The PTE from the emergency generator was calculated using a combination of the applicable Tier 4 emission standards, AP-42 emission factors, and 40 CFR Part 98 emission factors. The PTE assumes that the diesel-fired emergency generator, rated at 500 kW, will operate no more than 300 hours per year.

The PTE for particulate matter (PM) from the dry sorbent storage silo was calculated assuming an outlet PM grain loading of 0.02 gr/dscf and 100 hours of operation (i.e., during pneumatic loading) per year.

Emission calculation Tables C-1 through C-4 follow this section and provide additional calculation details.

Table C-1

Stericycle, Inc. - Tooele, UT Facility

Summary of Proposed Incinerator Potential to Emit from HMI Waste Combustion (2 HMIWI)

Pollutant	Uncontrolled Emission Factor	Units	Emission Factor Source	Controlled Emission Factor	Units	Emission Factor Source	Uncontrolled Potential to Emit[e]		Controlled Potential to Emit[e]	
							(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
Criteria Pollutants										
PM[c][d]	4.67	lb/ton	AP-42 Chapter 2.3[b]	0.0080	gr/dscf @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	9.57	41.93	0.44	1.93
PM_{10}[c]	4.67	lb/ton	AP-42 Chapter 2.3[b]	0.0080	gr/dscf @ 7% O_2	Engineering Estimate[c]	9.57	41.93	0.44	1.93
$PM_{2.5}$[c]	4.67	lb/ton	AP-42 Chapter 2.3[b]	0.0080	gr/dscf @ 7% O_2	Engineering Estimate[c]	9.57	41.93	0.44	1.93
CO[d]	11	ppmv @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	11	ppmv @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	0.31	1.35	0.31	1.35
SO_2[d]	2.17	lb/ton	AP-42 Chapter 2.3[b]	8.1	ppmv @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	4.45	19.48	0.52	2.28
NO_X[d]	7.32	lb/ton	Engineering Estimate	140	ppmv @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	15.00	65.68	6.45	28.24
VOC	0.299	lb/ton	AP-42 Chapter 2.3[b]	4.71E-02	lb/ton	AP-42 Chapter 2.3[b]	0.61	2.68	9.66E-02	0.42
GHGs										
CO_2e[g]	-	-	-	-	-	-	7,964.58	34,884.84	7,964.58	34,884.84
CO_2	199.96	lb/MMBtu	*40 CFR Part 98 - Table C-1*	199.96	lb/MMBtu	*40 CFR Part 98 - Table C-1*	7,788.40	34,113.21	7,788.40	34,113.21
CH_4	0.07	lb/MMBtu	*40 CFR Part 98 - Table C-2*	0.07	lb/MMBtu	*40 CFR Part 98 - Table C-2*	2.75	12.04	2.75	12.04
N_2O	0.01	lb/MMBtu	*40 CFR Part 98 - Table C-2*	0.01	lb/MMBtu	*40 CFR Part 98 - Table C-2*	0.36	1.58	0.36	1.58
HAPs										
Hydrogen Chloride[d]	33.5	lb/ton	AP-42 Chapter 2.3[b]	5.1	ppmv @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	68.68	300.80	0.19	0.82
Dioxins/Furans (as Total CDD)[d]	2.13E-05	lb/ton	AP-42 Chapter 2.3[b]	4.1	gr/10^9 dscf @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	4.37E-05	1.91E-04	2.26E-07	9.90E-07
Lead[d]	7.28E-02	lb/ton	AP-42 Chapter 2.3[b]	0.00030	gr/10^3 dscf @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	1.49E-01	0.65	1.65E-05	7.24E-05
Cadmium[d]	5.48E-03	lb/ton	AP-42 Chapter 2.3[b]	0.000057	gr/10^3 dscf @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	1.12E-02	4.92E-02	3.14E-06	1.38E-05
Mercury[d]	7.66E-04	lb/ton	Engineering Estimate	0.00057	gr/10^3 dscf @ 7% O_2	40 CFR Part 60, Subpart Ec[a]	1.57E-03	6.88E-03	3.14E-05	1.38E-04
Chlorine	1.05E-01	lb/ton	AP-42 Chapter 2.3[b]	1.05E-01	lb/ton	AP-42 Chapter 2.3[b]	0.22	0.94	2.15E-01	9.43E-01
Antimony	1.28E-02	lb/ton	AP-42 Chapter 2.3[b]	1.51E-04	lb/ton	AP-42 Chapter 2.3[b]	2.62E-02	1.15E-01	3.10E-04	1.36E-03
Arsenic	2.42E-04	lb/ton	AP-42 Chapter 2.3[b]	1.46E-05	lb/ton	AP-42 Chapter 2.3[b]	4.96E-04	2.17E-03	2.99E-05	1.31E-04
Beryllium	6.25E-06	lb/ton	AP-42 Chapter 2.3[b]	3.84E-06	lb/ton	AP-42 Chapter 2.3[b]	1.28E-05	5.61E-05	7.87E-06	3.45E-05
Chromium	7.75E-04	lb/ton	AP-42 Chapter 2.3[b]	3.96E-05	lb/ton	AP-42 Chapter 2.3[b]	1.59E-03	6.96E-03	8.12E-05	3.56E-04
Hydrogen Fluoride	0.149	lb/ton	AP-42 Chapter 2.3[b]	1.33E-02	lb/ton	AP-42 Chapter 2.3[b]	3.05E-01	1.34E+00	2.73E-02	1.19E-01
Manganese	5.67E-04	lb/ton	AP-42 Chapter 2.3[b]	5.67E-04	lb/ton	AP-42 Chapter 2.3[b]	1.16E-03	5.09E-03	1.16E-03	5.09E-03
Nickel	5.90E-04	lb/ton	AP-42 Chapter 2.3[b]	2.84E-04	lb/ton	AP-42 Chapter 2.3[b]	1.21E-03	5.30E-03	5.82E-04	2.55E-03
Total PCBs	4.65E-05	lb/ton	AP-42 Chapter 2.3[b]	4.65E-05	lb/ton	AP-42 Chapter 2.3[b]	9.53E-05	4.18E-04	9.53E-05	4.18E-04
Total HAPs	-	-	-	-	-	-	69.39	303.92	0.43	1.89
Other Non-HAPs										
Aluminum	1.05E-02	lb/ton	AP-42 Chapter 2.3[b]	2.99E-03	lb/ton	AP-42 Chapter 2.3[b]	2.15E-02	9.43E-02	6.13E-03	2.68E-02
Barium	3.24E-03	lb/ton	AP-42 Chapter 2.3[b]	7.39E-05	lb/ton	AP-42 Chapter 2.3[b]	6.64E-03	2.91E-02	1.51E-04	6.64E-04
Copper	1.25E-02	lb/ton	AP-42 Chapter 2.3[b]	2.75E-04	lb/ton	AP-42 Chapter 2.3[b]	2.56E-02	1.12E-01	5.64E-04	2.47E-03
Hydrogen Bromide	4.33E-02	lb/ton	AP-42 Chapter 2.3[b]	4.42E-03	lb/ton	AP-42 Chapter 2.3[b]	8.88E-02	3.89E-01	9.06E-03	3.97E-02
Iron	1.44E-02	lb/ton	AP-42 Chapter 2.3[b]	1.44E-02	lb/ton	AP-42 Chapter 2.3[b]	2.95E-02	1.29E-01	2.95E-02	1.29E-01
Silver	2.26E-04	lb/ton	AP-42 Chapter 2.3[b]	7.19E-05	lb/ton	AP-42 Chapter 2.3[b]	4.63E-04	2.03E-03	1.47E-04	6.46E-04
SO_3	9.07E-03	lb/ton	AP-42 Chapter 2.3[b]	9.07E-03	lb/ton	AP-42 Chapter 2.3[b]	1.86E-02	8.14E-02	1.86E-02	8.14E-02
Thallium	1.10E-03	lb/ton	AP-42 Chapter 2.3[b]	1.10E-03	lb/ton	AP-42 Chapter 2.3[b]	2.26E-03	9.88E-03	2.26E-03	9.88E-03
Ammonia	1.00	ppm	Engineering Estimate	1.00	ppm	Engineering Estimate	1.71E-02	7.47E-02	1.71E-02	7.47E-02

[a] Emission factors equivalent to emission limitations pursuant to 40 CFR Part 60, Subpart Ec *Standards of Performance for New Stationary Sources: Hospital/Medical/Infectious Waste Incinerators.*

[b] Emission factors from Chapter 2.3 (Medical Waste Incineration), Tables 2.3-1 through 2.3-11 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, July 1993.

[c] Stericycle has conservatively assumed that $PM=PM_{10}=PM_{2.5}$.

[d] 40 CFR Part 60, Subpart Ec HMIWI regulated pollutants.

[e] Emission calculations are based on the following:

Exhaust Gas Parameters		
9,508	dscfm (total)	
11.50	% O_2	
Operating Parameters		
8,760	hr/year	
2,000	lb/ton	
2.20462	lb/kg	
2	number of incinerators	
9,500	BTU/lb waste[f]	
18,000	tons of waste/year (total)	
4,100	lb waste/hr (total)	
Molecular Weight		
CO	28.00	lb/lbmole
SO_2	64.06	lb/lbmole
NO_2	46.01	lb/lbmole
HCl	36.45	lb/lbmole
NH_3	17.03	lb/lbmole

[f] Waste heating value based on engineering experience.

[g] CO_2e is carbon dioxide equivalent, calculated according to 40 CFR Part 98 Equation A-1:

$$CO_2e = \sum_{i=1}^{n} GHG_i \times GWP_i$$

where GHG_i = annual mass emissions of greenhouse gas i (metric tons/year)

GWP_i = global warming potential of greenhouse gas i from Table A-1 (below)

Table A-1

Pollutant	*GWP (100 year)*
CO_2	1
CH_4	25
N_2O	298

Table C-2

Stericycle, Inc. - Tooele, UT Facility

Summary of Proposed Incinerator Potential to Emit from Auxiliary Natural Gas Combustion

Pollutant	Emission Factor	Potential to Emit[g]	
		(lb/hr)	(tons/yr)
Criteria Pollutants			
PM	- -	See Footnote (e)	
PM_{10}	- -	See Footnote (e)	
$PM_{2.5}$	- -	See Footnote (e)	
CO	- -	See Footnote (e)	
SO_2	- -	See Footnote (e)	
NO_X	- -	See Footnote (e)	
VOC	5.5 lb/MMCF [a]	0.13	0.57
GHGs			
CO_2e[f]	- -	2,810.35	12,309.34
CO_2	53.06 kg CO_2/MMBtu [b]	2,807.45	12,296.64
CH_4	1.00E-03 kg CH_4/MMBtu [b]	5.29E-02	2.32E-01
N_2O	1.00E-04 kg N_2O/MMBtu [b]	5.29E-03	2.32E-02
HAPs			
Lead	- -	See Footnote (e)	
Cadmium	- -	See Footnote (e)	
Mercury	- -	See Footnote (e)	
2-Methylnaphthalene	2.40E-05 lb/MMCF [c]	5.65E-07	2.47E-06
3-Methylchloranthrene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05 lb/MMCF [c]	3.76E-07	1.65E-06
Acenaphthene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Acenaphthylene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Anthracene	2.40E-06 lb/MMCF [c]	5.65E-08	2.47E-07
Benz(a)anthracene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Benzene	2.10E-03 lb/MMCF [c]	4.94E-05	2.16E-04
Benzo(a)pyrene	1.20E-06 lb/MMCF [c]	2.82E-08	1.24E-07
Benzo(b)fluoranthene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Benzo(g,h,i)perylene	1.20E-06 lb/MMCF [c]	2.82E-08	1.24E-07
Benzo(k)fluoranthene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Chrysene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Dibenzo(a,h)anthracene	1.20E-06 lb/MMCF [c]	2.82E-08	1.24E-07
Dichlorobenzene	1.20E-03 lb/MMCF [c]	2.82E-05	1.24E-04
Fluoranthene	3.00E-06 lb/MMCF [c]	7.06E-08	3.09E-07
Fluorene	2.80E-06 lb/MMCF [c]	6.59E-08	2.89E-07
Formaldehyde	7.50E-02 lb/MMCF [c]	1.76E-03	7.73E-03
Hexane	1.80E+00 lb/MMCF [c]	4.24E-02	1.86E-01
Indeno(1,2,3-cd)pyrene	1.80E-06 lb/MMCF [c]	4.24E-08	1.86E-07
Naphthalene	6.10E-04 lb/MMCF [c]	1.44E-05	6.29E-05
Phenanathrene	1.70E-05 lb/MMCF [c]	4.00E-07	1.75E-06
Pyrene	5.00E-06 lb/MMCF [c]	1.18E-07	5.15E-07
Toluene	3.40E-03 lb/MMCF [c]	8.00E-05	3.50E-04

Table C-2 (continued)

Pollutant	Emission Factor	Potential to Emit[g] (lb/hr)	Potential to Emit[g] (tons/yr)
Arsenic	2.00E-04 lb/MMCF [d]	4.71E-06	2.06E-05
Beryllium	1.20E-05 lb/MMCF [d]	2.82E-07	1.24E-06
Chromium	1.40E-03 lb/MMCF [d]	3.29E-05	1.44E-04
Cobalt	8.40E-05 lb/MMCF [d]	1.98E-06	8.66E-06
Manganese	3.80E-04 lb/MMCF [d]	8.94E-06	3.92E-05
Nickel	2.10E-03 lb/MMCF [d]	4.94E-05	2.16E-04
Selenium	2.40E-05 lb/MMCF [d]	5.65E-07	2.47E-06
Total HAPs	- -	4.44E-02	1.94E-01
Other Non-HAPs			
Butane	2.10E+00 lb/MMCF [c]	4.94E-02	2.16E-01
Ethane	3.10E+00 lb/MMCF [c]	7.29E-02	3.19E-01
Pentane	2.60E+00 lb/MMCF [c]	6.12E-02	2.68E-01
Propane	1.60E+00 lb/MMCF [c]	3.76E-02	1.65E-01
Barium	4.40E-03 lb/MMCF [d]	1.04E-04	4.53E-04
Copper	8.50E-04 lb/MMCF [d]	2.00E-05	8.76E-05
Molybdenum	1.10E-03 lb/MMCF [d]	2.59E-05	1.13E-04
Vanadium	2.30E-03 lb/MMCF [d]	5.41E-05	2.37E-04
Zinc	2.90E-02 lb/MMCF [d]	6.82E-04	2.99E-03

[a] Emission factors from Chapter 1.4 (Natural Gas Combustion), Table 1.4-2 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, July 1998.

[b] Emission factors from 40 CFR Part 98 Tables C-1 and C-2.

[c] Emission factors from Chapter 1.4 (Natural Gas Combustion), Table 1.4-3 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, July 1998.

[d] Emission factors from Chapter 1.4 (Natural Gas Combustion), Table 1.4-4 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, July 1998.

[e] Emissions of these pollutants are regulated by 40 CFR Part 60, Subpart Ec - *Standards of Performance for New Stationary Sources: Hospital/Medical/Infectious Waste Incinerators* and are accounted for in Table C-1.

[f] CO_2e is carbon dioxide equivalent, calculated according to 40 CFR Part 98 Equation A-1:

$$CO_2e = \sum_{i=1}^{n} GHG_i \times GWP_i$$

where GHG_i = annual mass emissions of greenhouse gas i (metric tons/year)
GWP_i = global warming potential of greenhouse gas i from Table A-1 (below)

Table A-1	
Pollutant	*GWP (100 year)*
CO_2	1
CH_4	25
N_2O	298

[g] Emission calculations are based on the following information:

Unit Parameters	
24.00	MMBtu/hr
1,020	MMBtu/MMCF
23.53	MCF/hr
8,760	hrs/year
206.12	MMCF/year

Table C-3
Stericycle, Inc. - Tooele, UT Facility
Summary of Proposed Emergency Generator Potential to Emit

Pollutant	Emission Factor	Potential to Emit (lb/hr)[a]	Potential to Emit (tons/yr)[b]
Criteria Pollutants			
PM	0.02 g/kW-hr[g]	0.02	3.31E-03
PM_{10}	0.02 g/kW-hr[h]	0.02	3.31E-03
$PM_{2.5}$	0.02 g/kW-hr[h]	0.02	3.31E-03
CO	3.50 g/kW-hr[g]	3.86	0.58
SO_2	8.09E-04 lb/hp-hr[c]	0.54	0.08
NO_X	0.40 g/kW-hr[g]	0.44	0.07
VOC	7.05E-04 lb/hp-hr[c]	0.47	0.07
GHGs			
CO_2e[i]	- -	818.07	122.71
CO_2	73.96 kg CO_2/MMBtu[d]	815.27	122.29
CH_4	3.00E-03 kg CH_4/MMBtu[d]	0.03	4.96E-03
N_2O	6.00E-04 kg N_2O/MMBtu[d]	0.01	9.92E-04
HAPs			
Benzene	7.76E-04 lb/MMBtu[e]	3.88E-03	5.82E-04
Toluene	2.81E-04 lb/MMBtu[e]	1.41E-03	2.11E-04
Xylenes	1.93E-04 lb/MMBtu[e]	9.65E-04	1.45E-04
Formaldehyde	7.89E-05 lb/MMBtu[e]	3.95E-04	5.92E-05
Acetaldehyde	2.52E-05 lb/MMBtu[e]	1.26E-04	1.89E-05
Acrolein	7.88E-06 lb/MMBtu[e]	3.94E-05	5.91E-06
Naphthalene	1.30E-04 lb/MMBtu[f]	6.50E-04	9.75E-05
Acenaphthylene	9.23E-06 lb/MMBtu[f]	4.62E-05	6.92E-06
Acenaphthene	4.68E-06 lb/MMBtu[f]	2.34E-05	3.51E-06
Fluorene	1.28E-05 lb/MMBtu[f]	6.40E-05	9.60E-06
Phenanthrene	4.08E-05 lb/MMBtu[f]	2.04E-04	3.06E-05
Anthracene	1.23E-06 lb/MMBtu[f]	6.15E-06	9.23E-07
Fluoranthene	4.03E-06 lb/MMBtu[f]	2.02E-05	3.02E-06
Pyrene	3.71E-06 lb/MMBtu[f]	1.86E-05	2.78E-06
Benzo(a)anthracene	6.22E-07 lb/MMBtu[f]	3.11E-06	4.67E-07
Chrysene	1.53E-06 lb/MMBtu[f]	7.65E-06	1.15E-06
Benzo(b)fluoranthene	1.11E-06 lb/MMBtu[f]	5.55E-06	8.33E-07
Benzo(k)fluoranthene	2.18E-07 lb/MMBtu[f]	1.09E-06	1.64E-07
Benzo(a)pyrene	2.57E-07 lb/MMBtu[f]	1.29E-06	1.93E-07
Indeno(1,2,3-cd)pyrene	4.14E-07 lb/MMBtu[f]	2.07E-06	3.11E-07
Dibenz(a,h)anthracene	3.46E-07 lb/MMBtu[f]	1.73E-06	2.60E-07
Benzo(g,h,i)perylene	5.56E-07 lb/MMBtu[f]	2.78E-06	4.17E-07
Total HAPs	- -	7.87E-03	1.18E-03
Other Non-HAPs			
Propylene	2.79E-03 lb/MMBtu[e]	0.01	2.09E-03

[a] Short term emission rates calculated assuming that a 500 ekW, 671 HP emergency generator operates at full capacity. Non-criteria pollutants assume a heat input of 5.0 MMBtu per hour of diesel fuel.

[b] Annual emissions calculated assuming 300 hours of operation per year.

[c] Emission factors from Chapter 3.4, Table 3.4-1 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, October 1996. SO_2 emissions were developed using a fuel sulfur content of 0.1%.

[d] Emission factors from 40 CFR Part 98 Tables C-1 and C-2.

[e] Emission factors from Chapter 3.4, Table 3.4-3 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, October 1996.

[f] Emission factors from Chapter 3.4, Table 3.4-4 of U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, October 1996.

[g] Emission factors equivalent to Tier 4 Emission Standards for 450≤kW<560 power rating.

[h] Stericycle conservatively assumes that $PM=PM_{10}=PM_{2.5}$.

[i] CO_2e is carbon dioxide equivalent, calculated according to 40 CFR Part 98 Equation A-1:

$$CO_2e = \sum_{i=1}^{n} GHG_i \times GWP_i$$

where GHG_i = annual mass emissions of greenhouse gas i (metric tons/year)
GWP_i = global warming potential of greenhouse gas i from Table A-1 (below)

Table A-1

Pollutant	*GWP (100 year)*
CO_2	1
CH_4	25
N_2O	298

Table C-4

Stericycle, Inc. - Tooele, UT Facility

Summary of Proposed Potential to Emit Fugitive PM from the Dry Sorbent Silo

Pollutant	Emission Factor	Potential to Emit[c]	
		(lb/hr)	(tons/yr)
Criteria Pollutants			
PM[b]	0.02 gr/dscf[a]	0.11	0.01
PM_{10}[b]	0.02 gr/dscf[a]	0.11	0.01
$PM_{2.5}$[b]	0.02 gr/dscf[a]	0.11	0.01

[a] Engineering estimate.

[b] Stericycle has conservatively assumed that $PM=PM_{10}=PM_{2.5}$.

[c] Emission calculations are based on the following information:

Unit Parameters	
7,000	gr/lb
650	dscfm
60	min/hr
2,000	lbs/ton
100	hrs/year

APPENDIX D
UDAQ FORM 1A (EMISSIONS COMPARISON)

Table D-1
Stericycle, Inc. - Tooele, UT Facility
Summary of Proposed Facility Potential to Emit (NOI Form 1a)

Pollutants	Permitted Emissions (tons/year)		Emissions Increases (tons/year)		Proposed Emissions (tons/year)		Uncontrolled Emissions (tons/year)	
Criteria Pollutants								
PM	0.00		1.94		1.94		41.94	
PM_{10}	0.00		1.94		1.94		41.94	
$PM_{2.5}$	0.00		1.94		1.94		41.94	
CO	0.00		1.93		1.93		1.93	
SO_2	0.00		2.36		2.36		19.57	
NO_X	0.00		28.31		28.31		65.75	
VOC	0.00		1.06		1.06		3.32	
Greenhouse Gases[a]	**Mass Basis**	**CO_2e**	**Mass Basis**	**CO_2e**	**Mass Basis**	**CO_2e**	**Mass Basis**	**CO_2e**
CO_2	0.00	0.00	46,532.14	46,532.14	46,532.14	46,532.14	46,532.14	46,532.14
CH_4	0.00	0.00	12.27	306.81	12.27	306.81	12.27	306.81
N_2O	0.00	0.00	1.60	477.94	1.60	477.94	1.60	477.94
HFCs	N/A		N/A		N/A		N/A	
PFCs	N/A		N/A		N/A		N/A	
SF_6	N/A		N/A		N/A		N/A	
Total HAPs	0.00		2.08		2.08		304.12	
Hydrogen Chloride	0.00		8.15E-01		8.15E-01		3.01E+02	
Dioxins/Furans	0.00		9.90E-07		9.90E-07		1.91E-04	
Lead	0.00		7.24E-05		7.24E-05		6.54E-01	
Cadmium	0.00		1.38E-05		1.38E-05		4.92E-02	
Mercury	0.00		1.38E-04		1.38E-04		6.88E-03	
Chlorine	0.00		9.43E-01		9.43E-01		9.43E-01	
Antimony	0.00		1.36E-03		1.36E-03		1.15E-01	
Arsenic	0.00		1.52E-04		1.52E-04		2.19E-03	
Beryllium	0.00		3.57E-05		3.57E-05		5.74E-05	
Chromium	0.00		5.00E-04		5.00E-04		7.10E-03	
Hydrogen Fluoride	0.00		1.19E-01		1.19E-01		1.34E+00	
Manganese	0.00		5.13E-03		5.13E-03		5.13E-03	
Nickel	0.00		2.77E-03		2.77E-03		5.51E-03	
Total PCBs	0.00		4.18E-04		4.18E-04		4.18E-04	
2-Methylnaphthalene	0.00		2.47E-06		2.47E-06		2.47E-06	
3-Methylchloranthrene	0.00		1.86E-07		1.86E-07		1.86E-07	
7,12-Dimethylbenz(a)anthracene	0.00		1.65E-06		1.65E-06		1.65E-06	
Acenaphthene	0.00		3.70E-06		3.70E-06		3.70E-06	
Acenaphthylene	0.00		7.11E-06		7.11E-06		7.11E-06	
Anthracene	0.00		1.17E-06		1.17E-06		1.17E-06	
Benz(a)anthracene	0.00		6.52E-07		6.52E-07		6.52E-07	
Benzene	0.00		7.98E-04		7.98E-04		7.98E-04	
Benzo(a)pyrene	0.00		3.16E-07		3.16E-07		3.16E-07	
Benzo(b)fluoranthene	0.00		1.02E-06		1.02E-06		1.02E-06	
Benzo(g,h,i)perylene	0.00		5.41E-07		5.41E-07		5.41E-07	
Benzo(k)fluoranthene	0.00		3.49E-07		3.49E-07		3.49E-07	
Chrysene	0.00		1.33E-06		1.33E-06		1.33E-06	
Dibenzo(a,h)anthracene	0.00		3.83E-07		3.83E-07		3.83E-07	
Dichlorobenzene	0.00		1.24E-04		1.24E-04		1.24E-04	
Fluoranthene	0.00		3.33E-06		3.33E-06		3.33E-06	
Fluorene	0.00		9.89E-06		9.89E-06		9.89E-06	
Formaldehyde	0.00		7.79E-03		7.79E-03		7.79E-03	
Hexane	0.00		1.86E-01		1.86E-01		1.86E-01	
Indeno(1,2,3-cd)pyrene	0.00		4.96E-07		4.96E-07		4.96E-07	
Naphthalene	0.00		1.60E-04		1.60E-04		1.60E-04	
Phenanathrene	0.00		3.24E-05		3.24E-05		3.24E-05	
Pyrene	0.00		3.30E-06		3.30E-06		3.30E-06	
Toluene	0.00		5.61E-04		5.61E-04		5.61E-04	
Cobalt	0.00		8.66E-06		8.66E-06		8.66E-06	
Selenium	0.00		2.47E-06		2.47E-06		2.47E-06	
Xylenes	0.00		1.45E-04		1.45E-04		1.45E-04	
Acetaldehyde	0.00		1.89E-05		1.89E-05		1.89E-05	
Acrolein	0.00		5.91E-06		5.91E-06		5.91E-06	

[a] CO_2e is carbon dioxide equivalent, calculated according to 40 CFR Part 98 Equation A-1:

$$CO_2e = \sum_{i=1}^{n} GHG_i \times GWP_i$$

where GHG_i = annual mass emissions of greenhouse gas i (metric tons/year)
GWP_i = global warming potential of greenhouse gas i from Table A-1 (below)

Table A-1	
Pollutant	*GWP (100 year)*
CO_2	1
CH_4	25
N_2O	298

APPENDIX E
SOURCE SIZE DETERMINATION

SOURCE SIZE DETERMINATION

There are three (3) air quality programs under which a facility can be classified as a "major" source:

1. 40 CFR Part 70 and R307-415 – Title V Operating Permit Program
2. 40 CFR §52.21, R307-405, and R307-403 – New Source Review (Prevention of Significant Deterioration and Nonattainment New Source Review)
3. 40 CFR Part 63 – Hazardous Air Pollutants (HAPs)

The following sections address each of the three (3) air quality programs under which a facility can be classified as a major source.

TITLE V OPERATING PERMIT PROGRAM

The Tooele facility will be located in an attainment or unclassifiable area of Tooele County for all pollutants; therefore, the Title V emissions threshold is 100 tons per year of any air pollutant subject to regulation. The Tooele facility will not emit any air pollutants subject to regulation in excess of 100 tons per year, and therefore, will not be considered a major source with respect to the emissions thresholds of the Title V Operating Permit program. However, the Tooele facility will be subject to the Title V Operating Permit Program and Utah's Title V Permit Regulations (R307-415) as a regulated source under 40 CFR Part 60, Subpart Ec pursuant to 40 CFR §60.50c(l). Please see Appendix I for further discussion of the facility's Title V applicability.

NEW SOURCE REVIEW

New Source Review (NSR) permitting requirements potentially apply to new major stationary sources and major modifications to major stationary sources. Within the NSR program, major stationary sources may need to be evaluated for Prevention of Significant Deterioration (PSD) applicability in areas designated as attainment or unclassifiable with respect to the National Ambient Air Quality Standards (NAAQS), and Nonattainment New Source Review (NNSR) applicability in areas designated as nonattainment with respect to the NAAQS. The Tooele facility will be located in an attainment or unclassifiable area of Tooele County; therefore, NNSR requirements do not apply and are not discussed further herein.

A major stationary source with respect to PSD is defined at 40 CFR §52.21(b)(1)(i) as any source with the potential to emit greater than 250 tons per year of any regulated NSR pollutant or any stationary source defined as one of the 28 source categories listed in 40 CFR §52.21(b)(1)(i)(a) with the potential to emit greater than 100 tons per year of any regulated NSR pollutant. Hospital, medical, and infectious waste incineration is not one of the 28 listed source categories; therefore, the Tooele facility will be subject to the 250 tons per year threshold. The Tooele facility will not have the potential to emit more than 250 tons per year of any regulated NSR pollutant; therefore, the facility will not be a major source with respect to PSD. Please see Appendix I for further discussion of PSD and NNSR applicability.

HAZARDOUS AIR POLLUTANTS

A major source of hazardous air pollutants (HAPs) is defined as a source with the facility-wide potential to emit any single HAP of 10 tons per year or more, or with a facility-wide potential to emit total HAPs of 25 tons per year or more. The Tooele facility will not be a major source of HAPs; rather, it will be an area source of HAPs. An area source of HAPs is a source that emits HAPs, but does not qualify as a major source.

APPENDIX F
OFFSET REQUIREMENTS

OFFSET REQUIREMENTS

Parts of Tooele County are classified as nonattainment with respect to the NAAQS for the 2006 24-hour $PM_{2.5}$ standard and for the 1971 SO_2 primary and secondary standards. However, the location of the proposed Tooele facility is not within the nonattainment portions of Tooele County. Therefore, NNSR applicability does not need to be evaluated and offset requirements are not required. Please refer to Figures F-1 and F-2 for maps depicting the location of the Tooele facility with respect to nonattainment areas for pollutants for which Tooele County is in partial nonattainment. Please refer to Appendix I for further discussion.

Figure F-1
Proposed Tooele Facility Location Compared to $PM_{2.5}$ Attainment Status

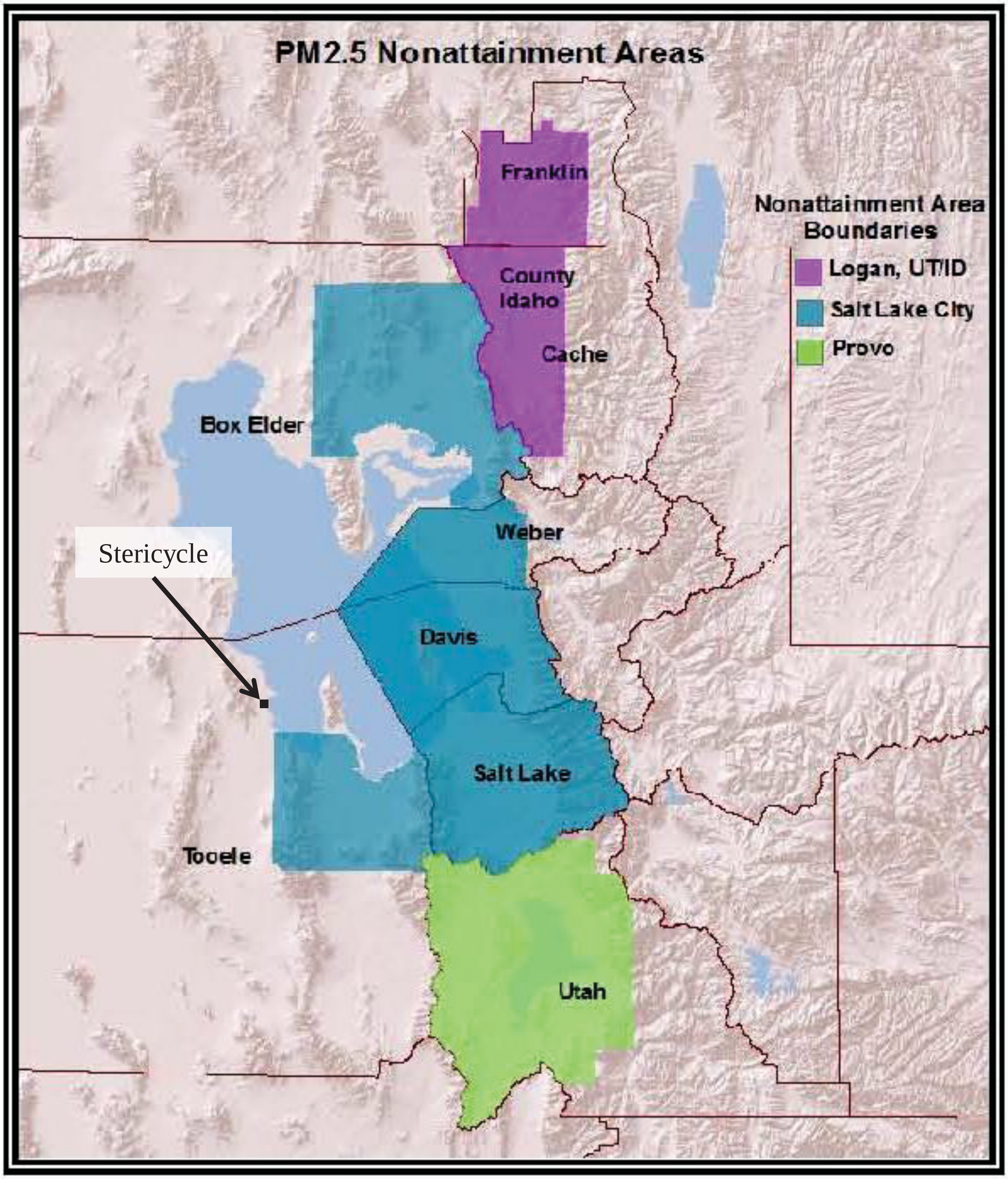
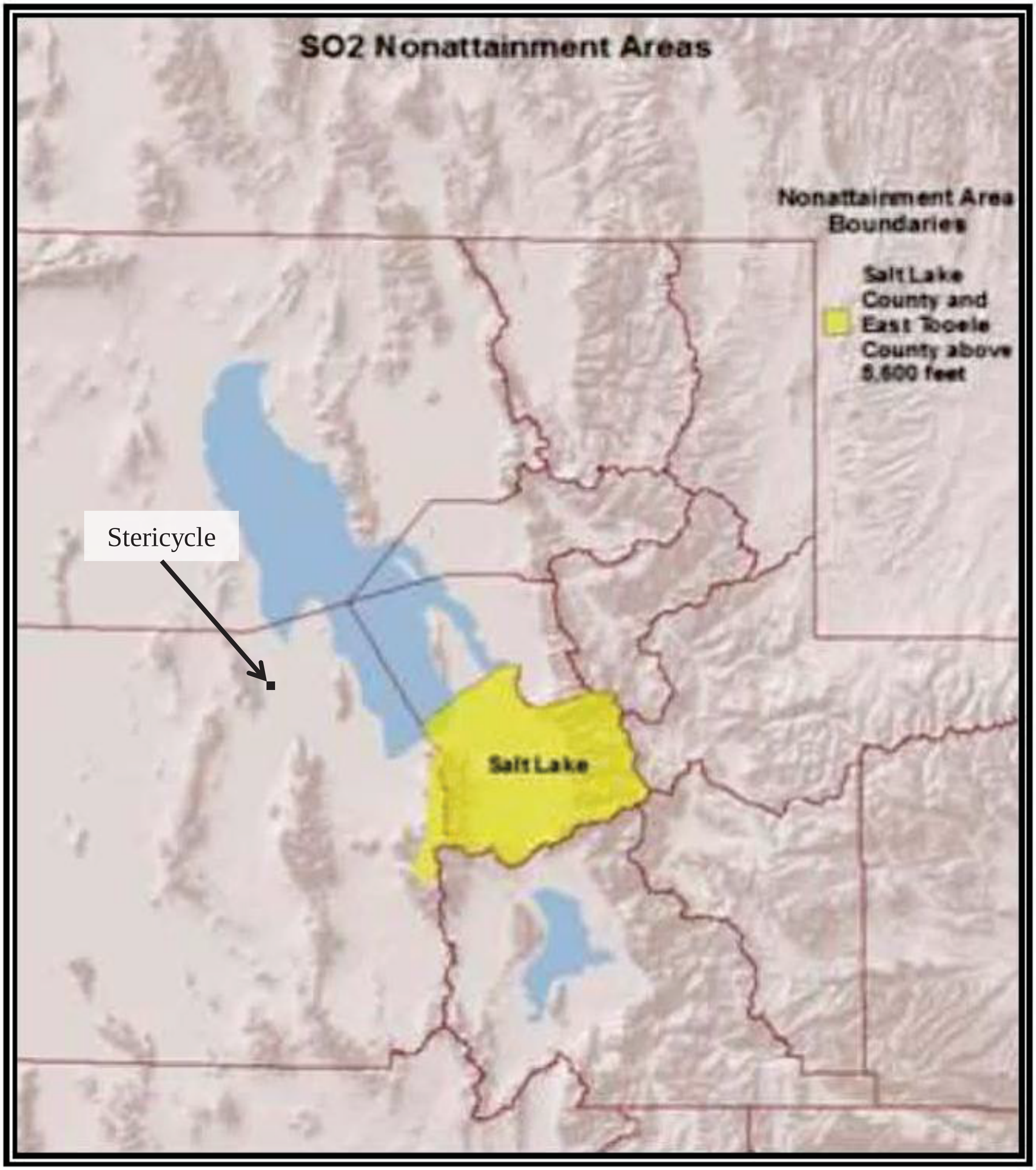


Figure F-2
Proposed Tooele Facility Location Compared to SO_2 Attainment Status



APPENDIX G
BEST AVAILABLE CONTROL TECHNOLOGY (BACT) ANALYSIS

BEST AVAILABLE CONTROL TECHNOLOGY (BACT) ANALYSIS

Pursuant to R307-401-8, permit applicants must demonstrate that the degree of pollution control for emissions, including fugitive emissions and fugitive dust, is at least best available control technology (BACT). Pursuant to R307-401-2:

> *"BACT means an emissions limitation (including a visible emissions standard) based on the maximum degree of reduction for each air contaminant which would be emitted from any proposed stationary source or modification which the director, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR parts 60 and 61. If the director determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results."*

UDAQ guidance recommends that BACT evaluations be completed by evaluating the following five criteria:

1. Energy impacts
2. Environmental impacts
3. Economic impacts
4. Other considerations
5. Cost calculation

Specifically, UDAQ recommends that BACT evaluations be completed using a "top-down" approach. U.S. EPA Guidance further recommends that BACT analyses be conducted using a step-by-step approach, including the following five basic steps:

- <u>Step 1: Identify All Available Control Technologies.</u> Compile all potential control technologies available. The list should not exclude technologies implemented outside of the United States.

- Step 2: Eliminate Technically Infeasible Options. Determine if any of the technologies identified in Step 1 are not technically feasible based on physical, chemical, and engineering principles.

- Step 3: Rank Remaining Control Technologies by Control Effectiveness. Rank the remaining control technologies that were not eliminated in Step 2 in order of most effective (i.e., lowest emission rate) to the least effective (i.e., highest emission rate). Evaluate each technology based on economic, environmental, and energy impacts.

- Step 4: Evaluate Most Effective Controls and Document Results. Objectively evaluate the information developed in Step 3 to determine whether economic, environmental, or energy impacts are sufficient to justify exclusion of the technology. Begin the analysis with the top ranked technology and continue until the technology under consideration cannot be eliminated by any environmental, economic, or energy impacts which justify that the alternative is inappropriate as BACT.

- Step 5: Identify BACT. Select the highest ranked remaining technology as BACT.

Stericycle understands that the use of a Tier 4 engine is considered BACT for emergency generators in Utah. Stericycle's proposed emergency generator will utilize a Tier 4 engine to satisfy BACT; therefore a full BACT evaluation for the engine is not included herein.

A BACT evaluation has been conducted for the proposed HMIWIs. This evaluation is also intended to satisfy the siting requirements contained in 40 CFR Part 60, Subpart Ec. Specifically, a siting analysis is required for new HMIWI pursuant to §60.54c(a), which "shall consider air pollution control alternatives that minimize, on a site-specific basis, to the maximum extent practicable, potential risks to public health or the environment. In considering such alternatives, the analysis may consider costs, energy impacts, non-air environmental impacts, or any other factors related to the practicability of the alternatives." §60.54c(b) goes on to state that "analyses of facility impacts prepared to comply with State, local, or other Federal regulatory requirements may be used to satisfy the requirements of this section, as long as they include the consideration of air pollution control alternatives specified in paragraph (a) of this section." Pursuant to §60.54c(c) and §60.58c(a)(1)(iii), the siting analysis must be submitted "prior to commencement of construction." This evaluation and submittal with the NOI application satisfies the 40 CFR Part 60, Subpart Ec siting requirements.

<u>HMIWIs</u>

Stericycle performed the 5-step BACT evaluation above for each pollutant regulated by 40 CFR Part 60, Subpart Ec for which the proposed air pollution control activities would aid in meeting the emission limitations. Based on this evaluation, Stericycle proposes the following air pollution control strategy to represent BACT, which is consistent with, and in some cases more stringent than, the control technologies identified under 40 CFR Part 60, Subpart Ec. 40 CFR Part 60, Subpart Ec was recently revised in 2009, and therefore reflects a recent determination of what controls are available for HMIWI.

The following description represents the APC equipment configuration for each HMIWI. The first control system is the selective non-catalytic reduction (SNCR) system. SNCR reagent (i.e., ammonia, urea, or equivalent) is injected into the secondary chamber exhaust gas to control NO_X emissions. The exhaust gas will then enter a waste heat boiler and subsequent evaporative cooler to reduce the flue gas temperature prior to the fabric filter (baghouse) further downstream. Steam generated by the waste heat boiler will be utilized to condition the gas stream throughout the APC system and for other ancillary equipment as needed throughout the facility. Upon exiting the evaporative cooler, carbon will be injected to help control and remove CDD/CDF and mercury from the flue gas. Dry sorbent injection (DSI) (i.e., sodium bicarbonate, lime, or equivalent) will also be utilized to neutralize the flue gas. After the baghouse, the flue gas will enter the wet gas absorber, where it will come in direct contact with recirculated scrubber liquor. The pH of the scrubber liquor will be monitored and an alkali reagent (i.e., sodium hydroxide or equivalent) will be injected as necessary to maintain the pH of the liquor so as to ensure the absorption of acid gases. A carbon bed (or equivalent) system will be utilized downstream of the wet gas absorber as a polishing mercury and CDD/CDF control prior to venting to the atmosphere via a single stack. Please refer to Appendix H for additional information on the APC system.

Stericycle's complete BACT determination is summarized below. Control technologies are presented in the order in which they will be configured in practice. Each pollutant that is controlled by a given technology is identified in the table below.

Air Pollution Control Technology	Pollutant(s) Controlled								
	CO	NO_X	Hg	CDD/ CDF	HCl	SO_2	PM	Pb	Cd
Good combustion practices	X	X	X	X			X	X	X
SNCR		X							
Carbon injection			X	X					
Dry sorbent injection (dry scrubber)					X	X			
Baghouse (fabric filter)			X	X	X	X	X	X	X
Wet gas absorber*					X	X			
Carbon bed (or equivalent) system			X	X					

* 40 CFR Part 60, Subpart Ec refers generally to "wet scrubbers" as a means for controlling emissions. Stericycle will employ a wet gas absorber, a type of wet scrubber specifically designed for controlling emissions of acid gases. Other types of wet scrubbers, such as wet venturi scrubbers, are used for controlling emissions of particulate matter.

The controls selected to represent BACT will limit the emissions of a given pollutant to the corresponding emission limitation established in 40 CFR Part 60, Subpart Ec. The supporting BACT evaluation for each pollutant is presented in the following sections.

NITROGEN OXIDES (NO_X)

Nitrogen oxides (NO_X) are a product of combustion and can be minimized through post-combustion control technologies.

The following sections present Stericycle's BACT evaluation for controlling emissions of NO_X.

Step 1 – Identify All Available Control Technologies

Stericycle has identified the following potential technologies for controlling emissions of NO_X:

1. Good combustion practices
2. Selective catalytic reduction
3. Selective non-catalytic reduction
4. Wet scrubbing
5. Process design

Step 2 – Eliminate Technically Infeasible Options

The next step in the top-down analysis is to evaluate the technical feasibility of each of the identified control options. Each of the potential control technologies considered is described below along with a discussion of the technical feasibility with respect to controlling emissions of NO_X.

1. Good combustion practices

Good combustion practices serve to increase efficiency of the combustion process which, in turn, reduces the emissions of NO_X by minimizing incomplete combustion. Based on Stericycle experience at other similar facilities, minimizing NO_X while simultaneously minimizing CO through good combustion practices causes operational problems. Therefore, Stericycle has eliminated good combustion practices as a technically feasible option for NO_X control.

2. Selective catalytic reduction

Selective catalytic reduction (SCR) utilizes a reagent (i.e., ammonia, urea, or equivalent) in conjunction with a catalyst to convert NO_X to N_2 and H_2O. Stericycle has identified SCR as a technically feasible option for NO_X control.

3. Selective non-catalytic reduction

Selective non-catalytic reduction (SNCR) utilizes reagent (i.e., ammonia, urea, or equivalent) injection into the flue gas to convert NO_X to N_2 and H_2O. Stericycle has identified SNCR as a technically feasible option for NO_X control.

4. Wet scrubbing

Wet scrubbing controls NO_X by bringing the flue gas into contact with a scrubbing liquid. Stericycle has identified wet scrubbing as a technically feasible option for NO_X control.

5. Process design

Stericycle evaluated the feasibility of different process designs such as flue gas recycle and/or control of waste feed composition to control emissions of NO_X. However, flue gas recycle is known to cause corrosion in the system. Additionally, Stericycle is not able to further control the waste feed composition since operator safety requirements do not allow waste to be sorted once it reaches the facility. Stericycle has therefore eliminated process design as a technically feasible option for NO_X control.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

Based on the reasons outlined in the above discussion, Stericycle has identified the following technologies as technically feasible, ranked in order of most effective to least effective.

1. Selective catalytic reduction
2. Wet scrubbing
3. Selective non-catalytic reduction

Step 4 – Evaluate Most Effective Controls and Document Results

This section provides Stericycle's evaluation of the technically feasible control technologies above for economic, environmental, or energy impacts that are sufficient to justify exclusion of the technology.

1. Selective catalytic reduction

Stericycle expects the use of SCR to result in an annualized cost of approximately \$22,900 per ton of NO_X controlled for each HMIWI unit. This cost includes catalyst replacement, labor, energy use, etc., as well as additional natural gas usage to achieve the required flue gas temperature. SCR would additionally require a capital investment of approximately \$2,160,000, which includes the cost of ID fan and absorber upgrades.

Stericycle believes that the economic impact for SCR is sufficiently high to justify exclusion of the technology, and has therefore eliminated SCR as a viable option for NO_X control. Please refer to Table G-1 for additional cost evaluation details.

2. Wet Scrubbing

Stericycle expects the use of wet scrubbing to result in an annualized cost of approximately $23,800 per ton of NO_X controlled for each HMIWI unit. This cost includes reagent, labor, energy use, etc. Wet scrubbing is the most complex of the possible control options and would require significant operator labor. Due to the high potential for CO_2 absorption, wet scrubbing would require large quantities of reagent to control NO_X. Wet scrubbing would additionally require a capital investment of approximately $1,200,000. Stericycle believes that the economic impact for wet scrubbing is sufficiently high to justify exclusion of the technology, and has therefore eliminated wet scrubbing as a viable option for NO_X control. Please refer to Table G-2 for additional cost information.

3. Selective non-catalytic reduction

Stericycle expects the use of SNCR to result in an annualized cost of approximately $2,600 per ton of NO_X controlled for each HMIWI unit. This cost includes reagent, labor, energy use, etc. SNCR would additionally require a capital investment of approximately $37,000. Stericycle does not foresee any other economic, environmental, or energy impacts regarding SNCR that are sufficient to justify exclusion of the technology. Therefore, Stericycle has identified SNCR as a viable option for NO_X control. Please refer to Table G-3 for additional cost evaluation details.

Step 5 – Identify BACT

Based on the above analysis, Stericycle proposes BACT for NO_X emissions to be the use of SNCR.

Table G-1
STERICYCLE, INC.
Control Cost Evaluation (one HMIWI)
Selective Catalytic Reduction (SCR)

CAPITAL COSTS

	COST ITEM	COST FACTOR		COST ($)
Direct Capital Costs				
	Purchased Equipment Costs			
(a)	SCR System and installation, including ammonia storage system and catalyst			$1,008,400
(c)	ID Fan and Absorber Upgrades			$150,000
	Purchased Equipment Subtotal		*A*	*$1,158,400*
(b)	Sales Tax	0.047	A	$54,444.80
(b)	Freight	0.05	A	$57,920.00
(a)	Site Improvements			$25,000
	Total Direct Capital Cost		***B***	***$1,295,765***
Indirect Costs (Installation)				
(b)	General Facilities	0.05	B	$64,788
(b)	Engineering Fees	0.10	B	$129,576
(b)	Process Contingency	0.05	B	$64,788
(b)	Construction and field expenses	0.10	B	$129,576
(b)	Contractor fees	0.10	B	$129,576
(b)	Start-up	0.01	B	$12,958
(b)	Performance test	0.01	B	$12,958
	Total Indirect Installation Costs		***IDC***	***$544,221***
(b)	Project Contingency	0.15	(B + IDC)	$275,998
(b)	Total Plant Cost		B+IDC+Proj. Cont.	$2,115,984
(b)	Preproduction Cost	0.02	(Total Plant Cost)	$42,320
(a)	Inventory Capital		$Vol_{reagent}$ * $Cost_{reagent}$	$600
Total Capital Investment			***TCI***	***$2,158,904***

ANNUALIZED COSTS

	COST ITEM	COST FACTOR		UNIT COST		ANNUAL COST ($)
Direct Annual Costs						
	Operating Labor					
(c)(d)	Labor, one employee	200	hours/year	$20.00	per hour	$4,000
	Maintenance					
(b)(d)	Maintenance Labor and Materials	0.015	TCI			$32,384
(a)(d)	Catalyst Replacement and Disposal	0.02	(Equip. Subtotal)			$23,168
(c)(d)	Ammonia Reagent, 29%	80,000	lbs	$0.26	per lb	$20,800
	Utilities					
(a)(d)	Electricity	207,692	kWh	$0.08	per kWh	$16,200
(a)(d)	Natural Gas for Flue Gas Reheat	26,809	MMBtu	$6.80	per MMBtu	$182,300
	Total Direct Annual Costs			***DAC***		***$278,852***
Indirect Annual Costs						
(b)	Overhead	60%	of sum of Operating Labor and Maintenance Costs			$48,211
(b)	Administrative charges	2%	of TCI			$43,178
(b)	Property taxes	1%	of TCI			$21,589
(b)	Insurance	1%	of TCI			$21,589
(b)	Capital recovery factor	0.087	CRF x TCI			$188,223
	Expected lifetime of equipment:		20 years at	6.0%	interest	
	Total Indirect Annual Costs			***IDAC***		***$322,790***
Total Annualized Cost				DAC+IDAC		***$601,642***
Cost Effectiveness ($/ton)						
	Control efficiency:	80%				
	Potential NO_X Emissions:	32.84	tpy	Total Annual Costs/Controlled NO_X Emissions:		
	Controlled NO_X Emissions:	26.27	tpy			***$22,902***

[a] Based on vendor estimate.
[b] Based on OAQPS Cost Control Manual, Sixth Edition, January 2002.
[c] Cost information provided by Stericycle, Inc.
[d] Based on 8,760 hours of operation per year.

Table G-2
STERICYCLE, INC.
Control Cost Evaluation (one HMIWI)
Wet Scrubbing

CAPITAL COSTS

	COST ITEM	COST FACTOR		COST ($)
Direct Capital Costs				
Purchased Equipment Costs				
(a)	Equipment and ID fan		*A*	$542,000
(b)	Instrumentation	0.10 A		$54,200
(b)	Sales Tax	0.047 A		$25,474
(b)	Freight	0.05 A		$27,100
	Total Purchased Equipment Cost		*B*	*$648,774*
Direct Installation Costs				
(c)	Installation			$162,194
Site Preparation				
(c)	Site Improvements			$100,000
(a)	Chemical Storage			$50,000
Total Direct Capital Cost			***DC***	***$960,968***
Indirect Costs				
(b)	Engineering	0.10 B		$64,877
(b)	Construction and field expenses	0.10 B		$64,877
(b)	Contractor fees	0.10 B		$64,877
(b)	Start-up	0.01 B		$6,488
(b)	Performance test	0.01 B		$6,488
(b)	Contingencies	0.03 B		$19,463
(a)	Inventory Capital			$18,406
Total Indirect Costs			***IC***	***$245,477***
Total Capital Investment			***TCI***	***$1,206,444***

ANNUALIZED COSTS

	COST ITEM	COST FACTOR	UNIT COST	ANNUAL COST ($)
Direct Annual Costs				
Operating Labor				
(c)(d)	Operator	2000 hours/year	$20.00 per hour	$40,000
Maintenance				
(c)(d)	Maintenance Labor and Material	0.02 A		$10,840
(a)(d)	Chemical Reagents			$154,777
Utilities				
(c)(d)	Electricity	689,848 kWh/yr	$0.08 per kWh	$54,498
(c)(d)	Purge Water and Disposal	200 kgal	$100.00 per kgal	$20,040
Total Direct Annual Costs			***DAC***	***$280,155***
Indirect Annual Costs				
(b)	Overhead	60% of sum of Operating Labor and Maintenance Costs		$135,394
(b)	Administrative charges	2% of TCI		$24,129
(b)	Property taxes	1% of TCI		$12,064
(b)	Insurance	1% of TCI		$12,064
(b)	Capital recovery	Capital recovery factor 0.103		$124,219
	Expected lifetime of equipment:	15 years at	6.0% interest	
Total Indirect Annual Costs			***IDAC***	***$307,871***
Total Annual Cost			DAC+IDAC	***$588,026***
Cost Effectiveness ($/ton)				
	Control efficiency:	75%		
	Potential NO_X Emissions:	32.84 tpy	Total Annual Costs/Controlled NO_X Emissions:	
	Controlled NO_X Emissions:	24.63 tpy		***$23,876***

(a) Based on vendor estimate.
(b) Based on OAQPS Cost Control Manual, Sixth Edition, January 2002.
(c) Cost information provided by Stericycle, Inc.
(d) Based on 8,760 hours of operation per year.

Table G-3
STERICYCLE, INC.
Control Cost Evaluation (one HMIWI)
Selective Non-Catalytic Reduction (SNCR)

CAPITAL COSTS

	COST ITEM	COST FACTOR		COST ($)
Direct Capital Costs				
Purchased Equipment Costs				
(a)	SNCR ammonia-based system including storage and delivery		***A***	$20,000
(b)	Sales Tax	0.047 A		$940
(b)	Freight	0.05 A		$1,000
Total Direct Capital Cost			***B***	***$21,940***
Indirect Costs (Installation)				
(b)	General Facilities	0.05 B		$1,097
(b)	Engineering Fees	0.10 B		$2,194
(b)	Process Contingency	0.05 B		$1,097
(b)	Construction and field expenses	0.10 B		$2,194
(b)	Contractor fees	0.10 B		$2,194
(b)	Start-up	0.01 B		$219
(b)	Performance test	0.01 B		$219
Total Indirect Installation Costs			***IDC***	***$9,215***
(b)	Project Contingency	0.15 (B + IDC)		$4,673
(b)	Total Plant Cost	B+IDC+Proj. Cont.		$35,828
(b)	Preproduction Cost	0.02 (Total Plant Cost)		$717
(a)	Inventory Capital	$Vol_{reagent} * Cost_{reagent}$		$600
Total Capital Investment			***TCI***	***$37,145***

ANNUALIZED COSTS

	COST ITEM	COST FACTOR		UNIT COST		ANNUAL COST ($)
Direct Annual Costs						
Operating Labor						
(c)(d)	Labor, one employee	200	hours/year	$20.00	per hour	$4,000
Maintenance						
(b)(d)	Maintenance Labor and Materials	0.015	TCI			$557
(a)(d)	Ammonia reagent, 29%	80,000	lbs	$0.26	per lb	$20,800
Utilities						
(a)(d)	Electricity	53,215	kWh	$0.08	per kWh	$4,204
Total Direct Annual Costs				***DAC***		***$29,561***
Indirect Annual Costs						
(b)	Overhead	60%	of sum of Operating Labor and Maintenance Costs			***$15,214***
(b)	Administrative charges	2%	of TCI			***$743***
(b)	Property taxes	1%	of TCI			***$371***
(b)	Insurance	1%	of TCI			***$371***
(b)	Capital recovery factor	0.087	CRF x TCI			***$3,238***
	Expected lifetime of equipment:		20 years at	6.0%	interest	
Total Indirect Annual Cost				***IDAC***		***$19,939***
Total Annual Cost				DAC+IDAC		***$49,500***
Cost Effectiveness ($/ton)						
	Control efficiency:	57%				
	Potential NO_X Emissions:	32.84	tpy	Total Annual Costs/Controlled NO_X Emissions:		
	Controlled NO_X Emissions:	18.72	tpy			***$2,645***

[(a)] Based on vendor estimate.
[(b)] Based on OAQPS Cost Control Manual, Sixth Edition, January 2002.
[(c)] Cost information provided by Stericycle, Inc.
[(d)] Based on 8,760 hours of operation per year.

CARBON MONOXIDE (CO)

Carbon monoxide (CO) is a product of combustion, and the primary means for minimizing emissions of CO is through combustion control. Add-on controls, such as CO oxidation catalysts, are typically only effective for large emitters, such as turbines and power producers, and as such have not been applied to HMIWIs in practice.

The following sections present Stericycle's BACT evaluation for controlling emissions of CO.

Step 1 – Identify All Available Control Technologies

Stericycle has identified the following potential technologies for controlling emissions of CO:

1. Good combustion practices
2. CO oxidation catalysts

Step 2 – Eliminate Technically Infeasible Options

The next step in the top-down analysis is to evaluate the technical feasibility of each of the identified control options. Each of the potential control technologies considered is described below along with a discussion of the technical feasibility with respect to controlling emissions of CO.

1. Good Combustion Practices

Good combustion practices serve to increase efficiency of the combustion process which, in turn, reduces the emissions of CO by minimizing incomplete combustion. Stericycle has identified good combustion practices as a technically feasible option for CO control.

2. CO Oxidation Catalysts

CO oxidation catalysts provide add-on control for CO emissions are typically only effective for large emitters of CO such as turbines and power producers. CO catalysts have not been employed in practice in the HMIWI arena. Because CO catalysts have never been applied to HMIWIs and because the uncontrolled CO mass emissions are already very low based on the emission standard (11 ppmdv, corrected to 7% O_2) and limited exhaust gas volumetric flow rate, CO catalysts have been eliminated as a technically feasible option for CO control.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

Based on the reasons outlined in the above discussion, Stericycle has identified the following technology as the only technically feasible option.

1. Good combustion practices

Step 4 – Evaluate Most Effective Controls and Document Results

Since Stericycle plans to utilize good combustion practices, the most effective control method for controlling CO emissions, further evaluation is not necessary.

Step 5 – Identify BACT

Based on the above analysis, Stericycle proposes BACT for CO emissions to be good combustion practices.

PARTICULATE MATTER (PM/PM_{10}/$PM_{2.5}$), LEAD (PB), CADMIUM (CD), AND PARTICULATE MERCURY (HG)

Particulate matter (PM/PM_{10}/$PM_{2.5}$) is a product of combustion and can be minimized through both combustion control and add-on controls. Lead, cadmium, and particulate-phase mercury are constituents of particulate matter that can similarly be minimized through combustion control and add-on controls. Control of gaseous or vapor-phase mercury, which represents a very small percentage of total particulate matter, is addressed in a separate section.

The following sections present Stericycle's BACT evaluation for controlling emissions of PM, lead, cadmium, and particulate-phase mercury.

Step 1 – Identify All Available Control Technologies

Stericycle has identified the following potential technologies for controlling emissions of PM, lead, cadmium, and particulate-phase mercury:

1. Good combustion practices
2. Fabric filter (baghouse)
3. Electrostatic precipitator (ESP)
4. Wet venturi scrubber
5. Cyclone/multiclone

Step 2 – Eliminate Technically Infeasible Options

The next step in the top-down analysis is to evaluate the technical feasibility of each of the identified control options. Each of the potential control technologies considered is described below along with a discussion of the technical feasibility with respect to controlling emissions of PM, lead, cadmium, and particulate-phase mercury.

1. Good Combustion Practices

Good combustion practices serve to increase efficiency of the combustion process which, in turn, reduces the emissions of particulate matter by minimizing incomplete combustion. Stericycle has identified good combustion practices as a technically feasible option for PM, lead, cadmium, and particulate-phase mercury control.

2. Fabric Filter (Baghouse)

A fabric filter (baghouse) utilizes specially designed bags to capture particulate and heavy metals emissions as the gas passes through the bags. Control efficiency increases as particulate matter accumulates on the outside of the filter bags. Stericycle has identified a fabric filter as a technically feasible option for PM, lead, cadmium, and particulate-phase mercury control.

3. Electrostatic Precipitator (ESP)

An ESP utilizes the force of an induced electrical charge in order to remove particles from the gas stream. Stericycle has identified an ESP as a technically feasible option for PM, lead, cadmium, and particulate-phase mercury control.

4. Wet Venturi Scrubber

A wet venturi scrubber utilizes a specially designed duct shape in conjunction with a scrubbing liquid which contacts the gas stream and removes the pollutants from it. Stericycle has identified a wet venturi scrubber as a technically feasible option for PM, lead, cadmium, and particulate-phase mercury control.

5. Cyclone/Multiclone

A cyclone/multiclone removes PM from the gas stream by rotating the gas at speeds that allow gravity to push the PM to the outside and drop out. Stericycle has identified a cyclone as a technically feasible option for PM, lead, cadmium, and particulate-phase mercury control.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

Based on the reasons outlined in the above discussion, Stericycle has identified the following technologies as technically feasible, ranked in order of most effective to least effective.

1. Good combustion practices
2. Fabric filter (baghouse)
3. Electrostatic precipitator (ESP)
4. Wet venturi scrubber
5. Cyclone/multiclone

Step 4 – Evaluate Most Effective Controls and Document Results

This section provides Stericycle's evaluation of the technically feasible control technologies above for economic, environmental, or energy impacts that are sufficient to justify exclusion of the technology. Stericycle plans to utilize good combustion practices and a fabric filter (baghouse). Stericycle believes that the most effective control methods for PM, lead, cadmium, and particulate-phase mercury emissions are being proposed and that further evaluation is not necessary.

Step 5 – Identify BACT

Based on the above analysis, Stericycle proposes BACT for PM, lead, cadmium, and particulate-phase mercury emissions to be the combination of good combustion practices, followed by a fabric filter (baghouse).

GASEOUS OR VAPOR-PHASE MERCURY

Emissions of mercury can occur in a gaseous or a particulate matter form. Control of particulate-phase mercury was addressed in the previous section. The following sections present Stericycle's BACT analysis for controlling emissions of gaseous mercury.

Step 1 – Identify All Available Control Technologies

Stericycle has identified the following potential technologies for controlling emissions of gaseous mercury:

1. Carbon injection
2. Carbon bed (or equivalent) system
3. Wet scrubbing

Step 2 – Eliminate Technically Infeasible Options

The next step in the top-down analysis is to evaluate the technical feasibility of each of the identified control options. Each of the potential control technologies considered is described below along with a discussion of the technical feasibility with respect to controlling emissions of gaseous mercury.

1. Carbon Injection

Carbon injection involves injecting activated carbon into the gas stream in order to adsorb the gaseous mercury. Carbon provides additional surface area for adsorption of gaseous mercury. The activated carbon/mercury is collected later in the process on the outside of the fabric filter. Stericycle has identified carbon injection as a technically feasible option for gaseous mercury control, and must be applied in conjunction with a fabric filter for dry particulate matter control (i.e., fabric filter).

2. Carbon Bed (or equivalent) System

A carbon bed (or equivalent) system utilizes activated carbon as an adsorption source to control the emissions of gaseous mercury. A carbon bed (or equivalent) system is most effective when processing a "clean" gas stream, that is, after it the gas stream has been processed by a scrubber and/or particulate matter control device. Stericycle has identified a carbon bed (or equivalent) system as a technically feasible option for gaseous mercury control.

3. Wet Scrubbing

Wet scrubbing utilizes a scrubbing liquid which contacts the gas stream and remove the pollutants from it. Stericycle has identified wet scrubbing as a technically feasible option for gaseous mercury control.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

Based on the reasons outlined in the above discussion, Stericycle has identified the following technologies as technically feasible, ranked in order of most effective to least effective.

1. Carbon injection
2. Carbon bed (or equivalent) system
3. Wet scrubbing

Step 4 – Evaluate Most Effective Controls and Document Results

This section provides Stericycle's evaluation of the technically feasible control technologies above for economic, environmental, or energy impacts that are sufficient to justify exclusion of the technology. Since Stericycle plans to utilize carbon injection with a fabric filter and a carbon bed (or equivalent) system, the two most effective control methods for gaseous mercury emissions, further evaluation is not necessary.

Step 5 – Identify BACT

Based on the above analysis, Stericycle proposes BACT for gaseous mercury emissions to be carbon injection with a fabric filter and a carbon bed (or equivalent) system.

SULFUR DIOXIDE (SO_2) AND HYDROGEN CHLORIDE (HCL)

Sulfur dioxide (SO_2) and hydrogen chloride (HCl) are acid gases that result from the combustion of sulfur and chlorine contained in the waste, respectively. The following sections present Stericycle's BACT analysis for controlling emissions of SO_2 and HCl.

Step 1 – Identify All Available Control Technologies

Stericycle has identified the following potential technologies for controlling emissions of SO_2:

1. Dry scrubber/fabric filter
2. Wet gas absorber

Step 2 – Eliminate Technically Infeasible Options

The next step in the top-down analysis is to evaluate the technical feasibility of each of the identified control options. Each of the potential control technologies considered is described below along with a discussion of the technical feasibility with respect to controlling emissions of SO_2 and HCl.

1. Dry Scrubber/Fabric Filter

A dry scrubber utilizes the injection of dry sorbent (i.e., sodium bicarbonate, lime, or equivalent) prior to a fabric filter, such that the sorbent collects on the outside of the fabric filter bags and creates a "cake" through which acid gases pass and are neutralized. Stericycle has identified dry scrubbing as a technically feasible option for SO_2 and HCl control.

2. **Wet Gas Absorber**

A wet gas absorber utilizes a caustic scrubbing liquid which contacts the gas stream and neutralizes the acid gases. Stericycle has identified a wet gas absorber as a technically feasible option for SO_2 and HCl control.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

Based on the reasons outlined in the above discussion, Stericycle has identified the following technologies as technically feasible, ranked in order of most effective to least effective.

1. Dry scrubber/fabric filter
2. Wet gas absorber

Step 4 – Evaluate Most Effective Controls and Document Results

This section provides Stericycle's evaluation of the technically feasible control technologies above for economic, environmental, or energy impacts that are sufficient to justify exclusion of the technology. Stericycle plans to inject dry sorbent with a fabric filter and utilize a wet gas absorber. This combined train of dry sorbent injection followed by a fabric filter followed by a wet gas absorber represents the most effective control methods for SO_2 and HCl, and therefore further evaluation is not necessary.

Step 5 – Identify BACT

Based on the above analysis, Stericycle proposes BACT for SO_2 and HCl emissions to be dry sorbent injection followed by a dry scrubber/fabric filter in series with a wet gas absorber.

DIOXINS/FURANS (CDD/CDF)

CDD/CDF are a product of incomplete combustion and are also dependent on the chlorine content of the waste combusted. The 3-T Rule (i.e., time, temperature, and turbulence) is a fundamental principal of all regulated waste combustion sectors and has proven that combustion technology is an effective means to reduce CDD/CDF emissions. Combustion temperature appears to be the primary driver in minimizing CDD/CDF formation. HMIWIs operate at high temperatures where CDD/CDF is destroyed.

The following sections present Stericycle's BACT analysis for controlling emissions of CDD/CDF.

Step 1 – Identify All Available Control Technologies

Stericycle has identified the following potential technologies for controlling emissions of CDD/CDF:

1. Good combustion practices
2. Carbon bed (or equivalent) system
3. Carbon injection
4. Fabric filter (baghouse) with catalyst-impregnated bags
5. Fabric filter (baghouse)
6. Wet scrubbing

Step 2 – Eliminate Technically Infeasible Options

The next step in the top-down analysis is to evaluate the technical feasibility of each of the identified control options. Each of the potential control technologies considered is described below along with a discussion of the technical feasibility with respect to controlling emissions of CDD/CDF.

1. Good Combustion Practices

Good combustion practices serve to increase efficiency of the combustion process which, in turn, reduces the emissions of CDD/CDF by minimizing incomplete combustion. In addition, good combustion practices enable a unit to better practice the 3-T Rule. Stericycle has identified good combustion practices as a technically feasible option for CDD/CDF control.

2. Carbon Bed (or equivalent) System

A carbon bed (or equivalent) system utilizes activated carbon as an adsorption source to control the emissions of CDD/CDF. Stericycle has identified a carbon bed (or equivalent) system as a technically feasible option for CDD/CDF control.

3. Carbon Injection

Carbon injection involves injecting activated carbon into the gas stream in order to adsorb CDD/CDF that may be formed. The activated carbon that may bind with CDD/CDF is collected later in the process by the particulate control device (i.e., fabric filter). Stericycle has identified carbon injection as a technically feasible option for CDD/CDF control.

4. Fabric Filter (Baghouse) with Catalyst-Impregnated Bags

A fabric filter (baghouse) with catalyst-impregnated bags utilizes specially designed bags entrained with a catalyst to capture particulate matter emissions, including activated carbon containing adsorbed CDD/CDF, as the gas passes through. The inlet temperature to the bags is monitored and maintained to reduce the reformation of CDD/CDF in the gas stream. Stericycle has identified a fabric filter with catalyst-impregnated bags as a technically feasible option for CDD/CDF control.

5. Fabric Filter (Baghouse)

A fabric filter (baghouse) utilizes specially designed bags to capture particulate matter emissions, including activated carbon containing adsorbed CDD/CDF, as the gas passes through. The inlet temperature to the bags is monitored and maintained to reduce the reformation of CDD/CDF in the gas stream. Stericycle has identified a fabric filter as a technically feasible option for CDD/CDF control.

6. Wet Scrubbing

Wet scrubbing utilizes a caustic scrubbing liquid which contacts the gas stream and remove the pollutants from it. Stericycle has identified wet scrubbing as a technically feasible option for CDD/CDF control.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

Based on the reasons outlined in the above discussion, Stericycle has identified the following technologies as technically feasible, ranked in order of most effective to least effective.

1. Good combustion practices
2. Carbon injection
3. Carbon bed (or equivalent) system
4. Fabric filter (baghouse) with catalyst-impregnated bags
5. Fabric filter (baghouse)
6. Wet scrubbing

Step 4 – Evaluate Most Effective Controls and Document Results

This section provides Stericycle's evaluation of the technically feasible control technologies above for economic, environmental, or energy impacts that are sufficient to justify exclusion of the technology. Stericycle plans to utilize good combustion practices, carbon injection with a fabric filter, and a carbon bed (or equivalent) system. These controls account for the three most effective control methods for CDD/CDF and four out of the top five. However, Stericycle has conservatively included a cost evaluation for the use of catalyst-impregnated bags in the fabric filter. Stericycle expects the use of catalyst-impregnated bags to result in an annualized cost of over $280,000,000 per ton of CDD/CDF controlled. Since Stericycle already plans to utilize a fabric filter which will incur capital and operational costs, this cost conservatively reflects only the need to replace the catalyst-impregnated bags once per year in order to maintain effectiveness. Stericycle believes that the economic impact for catalyst-impregnated bags is sufficiently high to justify exclusion of the technology, and has therefore eliminated catalyst-impregnated bags as a viable option for CDD/CDF control. Please refer to Table G-4 for additional cost evaluation details.

Step 5 – Identify BACT

Based on the above analysis, Stericycle proposes BACT for CDD/CDF emissions to be good combustion practices, carbon injection, followed by a fabric filter and a carbon bed (or equivalent) system.

Table G-4
STERICYCLE, INC.
Control Cost Evaluation (one HMIWI)
Fabric Filter with Catalyst-Impregnated Bags

CAPITAL COSTS

	COST ITEM	COST FACTOR			COST ($)
Direct Capital Costs					
Purchased Equipment Costs					
(c)	Bags, Instrumentation, Sales Tax, Freight				$0
Total Direct Capital Cost				***A***	***$0***
Direct Costs (Installation)					
(b)	Foundations and supports	0.04	A		$0
(b)	Handling and Erection	0.50	A		$0
(b)	Electrical	0.08	A		$0
(b)	Piping	0.01	A		$0
(b)	Insulation	0.07	A		$0
(b)	Painting	0.04	A		$0
Total Direct Installation Costs				***B***	***$0***
Indirect Costs					
(b)	Engineering	0.10	B		$0
(b)	Construction and Field Expenses	0.20	B		$0
(b)	Contractor Fees	0.10	B		$0
(b)	Start-up	0.01	B		$0
(b)	Performance Test	0.01	B		$0
(b)	Contingencies	0.03	B		$0
Total Indirect Cost					***$0***
Total Capital Investment				***TCI***	***$0***

ANNUALIZED COSTS

	COST ITEM	COST FACTOR		UNIT COST		ANNUAL COST ($)
Direct Annual Costs						
Operating Labor						
(c)	Labor, one employee	0	hours/year	$20.00	per hour	$0
Maintenance						
(c)	Maintenance Labor and Materials	0	hours/year	$30.00	per hour	$0
Replacement Costs						
(c)	Bag Cost	1	replacement/year	$20,000	per replacement	$20,000
(c)	Bag Replacement Labor	48	hours/year	$75.00	per hour	$3,600
Utilities						
(c)	Electricity	0	kWh	$0.08	per kWh	$0
Waste Disposal						
(c)	Bag Disposal - Hazardous Waste	120	bags	$2,000.00	per ton	$3,600
		30	lbs/bag			
Total Direct Annual Costs				***DAC***		***$27,200***
Indirect Annual Costs						
(b)	Capital recovery factor	1.100				
	Expected lifetime of equipment:	1	year at	10.0%	interest	
Total Indirect Annual Cost		CRF x TCI		***IDAC***		***$0***
Total Annual Cost				DAC+IDAC		***$27,200***

Cost Effectiveness ($/ton) [d]

Control efficiency:	99%		
Potential CDD/CDF Emissions:	9.55E-05	tpy	Total Annual Costs/Controlled CDD/CDF Emissions:
Controlled CDD/CDF Emissions:	9.45E-05	tpy	***$287,693,691***

[a] Based on vendor estimate.
[b] Based on OAQPS Cost Control Manual, Sixth Edition, January 2002.
[c] Cost information provided by Stericycle, Inc.
[d] Costs are conservatively based solely on the use of catalyst-impregnated bags instead of the non-catalyst-impregnated bags in the fabric filter.

APPENDIX H
CONTROL DEVICE INFORMATION (INCLUDING UDAQ FORMS 5, 9, AND 10)

CONTROL DEVICE INFORMATION

The following description represents the APC equipment configuration for each HMIWI. The first control system is the selective non-catalytic reduction (SNCR) system. SNCR reagent (i.e., ammonia, urea, or equivalent) is injected into the secondary chamber exhaust gas to control NO_X emissions. The exhaust gas will then enter a waste heat boiler and subsequent evaporative cooler to reduce the flue gas temperature prior to the fabric filter (baghouse) further downstream. Steam generated by the waste heat boiler will be utilized to condition the gas stream throughout the APC system and for other ancillary equipment as needed throughout the facility. Upon exiting the evaporative cooler, carbon will be injected to help control and remove CDD/CDF and mercury from the flue gas. Dry sorbent injection (DSI) (i.e., sodium bicarbonate, lime, or equivalent) will also be utilized to neutralize the flue gas. After the baghouse, the flue gas will enter the wet gas absorber, where it will come in direct contact with recirculated scrubber liquor. The pH of the scrubber liquor will be monitored and an alkali reagent (i.e., sodium hydroxide or equivalent) will be injected as necessary to maintain the pH of the liquor so as to ensure the absorption of acid gases. A carbon bed (or equivalent) system will be utilized downstream of the wet gas absorber as a polishing mercury and CDD/CDF control prior to venting to the atmosphere via a single stack.

Stericycle has completed UDAQ Form 5 (Adsorption Unit) for the carbon bed (or equivalent) system, Form 9 (Scrubbers & Wet Collectors) for the wet gas absorber, and Form 10 (Fabric Filters) for the baghouse.

Please refer to Appendix A for further information specific to the proposed facility configuration.

Utah Division of Air Quality
New Source Review Section

Form 5
Adsorption Unit

Company Stericycle
Site/Source Tooele County, Utah
Date February 2015

Equipment Information

1. Name of control device: Carbon Bed or equivalent	2. Manufacturer: TBD Model no. TBD
3. Provide diagram of unit: See Figure A-1	4. Type of air contaminant controlled: Hg and CDD/CDF

Gas Stream Characteristics

5. Components: Mole % A. N2 — 64.4 B. O2 — 8.6 C. CO2 — 6.7 D. H2O — 20.3	6. Total flow rate (acfm): Design maximum: ~10,000 Average expected: ~8,400
7. Gas stream temperature (°F): Inlet ~140-170 Outlet ~140-170	8. Pressure drop across unit: (inch H_2O Gauge) ~2

Adsorbent Characteristics

9. Material to be adsorbed (chemical name of adsorbate): Hg and CDD/CDF		10. Type of adsorbent: Sulfur-impregnated carbon	
11. Number of beds per unit: 2	12. Weight of adsorbent per bed: 5000 lb.	13. Bed depth (ft): 0.92	14. Bed volume (ft^3): 145
15. Saturation Capacity of Pollutant on adsorbent (supply units): Approx. 20% by weight		16. Length of mass transfer zone (inches): 11" per bed	

Regenerative Systems

17. Type of regeneration: ☒ Replacement ☐ Steam ☐ Other specify

18. Method of regeneration:
- ☐ Alternate use of ____ entire units
- ☒ Alternate use of 1 beds in a single unit
- ☐ Source shut down
- ☐ Other: Describe

Average Operation of Source	Maximum Operation of Source
19. Time on line before regeneration: Min/bed TBD	21. Time on line before regeneration: Min/bed TBD
20. Efficiency of adsorber: % Stericycle will comply with Subpart Ec emission limits	22. Efficiency of adsorber: % Stericycle will comply with Subpart Ec emission limits

Emissions Calculations (PTE)

23. Calculated emissions for this device

See Appendix C

Submit calculations as an appendix. If other pollutants are emitted, include the emissions in the appendix.

Instructions

NOTE: 1. **<u>Submit this form in conjunction with Form 1 and Form 2.</u>**
2. Call the Division of Air Quality (DAQ) at **(801) 536-4000** if you have problems or questions in filling out this form. Ask to speak with a New Source Review engineer. We will be glad to help!

1. Supply the name of the control equipment.
2. Indicate the manufacturer and the model number of the equipment.
3. Supply an assembly drawing showing all the duct work and its connection to the vapor absorber and any pre-cleaners. Show duct work from adsorber units and auxiliary equipment, including final vent. Show all of the following details which apply:
   a. Sizes and shapes of all hoods.
   b. Diameters or cross-sectional dimensions and lengths of all branch and main ducts.
   c. Locations, sizes and shapes of all bends, junctions and transition pieces.
   d. Locations, sizes and shapes of all passageways other than ordinary ducts. Also show all cooling devices (spray chambers, heat exchangers, cool columns, etc.)
   e. Locations and descriptions of all dampers, baffles and similar controls.
   f. Locations, sizes and shapes of any by-passes around the control equipment. Describe how operated, stating under what conditions and for what lengths of time these by-passes are used.
4. List the type of contaminant that the system is used to control.
5. Supply the components of the gas stream including mole percent.
6. Indicate the gas stream flow rates at design maximum and average.
7. Indicate what the gas stream temperature is when it enters and exits the unit.
8. What is the design pressure drop across the unit?
9. What chemical will be adsorbed?
10. Indicate the material which will be adsorbing the chemical.
11. Indicate the number of beds of adsorbent in each unit.
12. Indicate the weight of the adsorbent in each unit.
13. How deep is each bed of adsorbent?
14. How many cubic feet of adsorbent is in each bed?
15. Indicate the saturation capacity of pollutant on the adsorbent.
16. How long is the mass transfer zone?
17. Indicate how the regeneration of the adsorbent is done.
18. Indicate the method of regeneration.
19. Supply the time on line before regeneration occurs during the average operation of the source.
20. Supply the efficiency of the adsorber during average operation of the source.
21. Supply the time on line before regeneration occurs during maximum operation of the source.
22. Supply the efficiency of the adsorber during maximum operation of the source.
23. Supply calculations for all criteria pollutants and HAPs. Use AP42 or Manufacturers data to complete your calculations.

Utah Division of Air Quality
New Source Review Section

Company Stericycle
Site/Source Tooele County, Utah
Date February 2015

Form 9
Scrubbers & Wet Collectors

Equipment Information

1. Provide diagram of internal components (attachment)
See Figure A-1

2. Manufacturer: TBD
Model no. TBD

3. Date installed: TBD

4. Emission Equipment served: HMIWI

5. Type of pollutant(s) controlled:
- Particulate (type) ______
- SO_x S02
- Odor ______
- Other HCl

6. Type of Scrubber:
- ☒ Spray Chamber
- ☐ Venturi
- ☐ Cyclone
- ☒ Packed Tower Type
- ☐ Orifice
- ☐ Mechanical

7. Gas Stream Characteristics

Flow rate (acfm)		Gas Stream Temperature (°F)		Particulate Grain Loading (grains/scf)	
Design Maximum	Average Expected	Inlet	Outlet	Inlet	Outlet
~11,600	~8,500	~325 - 400	~130	N/A	N/A

8. Particulate size: N/A microns (mean geometric diameter)

Scrubbing Liquid Characteristics

9. Scrubbing Liquid NaOH or equivalent
PH ______ Range 4 - 8

	Composition	Wt. %
1.	NaCl, NaSO4	10
2.	NaOF	Negligible
3.		
4.		
5.		
6.		

10. Liquid Injection Rate (gpm)

Design Maximum	Average Expected
~200	~100-200

11. Pressure at Spray Nozzle: N/A (psia)

12. Pressure Drop thru Scrubber N/A (inches of water)

Data for Venturi Scrubber N/A

13. Throat Dimensions (Specify Units)

14. Throat Velocity (ft/sec)

Data for Packed Towers

15. Type of Packing
TriPack

16. Superficial Gas Velocity through Bed

Form 9 Scrubbers & Wet Collectors - Continued

Data Stack/Exhaust Exit

17. Height: ______feet N/A	18. Temperature of exhaust stream: ~100-150 °F	19. Inside dimensions: N/A ______feet diameter or ______feet x ______feet

20. Monitoring Equipment Stericycle will monitor liquor pH and liquor recirculation flow rate. Operating parameters will be determined during performance testing.

Type	Manufacturer	Model	Range	Units
Gas Pressure	N/A	N/A	N/A	inches of water column
Water Flow	TBD	TBD	TBD	gallons per minute
Water Pressure	N/A	N/A	N/A	pounds per square inch

Settling Ponds N/A

21. Dimensions of settling pond: Width: Length: Depth:	22. Flow rate through settling pond: 23. Residence time of water in pond:

Emissions Calculations (PTE)

24. Calculated emissions for this device

See Appendix C

Submit calculations as an appendix.

Instructions – Form 9 Scrubbers & Wet Collectors

NOTE: 1. **<u>Submit this form in conjunction with Form 1 and Form 2.</u>**
2. Call the Division of Air Quality (DAQ) at **(801) 536-4000** if you have problems or questions in filling out this form. Ask to speak with a New Source Review engineer. We will be glad to help!

1. Supply an assembly drawing, dimensioned and to scale of the interior dimensions and features of the equipment. Please include inlet and outlet liquid and gas flow directions and temperatures, and demister section.
2. Specify the manufacturer and model number of equipment.
3. Please indicate the date that the equipment was installed.
4. Specify what type of equipment or process the scrubber is being used for.
5. Specify what pollutant is being controlled by the scrubber/wet collector.
6. Specify the type of scrubber.
7. Supply the specifications for the gas stream including the flow rate at the design maximum and expected average, inlet and outlet temperatures, and particulate grain loading at inlet and outlet.
8. Supply the particulate mean geometric diameter.
9. Supply the composition of the scrubbing liquid used in the equipment.
10. Indicate what the liquid injection rate is for the design maximum and the expected average in gallons per minute.
11. Indicate the pressure at the spray nozzle.
12. Identify what the pressure drop through the scrubber is.
13. Indicate what the throat dimensions are for a venturi scrubber.
14. Indicate what the throat velocity is for a venturi scrubber.
15. Indicate what the type of packing is in a packed tower.
16. Specify what the gas velocity is through the bed in a packed tower.
17. Indicate what the stack height is of the scrubber.
18. Indicate the temperature of the exhaust gas.
19. Supply the inside dimensions of the stack.
20. Supply specifications of any monitoring equipment which is used in the system.
21. Specify the dimensions of the settling pond.
22. Indicate the flow rate of the water through the settling pond.
23. Supply the residence time of the water in the settling pond.
24. Supply calculations for all criteria pollutants and HAPs. Use AP42 or Manufacturers data to complete your calculations.

Utah Division of Air Quality
New Source Review Section

Form 10
Fabric Filters (Baghouses)

Company Stericycle
Site/Source Tooele County, Utah
Date February 2015

Baghouse Description

1. Briefly describe the process controlled by this baghouse:
HMIWI

Gas Stream Characteristics

2. Flow Rate (acfm):		3. Water Vapor Content of Effluent Stream (lb. water/lb. dry air)	4. Particulate Loading (grain/scf)	
Design Max	Average Expected		Inlet	Outlet
~13,800	~11,500	~0.10 - 0.20	0.25	<0.005

5. Pressure Drop (inches H_2O)	6. Gas Stream Temperature (°F):	7. Fan Requirements (hp) (ft^3/min)
High 7.5 Low 1	~350	N/A

Equipment Information and Filter Characteristics

8. Manufacturer and Model Number: TBD

9. Bag Material:	10. Bag Diameter (in.)	11. Bag Length (ft.)	12. Number of Bags:	13. Stack Height
☐ Nomex nylon ☐ Polyester ☐ Acrylics ☒ Fiber glass ☐ Cotton ☐ Teflon ☒ Other - TBD	6.25	16.7	120	N/A feet Stack Inside Diameter N/A inches
	14. Filtering Efficiency Rating: >99 %	15. Air to Cloth Ratio: 3.4 : 1	16. Hours of Operation: Max Per day 24 Max Per year 8,760	17. Cleaning Mechanism: ☐ Reverse Air ☐ Shaker ☒ Pulse Jet ☐ Other:

Emissions Calculations (PTE)

18. Calculated emissions for this device

See Appendix C

Submit calculations as an appendix.

Instructions - Form 10 Fabric Filters (Baghouses)

NOTE:

1. **Submit this form in conjunction with Form 1 and Form 2.**
2. Call the Division of Air Quality (DAQ) at **(801) 536-4000** if you have problems or questions in filling out this form. Ask to speak with a New Source Review engineer. We will be glad to help!

1. Describe the process equipment that the filter controls, what product is being controlled, particle size data (if available), i.e., cement silo, grain silo, nuisance dust in work place, process control with high dust potential, etc.
2. The *maximum* and *design* exhaust gas flow rates through the filter control device in actual cubic feet per minute (ACFM). Check literature or call the sales agent.
3. The water/moisture content of the gas stream going through the filter.
4. The amount of particulate in the gas stream going into the filter and the amount coming out if available. Outlet default value = 0.016 grains PM_{10}/dscf.
5. The pressure drop range across the system. Usually given in the literature in inches of water.
6. The temperature of the gas stream entering the filter system in degrees Fahrenheit.
7. The horse power of the fan used to move the gas stream and/or the flow rate of the fan in ft^3/min.
8. Name of the manufacturer of the filter equipment and the model number if available.
9. Check the type of filter bag material or fill in the blank. Check literature or call the sales agent.
10. The diameter of the bags in the system. Check literature or call the sales agent.
11. The length of the bags in the system. Check literature or call the sales agent.
12. The number of bags. Check literature or call the sales agent.
13. The height to the top of the stack from ground level and the stack inside diameter.
14. The filtering efficiency rating that the manufacturer quotes. Check literature or call the sales agent.
15. The ratio of the flow rate of air to the cloth area (A/C).
16. The number of hours that the process equipment is in operation, maximum per day and per year.
17. The way in which the filters bags are cleaned. Check the appropriate box.
18. Supply calculations for all criteria pollutants and HAPs. Use AP42 or Manufacturers data to complete your calculations.

APPENDIX I
FEDERAL/STATE REQUIREMENT APPLICABILITY

FEDERAL/STATE REQUIREMENT APPLICABILITY

Stericycle reviewed the Federal and State of Utah air quality regulations to determine which regulations could potentially apply to the proposed project. Specifically, the following sections summarize only those air regulations that potentially could be triggered by the proposed construction of the Tooele facility.

FEDERAL REGULATIONS

For the purpose of this application, potentially applicable Federal regulations are defined as:

- New Source Review (NSR)
- New Source Performance Standards (NSPS) and Emissions Guidelines
- National Emission Standards for Hazardous Air Pollutants (NESHAP)
- Compliance Assurance Monitoring (CAM)
- GHG Tailoring Rule
- Risk Management Plan Requirements

A discussion of each specific Federal requirement is addressed in the subsections below.

New Source Review (NSR)

New Source Review (NSR) permitting requirements potentially apply to new major stationary sources and major modifications to major stationary sources. Within the NSR program, major stationary sources may need to be evaluated for Prevention of Significant Deterioration (PSD) applicability in areas designated as attainment or unclassifiable with respect to the National Ambient Air Quality Standards (NAAQS), and Nonattainment New Source Review (NNSR) applicability in areas designated as nonattainment with respect to the NAAQS.

Tooele County is classified as attainment or unclassifiable with respect to the NAAQS for NO_2, CO, PM, PM_{10}, annual $PM_{2.5}$, and ozone. Therefore, the proposed project must be evaluated for PSD applicability for those pollutants. Parts of Tooele County are classified as nonattainment with respect to the NAAQS for the 2006 24-hour $PM_{2.5}$ standard and the 1971 SO_2 primary and secondary standards. However, the location of the proposed Tooele facility is not within the nonattainment portions of Tooele County. Therefore, NNSR applicability does not need to be evaluated and $PM_{2.5}$ and SO_2 will be included as part of the PSD applicability evaluation. Please refer to Figures F-1 and F-2 for maps depicting the location of the Tooele facility with respect to nonattainment areas for pollutants for which Tooele County is in partial nonattainment.

A major stationary source is defined at 40 CFR §52.21(b)(1)(i) as any source with the potential to emit greater than 250 tons per year of any regulated NSR pollutant or any stationary source defined as one of the 28 source categories listed in 40 CFR §52.21(b)(1)(i)(a) with the potential to emit greater than 100 tons per year of any regulated NSR pollutant.

Stericycle will not be a major stationary source as defined in 40 CFR §52.21(b)(1)(i). As a result of this PSD applicability evaluation, NSR regulations do not apply to the proposed project.

New Source Performance Standards (NSPS) and Emission Guidelines (EG)

U.S. EPA has promulgated standards of performance and emission guidelines for specific sources of air pollution at 40 CFR Part 60. Stericycle's two proposed HMIWI units will be subject to 40 CFR Part 60, Subpart Ec (Standards of Performance for New Stationary Sources: Hospital/Medical/Infectious Waste Incinerators) as amended on October 6, 2009. Stericycle intends to comply with the rule upon startup.

40 CFR Part 60, Subpart Ce (Emission Guidelines and Compliance Times for Hospital/Medical/Infectious Waste Incinerators) is intended to direct states in developing their own State Plans for existing HMIWI facilities and is not directly applicable to HMIWI.

40 CFR Part 62, Subpart HHH (Federal Plan Requirements for Hospital/Medical/Infectious Waste Incinerators Constructed on or Before December 1, 2008) applies to existing facilities in States without a U.S. EPA-approved State Plan. Since the Tooele facility will commence construction after December 1, 2008, the proposed HMIWI units will not be subject to 40 CFR Part 62, Subpart HHH.

The proposed emergency generator will be subject to 40 CFR Part 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition (CI) Internal Combustion Engines) pursuant to the applicability criteria of 40 CFR §60.4200(a)(2)(i) for stationary CI engines that commenced construction after July 11, 2005 and were manufactured on or after April 1, 2006. Specifically, the emergency generator will be subject to the emission standards codified at 40 CFR §60.4205(b), which references engine manufacturer emission limits in 40 CFR §60.4202. The engine associated with the emergency generator is rated at 500 kW (671 HP) and will meet U.S. EPA Tier 4 standards.

National Emissions Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAP) promulgated prior to the Clean Air Act Amendments (CAAA) of 1990, found at 40 CFR Part 61, apply to specific compounds emitted from specific processes. There are no promulgated Part 61 requirements that apply to the proposed project.

NESHAP promulgated under 40 CFR Part 63, also referred to as Maximum Achievable Control Technology (MACT) standards, apply to specific source categories that are considered area sources or major sources of hazardous air pollutants (HAP). A major source of HAP is defined as a source with the facility-wide potential to emit any single HAP of 10 tons per year or more, or with a facility-wide potential to emit total HAP of 25 tons per year or more. The Tooele facility will not be a major source of HAPs; rather, it will be an area source of HAP.

Stericycle's proposed emergency generator will be subject to 40 CFR Part 63, Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE)), commonly referred to as the RICE MACT. The rule applies to both area sources and major sources of HAP emissions.

Pursuant to 40 CFR §63.6590(a)(2)(iii), the proposed emergency generator will be an affected source classified as a new stationary RICE because it will be located at an area source of HAP and construction will have commenced on or after June 12, 2006. However, pursuant to 40 CFR §63.6590(c)(1), the proposed emergency generator satisfies all requirements of Subpart ZZZZ by meeting the requirements of 40 CFR Part 60 Subpart IIII. Therefore, no further requirements apply for such engines under 40 CFR Part 63, Subpart ZZZZ.

Compliance Assurance Monitoring (CAM)

Compliance Assurance Monitoring (CAM), promulgated under 40 CFR Part 64, applies to certain pollutant-specific emissions units at Title V facilities that utilize a control device to reduce uncontrolled emission rates greater than 100 tons per year in order to comply with an applicable emissions limit. 40 CFR §64.2(b) identifies exemptions from the requirements for any emission limitation or standards proposed by the Administrator after November 15, 1990 pursuant to Section 111 or 112 of the Act (the NSPS and NESHAP requirements). Controlled emissions from the HMIWI units are regulated pursuant to 40 CFR 60, Subpart Ec, which was proposed after November 15, 1990; therefore, the HMIWI units are exempt from developing a CAM Plan for the pollutants regulated under Subpart Ec.

Greenhouse Gas Tailoring Rule

This section provides a discussion of the potential permitting requirements pursuant to the PSD and Title V Greenhouse Gas (GHG) Tailoring Rule (75 Fed. Reg. 31514, June 3, 2010). This final rule, which became effective on August 2, 2010, sets the timing and establishes thresholds for addressing GHG emissions from stationary sources under the CAA permitting programs.

The Tooele facility will be subject to the Title V Operating Permit program due to being subject to U.S. EPA's HMIWI NSPS at 40 CFR Part 60, Subpart Ec. However, the facility will not have the potential to emit more than 100,000 tons per year of CO_2 equivalent (CO_2e) emissions; therefore, GHGs are not subject to regulation as defined in 40 CFR §70.2 and there are no Title V requirements applicable to GHGs.

Pursuant to a July 24, 2014 memo from U.S. EPA, PSD requirements are not applicable due to emissions of GHGs alone. As discussed in Appendix E, this facility is not a major source with respect to PSD, and further, the facility will not emit a significant amount of GHGs; therefore, PSD requirements are not applicable.

Risk Management Plan Requirements

Risk Management Plan (RMP) requirements apply to an owner or operator of a stationary source that has more than a threshold quantity of a regulated substance in a process, as determined under §68.115. Stericycle does not expect to operate any processes that contain or process chemicals that meet the minimum threshold quantities to subject the facility to the rule.

STATE OF UTAH AIR QUALITY REGULATIONS

For the purpose of this application, potentially applicable Utah regulations are defined as:

- R307-201 – Emission Standards: General Emission Standards
- R307-203 – Emission Standards: Sulfur Content of Fuels
- R307-205 – Emission Standards: Fugitive Emissions and Fugitive Dust
- R307-210 – Stationary Sources
- R307-214 – National Emission Standards for Hazardous Air Pollutants (NESHAP)
- R307-220 – Emission Standards: Plan for Designated Facilities
- R307-222 – Emission Standards: Existing Incinerators for Hospital, Medical, Infectious Waste
- R307-401 – Permits: New and Modified Sources
- R307-403 – Permits: New and Modified Sources in Nonattainment Areas and Maintenance Areas
- R307-415 – Permits: Operating Permit Requirements

A discussion of each specific Utah requirement is addressed in the subsections below.

R307-201 – Emission Standards: General Emission Standards

R307-201 establishes emission standards for all areas of the state except for sources listed in Section IX, Part H of the state implementation plan or located in a PM_{10} nonattainment or maintenance area. R307-201 will apply to the Tooele facility since it is not a listed source and is not located in a PM_{10} nonattainment or maintenance area.

R307-203 – Emission Standards: Sulfur Content of Fuels

R307-203-1 establishes a maximum sulfur level limitation of 0.85 lb/MMBtu (gross) heat input for any oil burned in any fuel burning or process installation not covered by New Source Performance Standards for sulfur emissions. R307-203-1 will apply to the proposed diesel-fired emergency generator.

R307-205 – Emission Standards: Fugitive Emissions and Fugitive Dust

R307-205 establishes minimum work practices and emission standards for sources of fugitive emissions and fugitive dust for sources located in all areas in the state except those listed in Section IX, Part H of the state implementation plan or located in a PM_{10} nonattainment or maintenance area. R307-205 will apply to the fugitive emissions sources at the Tooele facility (i.e., dry sorbent silo loading).

R307-210 – Standards of Performance for New Stationary Sources (NSPS)

R307-210 incorporates the Federal New Source Performance Standards (NSPS) at 40 CFR Part 60 including 40 CFR Part 60, Subpart Ec (Standards of Performance for New Stationary Sources: Hospital/Medical/Infectious Waste Incinerators). As discussed above in the Federal regulation applicability, the proposed HMIWI units will be subject to Subpart Ec upon startup.

R307-210 also incorporates 40 CFR Part 60, Subpart IIII. As discussed above in the Federal regulation applicability, the proposed emergency generator will be subject to Subpart IIII.

R307-214 – National Emissions Standards for Hazardous Air Pollutants

R307-214 incorporates the Federal National Emissions Standards for Hazardous Air Pollutants (NESHAP) and Maximum Achievable Control Technology (MACT) standards. As discussed above in the Federal regulation applicability, the emergency generator will be subject to 40 CFR Part 63, Subpart ZZZZ.

R307-220 – Emission Standards: Plan for Designated Facilities

R307-220 incorporates by reference the Utah State Plan for HMIWI. The Tooele facility HMIWI units will not be subject to the Utah State Plan for HMIWI since they commenced construction after December 1, 2008. Instead, the HMIWI units will be subject to 40 CFR Part 60, Subpart Ec (Standards of Performance for New Stationary Sources: Hospital/Medical/Infectious Waste Incinerators).

R307-222 – Emission Standards: Existing Incinerators for Hospital, Medical, Infectious Waste

R307-222 establishes emission standards for existing HMIWIs. However, the Tooele facility HMIWI units will not be subject to R307-222 since they commenced construction after December 1, 2008 as per R307-222-1(2). Instead, the HMIWI units will be subject to 40 CFR Part 60, Subpart Ec (Standards of Performance for New Stationary Sources: Hospital/Medical/Infectious Waste Incinerators).

R307-401 – Permits: New and Modified Sources

R307-401 establishes the application and permitting requirements for new installations and modifications to existing installations throughout the State of Utah. This application is being submitted in accordance with R307-401-5 (Notice of Intent).

R307-403 – Permits: New and Modified Sources in Nonattainment Areas and Maintenance Areas

R307-403 applies to the construction or major modification of major stationary sources of air pollution emissions located within any area that has been identified as not meeting a national ambient air quality standard for the pollutant for which the source is major. The Tooele facility will be located in an attainment or unclassifiable area of Tooele County; therefore, R307-403 (NNSR requirements) does not apply.

R307-415 – Permits: Operating Permit Requirements

This rule establishes an air quality permitting program as required under Title V of the Clean Air Act Amendments of 1990 and 40 CFR Part 70. The Tooele facility will emit less than 100 tons per year for all pollutants and will therefore not be a major source with respect to the emissions thresholds of the Title V Operating Permit program. However, pursuant to 40 CFR §60.50c(l), the Tooele facility will be required to operate under a Title V permit issued under a U.S. EPA-approved operating permit program. Therefore, Stericycle will be subject to the Title V requirements and will operate pursuant to a Title V Operating Permit. Pursuant to R307-415-5a(1)(a), the Tooele facility will apply for the Title V operating permit within one (1) year of becoming subject to the Title V permit program.

APPENDIX J
EMISSIONS IMPACT ASSESSMENT

EMISSIONS IMPACT ASSESSMENT

The following sections describe Stericycle's approach for performing the Emissions Impact Assessment.

CRITERIA POLLUTANTS

New sources in an attainment area whose total controlled emission increase levels are greater than the thresholds listed in Table 1 of R307-410-4 are required to submit a dispersion modeling analysis for criteria pollutants as part of a complete NOI application. As presented in Table J-1, the proposed Tooele facility will not have the potential to emit pollutants in excess of the thresholds listed in Table 1 of R307-410-4; therefore, dispersion modeling of criteria pollutant impacts is not required.

HAZARDOUS AIR POLLUTANTS (HAPS)

Pursuant to R307-410-5, the Tooele facility is required to provide documentation of increases of hazardous air pollutants (HAPs) which includes the estimated maximum short-term (i.e., pounds per hour) emission rate increase from each affected installation, the type of release, the maximum release duration in minutes per hour, the release height measured from the ground, the height of any adjacent building or structure, the shortest distance between the release point and any area defined as "ambient air" under 40 CFR §50.1(e), and the emission threshold value.

The emission threshold value is calculated to be the applicable threshold limit value (TLV) on a time-weighted average or a ceiling basis multiplied by the appropriate emission threshold factor listed in Table 2 of R307-410-5. Stericycle utilized UDAQ's emission threshold value spreadsheet to complete this evaluation. As presented in Table J-2, the proposed Tooele facility will not have the potential to emit HAPs at a rate equal to or greater than the corresponding emissions threshold values; therefore, dispersion modeling of HAP impacts is not required.

Table J-1
Stericycle, Inc. - Tooele, UT Facility
Criteria Pollutant Modeling Threshold Evaluation

Pollutant[a]	Emission Threshold Value[a] (tons/yr)	Facility-Wide Maximum Annual Emissions (tons/yr)	Modeling Requirement
PM_{10} - fugitive emissions	5	0.01	No
PM_{10} - non-fugitive emissions	15	1.93	No
CO	100	1.93	No
SO_2	40	2.36	No
NO_2	40	28.31	No
Lead	0.6	7.24E-05	No

[a] Emission thresholds are displayed pursuant to R307-410-4.

Table J-2
Stericycle, Inc. - Tooele, UT Facility
HAP Modeling Threshold Evaluation

Pollutant[a]	Emission Threshold Value[b] (lb/hr)	Facility-Wide Maximum Short-Term Emissions (lb/hr)	Modeling Requirement
Acetaldehyde	13.96	1.26E-04	No
Acrolein	0.07	3.94E-05	No
Formaldehyde	0.11	2.16E-03	No
Hydrogen Chloride	0.92	0.19	No
Hydrogen fluoride (Hydrofluoric acid)	0.51	0.03	No
m-Xylenes	0.03	9.65E-04	No
Arsenic Compounds (inorg. incl. arsinec)	3.68E-03	3.46E-05	No
Benzene (incl.benzene for gas)	0.59	3.93E-03	No
Beryllium Compounds	1.84E-05	8.15E-06	No
Cadium Compounds	2.46E-04	3.14E-06	No
Chromium Compounds	1.23E-03	1.14E-04	No
Nickel Compounds	1.23E-02	6.32E-04	No
Antimony Compounds	0.18	3.10E-04	No
Chlorine	0.53	0.22	No
Cobalt Compounds	7.36E-03	1.98E-06	No
1,4-Dichlorobenzene(p)	22.13	2.82E-05	No
Hexane	64.86	0.04	No
Manganese Compounds	0.07	1.17E-03	No
Mercury Compounds	3.68E-03	3.14E-05	No
Naphthalene	19.29	6.64E-04	No
Polychlorinated biphenyls (Aroclors)	0.18	9.53E-05	No
Selenium Compounds	0.07	5.65E-07	No
Toluene	27.73	1.49E-03	No
Xylenes (isomers and mixture)	159.78	9.65E-04	No

[a] Pollutants identified are from the list of pollutants provided by the Utah Division of Air Quality in the *2014 ACGIH - TLVs and UDAQ - TSLs and ETVs* spreadsheet. Only pollutants that are potentially emitted by the facility are included in this table.

[b] Emission thresholds are obtained from the Utah Division of Air Quality in the 2014 ACGIH - TLVs and UDAQ - TSLs and ETVs spreadsheet and are based on Stericycle's design plan for vertical, unrestricted stack(s) greater than 100 meters away from the property line.