PINEWOOD SITE LEACHATE TREATMENT SYSTEM PERMIT APPLICATION
PINEWOOD SITE CUSTODIAL TRUST – PINEWOOD, SC

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Pinewood Site Custodial Trust

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1. EXECUTIVE SUMMARY

The Pinewood Site (the “Site”) is a closed Resource Conservation and Recovery Act (RCRA) permitted hazardous waste Treatment, Storage and Disposal Facility (TSDF) located outside of Pinewood, Sumter County, South Carolina. The Site was operated by Safety-Kleen (and prior to that Laidlaw/GSX) under EPA ID SCD070375985. Activities on-Site included solidification/stabilization and land disposal. Waste types included acidic/corrosives, metals, solvents, and halogenated organics. The Site reportedly began operations in the 1970s and closure of the final landfill cell began in 2004. Currently the only wastes managed on the Site include leachate, leachate derived wastes, and wastes generated from on-Site activities.

The Pinewood Site Custodial Trust (the “Trust”) is a private trust that owns the Pinewood Site. The Trust is proposing to construct a new on-Site system for treatment of leachate produced by the landfill cells at the Site. The proposed project will consist of metals precipitation, a filter press, an evaporator, and sludge and slurry dryers. Estimates of potential emissions from the Site following construction and operation of the proposed leachate treatment system do not exceed the major source thresholds of 100 tons per year for the Title V operating permit program (Regulation 61-62.70) or the Prevention of Significant Deterioration (PSD) program. Therefore, the Site will be classified as a minor source with regards to Title V and PSD permitting applicability.

The Trust requests that a state permit authorizing the construction and operation of the proposed leachate treatment system be issued under the provisions of the South Carolina Department of Health and Environmental Control (DHEC) Air Pollution Control Regulations and Standards 61-62.1 Section IIA.

The following information is included as part of this application submittal:

- Section 2 contains a detailed description of the on-Site processes;
- Section 3 contains emissions calculations methodology and results;
- Section 4 contains a regulatory applicability analysis;
- Section 5 contains the dispersion modeling analysis;
- Section 6 contains the required DHEC permit application forms;
- Appendix A contains an area map, plot plan;
- Appendix B contains process flow diagrams;
- Appendix C contains chemical concentration data for the leachate;
- Appendix D contains emissions calculations;
- Appendix E contains modeling figures and the required modeling files; and
- Appendix F contains DHEC forms and modeling questionnaire forms required for this application.

2. PROJECT DESCRIPTION

The purpose of this application is to obtain authorization to construct and operate a leachate treatment system at the Pinewood Site (the "Site"), a closed Resource Conservation and Recovery Act (RCRA) permitted hazardous waste Treatment, Storage and Disposal Facility (TSDF) located outside of Pinewood, Sumter County, South Carolina. The Pinewood Landfill was operated by Safety-Kleen (and prior to that Laidlaw/GSX) under EPA ID SCD070375985. Activities on-Site included solidification/stabilization and land disposal. Waste types included acidic/corrosives, metals, solvents, and halogenated organics. The Landfill reportedly began operations in the 1970s and closure of the final cell began in 2004. Currently the only wastes managed on the Site include leachate, leachate derived wastes, and wastes generated from on-Site activities.

The Site is currently categorized as a true minor source of air pollutant emissions and is not required to operate under an air quality permit. Maintenance of the Site involves, among other things, collection and treatment of leachate that is continually produced in the landfill. Such activities are regulated by the Site's RCRA Part B permit, and are expected to be necessary for many more years.

Collected leachate has historically been transported to a RCRA permitted commercial treatment facility located in a distant state that is specially permitted to dispose of liquids having the characteristics of the leachate. However, that treatment facility informed the Trust in 2011 that in March 2012 it would discontinue commercial waste treatment and no longer be able to accept the leachate from the Site. Because the rate of leachate production is inherently not controllable by the Site, it was necessary for the Trust to search for alternatives to its existing disposal contractor for treatment of the leachate. A limited number of alternative facilities are available in the US for offsite disposal of the leachate; therefore, the Trust has concluded that the construction and operation of an on-site leachate treatment system provides the most reliable and economically feasible approach to long term management of the leachate.

The Trust is proposing to add to the existing leachate collection, storage and handling facilities on-Site a new treatment facility that will reduce by approximately 94% the volume of leachate that must be sent offsite for final treatment and/or disposal. The system includes a series of treatment steps designed to separate metals and other solids from the leachate, an evaporation process, and a means for containerizing residuals for transportation offsite.

This application encompasses the addition of and estimation of emissions and ambient air impacts from the proposed treatment system. It also and includes descriptions, emission estimates and estimated contributions to ambient air impacts for the remainder of the known stationary sources at the Site.

2.1 CURRENT SITE DESCRIPTION

In its current configuration, the Site consists of three separate landfill sections, leachate collection, treatment and storage facilities, stormwater collection and aeration basins, a small building in which solid residues that have been filtered from the leachate are stabilized and containerized, emergency power generator, and buildings housing maintenance shops, offices, etc. The general location of the landfill and a Site layout drawing are included as Figures A-1 and A-2 in Appendix A. A general process flow diagram (PFD) for the Site as currently configured is included as Figure B-1 in Appendix B.

The sections of the landfill are designated Section I, Section II and Section III, and generally were filled and closed in that order. The sections have varying containment designs and materials for the landfill liner systems (bottom) and cover systems (top). The landfill liners were constructed as composite liner systems and consist of synthetic materials and compacted, low permeability soils designed to prevent leachate from entering the ground, and to facilitate the collection of leachate from that section of the landfill. Section I and portions of Section II were constructed with primary liners only; primary and secondary liner systems were incorporated into the remaining portions of Section II and all of Section III. The purpose of the secondary liners is to provide a backup for the primary liners in the unlikely event that leachate from the section leaks through the primary liners. Leachate, as defined in 40 CFR §260.10, is "any liquid, including any suspended components in the liquid, that has percolated through or drained from hazardous waste."

The landfill tops were constructed as a composite cover system consisting of synthetic materials, compacted, low permeability soils, protective soil, and drainage and vegetative layers designed to contain the waste mass and reduce infiltration of surface water into the landfill cell.

Each landfill section comprises several cells. The cells are subunits of the landfill section that were typically sequentially filled with wastes. Cell bottoms were designed and sloped such that the leachate generated in a given cell would flow through a drainage system to primary sumps within the cell for collection. Primary sumps are concrete structures located at low points within a cell bottom where leachate from the primary liner system is collected. The primary sumps are constructed with a vertical shaft (typically made of four-foot diameter concrete pipe) which rises to the surface through the cover system. Primary sump pumps are positioned in each primary sump and are set to activate and pump leachate out of the sump when the leachate reaches a predetermined level. Primary sump top covers are provided to keep precipitation out of the sump, contain leachate, and minimize the potential for vapors in the sump to be emitted to the atmosphere.

Secondary sumps exist on the portions of Section II and all of Section III where secondary liner systems were constructed. The purpose of the secondary sumps is to remove liquid collected on top of the secondary liners. The secondary sumps can be influenced by shallow groundwater around the perimeter of the landfill sections following significant rain events. However, all waters collected by secondary sumps are managed in the same manner as leachate. Periodic analyses of secondary waters consistently indicate only very trace concentrations of chemicals that may have originated from the wastes.

The pumps located in primary sumps within a given section of the landfill discharge to header pipes installed in utility berms on top of the landfill cover system. Pumps located in secondary sumps do not have a header pipe system and rather discharge into a mobile tank trailer. The primary sump headers as well as the secondary sump mobile tank trailer convey the combined leachate from each section of the landfill to the Central Leachate Tank Farm (Central LTF). The Central LTF contains ten identical 40,000 gallon vertical aboveground storage tanks (ASTs) for primary leachate and one 1,500 gallon AST for secondary leachate. The secondary leachate is collected in the smaller storage tank and used to rinse out the empty larger storage tanks. It is then combined with the primary leachate and treated as such. The leachate is currently passed through a filter to remove suspended solids before being stored in one of the large storage tanks or directly transferred to the tanker trucks at the loading station and shipped offsite. A pneumatic pump is used to transfer the leachate between the filter box, storage tanks, and tanker truck loading station.

The Site has a separate Auxiliary LTF that comprises two 40,000 gallon horizontal ASTs. The Auxiliary LTF is maintained as an on-Site leachate storage backup for the Central LTF.

The Site includes a small operation in the WP2 building for solidifying the sludge removed from the leachate filter box, leachate storage tank bottoms and other areas. The solidification operation in this building currently occurs approximately once every three weeks and is expected to occur less frequently once the LTS becomes operational. During the operation sludge is placed in a mixing box in the building and left to sit for a period of time, allowing the solids to settle. The liquid is decanted and returned to the ASTs in the Central LTF. The remaining material is solidified by mixing it with vermiculite, transferred to a storage box, and transported off site. The building has metal doors that can be closed during the stabilization operation, effectively protecting the operation from wind.

The closure of the landfill facility included addressing Solid Waste Management Units (SWMUs) pursuant to the federal Resource Conservation and Recovery Act Corrective Action regulations. These SWMUs were areas of contaminated soils that were the result of oil recycling operations in the late 1970's, prior to the construction and operation of the lined landfill. Part of the corrective action included installation of a sand blanket drain system in the slopes of the First Flush Basin (FFB). The system was designed to separate groundwater affected by the SWMUs from surface water passing through the FFB. The groundwater in this area contained perchloroethylene (PCE) and trichloroethylene (TCE) at concentrations that required management. The waters collected in the sand blanket drains are collected and conveyed to the North and South Aeration Basins, each of which has a 2 hp aerator. The collected water is aerated to remove trace volatile compounds before the water is discharged to the Site's storm water management system in accordance with NPDES Permit No. SC0042170.

The Site also has a stationary diesel-fired 200 kW emergency generator with a 366 gallon sub-base diesel fuel tank. Mobile sources at the Site include a, diesel-fired, trailer-mounted 110 kW emergency generator, a diesel-fired trailer-mounted 50 hp emergency pump, a vacuum truck, landscape maintenance equipment and four gasoline-fired portable 4 hp well wizards that are used occasionally for groundwater monitoring events.

2.2 DESCRIPTION OF THE PROPOSED LEACHATE TREATMENT SYSTEM

The proposed leachate treatment system (LTS, unit i.d. No. LTS1) will comprise multiple processes for removing solids and metals from the leachate, evaporating approximately 94% of the leachate, and containerizing the treatment residuals for transportation offsite. The LTS will be located in a dedicated building on-Site near the Central LTF as indicated in Figure A-2. A simplified PFD for the LTS is depicted in Figure B-2. A general description of how the LTS is designed to function is provided below. Additional technical details about the LTS will be provided in the section below describing how emissions from the LTS were estimated.

Leachate will be processed in batches. The LTS will be nominally designed to treat the maximum assumed weekly volume of leachate produced by the landfill in four days so as to reduce the staffing requirement for the LTS and to provide for time to catch up on treatment of leachate following any downtime for equipment maintenance, etc. It is important to note that it is the rate of production of leachate from the landfill, and not the capacity of the leachate treatment system, that will affect the long-term potential emission from the LTS.

Leachate from the Central LTF will be pumped into a new holding tank (unit i.d. No.T-700) located in the LTS building. Leachate will be pumped from that tank into an agitated mixing tank (unit i.d. No.T-200) to which sulfuric acid (stored in unit i.d. No. T-400) and/or caustic soda solution (stored in unit i.d. No. T-300) will be added to adjust the pH of the leachate and perlite (stored in unit i.d. No. T-500) will be added to facilitate removal of precipitate in the downstream filter press. A significant percentage of dissolved metals is expected to precipitate almost instantaneously from the liquid in the tank. The treated liquid will be pumped into a plate and frame filter press (unit i.d. No. FLT-600). The filter cake will be dried in an electrically heated sludge dryer (unit i.d. No. D-601), containerized and the filtrate will be pumped into another holding tank (unit i.d. No. T-600).

The filtered leachate will be pumped into an evaporator (unit i.d. No. E-800), in which the leachate will be indirectly heated to the boiling point by a propane fired burner. The evaporator comprises an open topped tank having a large liquid surface area. Heat will be transferred into the leachate through a tube submerged beneath the liquid surface in the tank. Hot combustion gases from the burner will be directed into the tube. Cooled combustion gases will exit the tube without contacting the liquid undergoing treatment. The majority of more volatile organic compounds (e.g., those with boiling points lower than that of the leachate) and water are expected to be evaporated from the leachate during the evaporator cycle. An induced-draft exhaust system will capture steam and vapors liberated from the surface of the liquid in the tank, mix the vapors with the cooled combustion gas from the burner, and discharge the vapors to the atmosphere through an exhaust stack (i.d. Nos. LTSA, LTSB, LTSC, and LTSD) located at the end of the building[1].

Following the evaporator cycle, the residual liquid is expected to continue to consist primarily of water, but will contain higher concentrations of nonvolatile salts and solids, some semi-volatile organic compounds (e.g., those with boiling points higher than the boiling point of the leachate), and much reduced concentrations of volatile organic compounds. The residual liquid will be pumped from the evaporator into a slurry holding tank (unit i.d. No. T-900).

The slurry will be pumped from the holding tank to the electrically heated slurry dryer (Unit i.d. No. D-901). The dryer is designed to further dry the slurry to the point where it has a much higher solids content. The material remaining in the slurry dryer after completion of the drying cycle will be

[1] Multiple i.d. numbers for the single stack are necessary to distinguish between four distinct operating scenarios.

transferred to sealed containers and stored in the LTS building for a short time until being shipped offsite for disposal.

All open tanks and equipment that contain or treat leachate or leachate residuals in the LTS will be exhausted to a central ventilation system that discharges through a single stack. The LTS building itself will be ventilated by an exhaust fan that will discharge through the exhaust stack (i.d. Nos. LTSA, LTSB, LTSC, and LTSD). The single point process/building exhaust was chosen to ensure fugitive emissions and any associated odors from the process do not build up in the building, and are discharged with a high degree of dispersion.

3. EMISSION QUANTIFICATION

When applying for an air quality permit for a new facility or a project at an existing facility, it is necessary to conduct an assessment of emission sources at the facility to both identify the pollutants that can be emitted, and estimate the potential of the sources at the facility to emit all identified pollutants. Knowledge of the types of pollutants emitted and magnitudes of the potential emission rates is necessary to determine whether the facility meets the description of a major source, a synthetic minor source or a true minor source for the purposes of identifying the permitting program and emission standards and limits that will be applicable to the facility, and to use in demonstrating compliance South Carolina Regulation 61-62.5 (Standard No. 8).

A comprehensive estimate of potential emissions from the proposed LTS and other existing sources at the Site was conducted based on an extensive analysis of available chemical and design data. Results of the estimate are summarized in Table 3-1. Results indicate that following the construction and operation of the LTS, the Site will remain a true minor source of air pollutants for the foreseeable future.

TABLE 3-1. SUMMARY OF ESTIMATED POTENTIAL EMISSIONS FROM THE SITE FOLLOWING CONSTRUCTION AND OPERATION OF THE LTS

Pollutant	Emissions (tpy)
PM	0.30
PM_{10}	0.30
$PM_{2.5}$	0.30
SO_2	0.14
NO_X	4.90
VOC	20.03
CO	2.08
CO_2e	2,767
Total HAPs	23.00
Largest Individual HAP	5.10

The remainder of this section presents the assessment of air emission sources at the Site, the types of pollutants that might be emitted by those sources, and the estimated potential of each of the sources to emit pollutants. Key data, assumptions and estimation methodologies are discussed below for each emission source.

Potential post-project stationary sources of emissions identified at the Site are:

1. The covers on the three sections of the landfill
2. The sumps in the three sections of the landfill
3. The primary and auxiliary leachate storage tanks
4. The proposed leachate treatment system
5. The two stormwater aeration basins
6. The WP2 building
7. The emergency generator

Pollutants which may be emitted from one or more of the above sources were determined to include criteria pollutants, greenhouse gases (GHGs, designated as carbon dioxide equivalents "CO_2e"), hazardous air pollutants (HAPs) and toxic air pollutants (TAPs) as defined South Carolina Regulation 61-62.5 Standard No. 8. Criteria pollutants identified are oxides of nitrogen (NO_X), carbon monoxide (CO), particulate matter (PM), volatile organic compounds (VOC), and sulfur dioxide (SO_2).

Emissions of NO_X, CO, SO_2 and CO_2e on site are expected to arise solely from the combustion of conventional fuels in the proposed leachate treatment system and emergency generator. The primary sources of emissions of VOC, HAP and TAP on-Site are those involved with the storage, handling and treatment of leachate collected from the three sections of the landfill. Smaller potential sources of emissions of VOC, HAP, TAP and PM include the combustion of conventional fuels on-Site, the covers on the landfill sections, the aeration basins, and solid waste stabilization activities.

When estimating potential emissions for the Site, it was necessary to assess each of the potential emission sources on-Site to determine if there are factors inherent to those sources that would limit emissions of air pollutants[2]. All sources on-Site were found to fit into one of two general categories in regards to what limits their potential to emit. The first category is characterized by sources for which the maximum potential to emit is dependent upon factors that are under direct control of the Site. The only source which clearly fits into this category is the emergency generator, the operation of which may be limited by permit condition or discretion of the Site. Estimation of potential emissions from this unit is straightforward, and may rely on well known emission factors and operating hour limitations in state rules.

The second category is characterized by sources for which the factors primarily affecting the maximum potential to emit cannot be controlled by the Site. Those sources are the first six included in the above bullet list. By far the most significant of these sources are those that deal with leachate collection, storage and treatment. Leachate is the only significant source of non-combustion generated VOC, HAP and TAP on-Site and contains a wide variety of dissolved organic and

[2] For example, if a facility has only one fuel burning device, a boiler, the potential emissions of NO_X (a combustion product) from that facility would be inherently limited by the size of the burner(s) in the boiler and the type of fuel that the boiler is designed to combust.

inorganic chemicals (including HAPs and TAPs) in low concentrations that were released from wastes placed in the landfill and transported to the leachate system along with the collected water.

The potential exists for small quantities of chemicals in the leachate to be emitted through evaporation wherever the leachate is exposed to ambient air (e.g., through vents on the sumps and storage tanks). The proposed leachate treatment system, which is designed to evaporate a large fraction of the leachate, will be the single greatest source of emission of volatile chemicals in the leachate. Due to the evaporative nature of the mechanisms by which chemicals in the leachate may be emitted, the identities of the chemicals that can be emitted by these sources, their potential long term (e.g., annual) emission rates, and the applicable permitting programs and emission standards are directly dependent upon the composition and rate of production of leachate by the landfill. Therefore, establishing a conservative but reasonable estimate of the annual rate of production and composition of leachate is a key first step in the estimation of potential emissions from the leachate system.

3.1 ANALYSIS OF LEACHATE FLOW AND CONCENTRATION

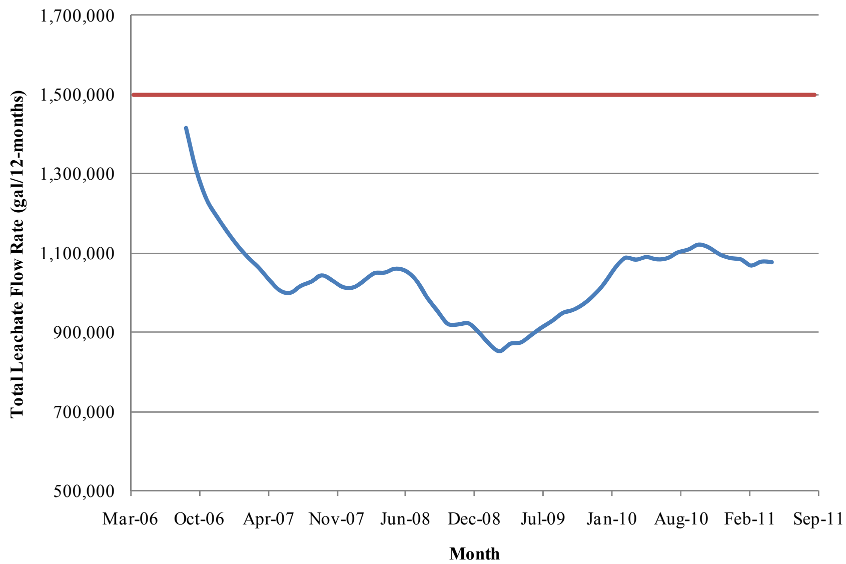
The aggregated leachate collected at the Site is primarily water (approximately 97%) that was either in the material contained in the landfill at the time it was closed, rainwater, or groundwater. The leachate system includes a separate set of primary and secondary leachate collection sumps in each of the three sections of the landfill, the common leachate storage tanks, and following its construction, the proposed leachate treatment system.

3.1.1 LEACHATE PRODUCTION RATE

Site monitoring data were reviewed to prepare a conservative estimate of the annual rate of production of leachate for the entire Site and for certain components of the leachate collection system. The Site is required by conditions of its Resource Conservation and Recovery Act (RCRA) permit and terms of its agreements with offsite leachate treatment companies to measure and record leachate production and composition data. Leachate is automatically pumped from each sump when the liquid level in the sump reaches a predetermined height. Manual pumping is required when necessary during pump maintenance or outages. Where positive displacement pumps are used, estimates of monthly leachate flow from individual sumps were made by multiplying the number of strokes made by the pump in a given sump during a given month by the theoretical displacement of each stroke[3]. Where centrifugal pumps are used, flow meters and/or volume calculation methods are used as appropriate. The 12 month rolling total of leachate produced by the landfill from both primary and secondary sumps during the past five years (September 2006 through May 2011) is presented in Figure 3-1.

[3] Volumes estimated in this manner may overestimate average flow of leachate having elevated viscosity, due to incomplete filling of the pump before it strokes. Therefore, the estimated flows should be conservative.

FIGURE 3-1. ROLLING 12 MONTH TOTAL LEACHATE FLOW TO THE TANK FARM



The elevated flow rates estimated in 2006 resulted from dewatering of Section III of the landfill, which was the final section of the landfill in which wastes were placed. The final cover was substantially complete on Section III in January 2006. Before the final cover was installed, there were more ways for rainwater to enter the open cells in the section, and hence cause higher flows of leachate from the section. Once the cover was installed, the residual water in the section began to drain into the sumps and the total production of leachate rapidly diminished.

The rolling total leachate production data shown in Figure 3-1 indicates that the volume of leachate produced has been relatively constant in the years since the final cover was placed on Section III. Changes appear to occur over relatively long time scales and are limited in nature. The data show no indication of a long-term upwards or downwards trends in leachate production. The rolling total volume production rate has been approximately 1.1 million gallons per year over the past 12 month period.

Based on the historical production, it was decided to use a leachate volume production rate of 1.5 million gallons per year as a basis for estimation of potential emissions from all handling, storage and treatment activities involving the combined leachate (i.e., the leachate stored in the leachate tank farm). The chosen maximum production rate, which is represented by the horizontal red line shown in Figure 3-1, is approximately 136% of the maximum production rate that was calculated for the period since February 2007. Although it is not possible to guarantee that the leachate production rate will never exceed 1.5 million gallons per year, data indicate that the figure is conservative and should provide a more than adequate margin for ensuring the estimated potential emission rates are conservative.

It was also necessary to know the rate of production of leachate by the primary sumps in each of the three sections of the landfill in order to estimate emissions from those sumps.

As will be discussed in more detail below, calculating emission rates for each of the 44 primary sumps on-Site would have been complicated and time consuming. In order to simplify the calculation of emissions from sumps, a hypothetical worst case sump was prepared for each section of the landfill. The monthly leachate production rate for the worst case sump was arrived at for each section by totaling the sump flow rates for all sumps in that section each month during the period of January 2006 through May 2011, and dividing the highest monthly total during that period by the number of sumps in that section. This was a conservative estimate, as sump flow rates can vary widely from one sump to another, and sump flow rates are expected to decrease in time as the residual water is further drained from the cells of the landfill sections.

3.1.2 LEACHATE CHEMICAL CONCENTRATIONS

The second key factor determining the nature and magnitude of emissions from leachate handling sources is the types of chemicals contained in the leachate and their concentrations. Generally speaking, for evaporative sources the emission rate of a chemical that is volatile under the conditions in the leachate system is going to be directly proportional to the concentration of the chemical in the leachate. Therefore, in order to estimate potential emissions of chemicals in the leachate, it is also important to establish a conservative but reasonable upper limit of concentration for each chemical for use in emission estimation.

Because the Site is a hazardous waste landfill, many chemicals could have been present in the wastes placed therein, and therefore might be present in the leachate. The types, quantities and chemical compositions of the wastes placed in the landfill are not precisely known and therefore waste disposal records were not a viable basis for estimating potential emissions from the landfill. However, the Site has historically analyzed samples of leachate taken directly from the sumps on an annual basis, and the aggregate leachate (a mixture of leachate from Sections I, II and III) that is collected in the leachate tank farm on at least a quarterly basis. These analyses provided various types of information useful in the emission estimation process, including the identities and concentrations of chemicals (the "target analytes") that have been reported as detected and the identities of chemicals which have been reported as not detected, and the detection limits for those chemicals. The approaches used to select the concentrations of chemicals to be used in the estimation of potential emissions from the aggregate leachate stored in the tank farm and treated by the leachate treatment system, and the leachate in the sumps in each of the 3 sections of the landfill are discussed below. Discussions of how the estimates were actually prepared are provided in detail in later sections of the report.

3.1.3 TANK FARM LEACHATE

Knowledge of the types and concentrations of chemicals in the aggregate leachate stored in the leachate tank farm was necessary in order to estimate potential emissions from the leachate tank farm, and all aggregate leachate handling and treatment activities. The properties of the leachate collected in the individual sumps located in the three sections of the landfill (discussed in the following section) were used for estimating potential emissions from the sumps.

Reports of the chemical analyses of leachate from the leachate tank farm that were conducted from January 2004 through July 2011 were reviewed to ascertain the chemical composition of the leachate and the concentrations of the chemicals. During that period, 33 different samples of leachate, typically taken at quarterly intervals, had been analyzed. A list was developed that comprises 148 chemicals from the Standard 8 list of TAPs and, on a year by year basis, and all the chemicals from the leachate analysis reports reviewed that had been included either as detected or as non-detects[4]. The list also indicated whether each chemical was on the list of TAPs, the list of federal HAPs, and if a chemical designated as a TAP or HAP had not been among the target analytes for the tests. The list included a total of 283 different chemicals and is included in Table C-1 of Appendix C[5].

The list is summarized in Table 3-2. It can be seen that a number of TAPs were not included among the target analytes in the quarterly analyses (designated in the table as "Not a Target"). This was because sampling was being conducted for RCRA purposes, and the target analyte list for the RCRA testing did not include some of the chemicals on the TAP list. In mid-3011 several analytical laboratories were contacted to determine if it would be possible to include all TAPs on the Standard 8 list as target analytes in leachate analyses. The laboratories consistently indicated that due to the absence of developed, quality assured methods and other technical issues, only 29 of the 45 missing TAPs could be added as target analytes in the leachate analyses. The remaining 16 TAPs were not included in the revised list of target compounds either because they were not likely to be present in the leachate (e.g., hydrochloric acid, which if present would have reacted with waste materials), or there was no standard EPA method capable of quantifying for the chemicals[6]. Therefore, as of July 2011, chemical analyses for approximately 267 chemicals (or categories of chemicals) had been conducted on the tank farm leachate.

TABLE 3-2. TARGET ANALYTE SUMMARY FOR TANK FARM LEACHATE

Outcome	2004	2005	2006	2007	2008	2009	2010	2011
Not a Target	76	75	61	46	47	46	45	16
Non-Detect	153	135	136	147	160	160	154	169
Detected	54	73	86	90	76	77	84	98
Total	283	283	283	283	283	283	283	283

[4] A chemical is categorized as not detected if it was not reported in an analysis at a concentration greater than the minimum detection limit (MDL) that was reported for that chemical.

[5] In addition to individual chemicals, the list included several general categories, such as total organic carbon, hardness, etc.

[6] The labs indicated that given time, it should be possible to develop special test methods for the chemicals. However, these would not undergo the rigorous validation required by EPA test methods, and could be of questionable accuracy.

Having obtained chemical analyses for the maximum number of target analytes, the next step was selecting a concentration from the results reported in the many tests conducted over the period of 2004 through mid-3011. Results reported for the target analytes included detected and not detected, with the detected concentrations and minimum detection limits (MDLs) spanning a range over the years. Given that concentrations and MDLs have varied considerably for some individual chemicals, and some chemicals have only been detected occasionally during the period, it was necessary to formulate a strategy for selecting a concentration for each chemical for use in estimating potential emissions of that chemical.

The concentrations of the target analytes that were actually reported as detected in at least one analytical test during the period were reviewed in order to select the concentrations to be used in estimating potential emissions of each detected target analyte. There were substantial variations noted in the concentrations reported for many target analytes over that period. Because this group of target analytes had actually been detected, in order to be conservative, the maximum detected concentration for each target analyte reported at any time during the period was used for the purposes of estimating potential emissions.

There is no reason to believe that a target analyte that was never reported as detected during the period was actually in the leachate. However, in the interests of conservatism, any chemical that was a target analyte anytime during the period, but for which no detected concentrations were reported during the entire period, was assumed for the purposes of estimating potential emissions to have a leachate concentration that was 100% of the lowest of the MDLs reported for that chemical during the entire period.[7]

The lowest MDL was selected because it is believed to be both conservative and realistic. Analysis of the MDLs reported during the period indicated that the MDL for a given chemical could vary considerably (e.g., by up to over a factor of 20) during a given year, and hugely (i.e., in some cases by a factor of 5,000) during the entire period. Importantly, there was no clear upward trend in MDLs noted during the period. The highest MDLs often occurred in years that were followed by much lower MDLs. The MDLs were seen on a test by test basis to typically be the same for similar classes of compounds (e.g., semivolatile organics). The variations in the MDLs from test to test basis were noted to occur very nearly in multiples (e.g., x4, x10), suggesting that the variations in MDL for a given class of compounds from test to test was most likely due to variations in the dilution factor found to be necessary by the analytical laboratory to apply to the leachate sample in order to ensure that the most concentrated chemical in the leachate was reduced to a concentration that was within the range of the instrument calibration required by the protocol that had been specified for the analysis.

[7] Note that use of 100% of the MDL is even more conservative than required by RCRA rules, which only require that 50% of the MDL of a non-detected chemical be assumed to be present.

Use of the highest MDL was determined to result in emission estimates that were so overly conservative that they gave false impressions about the number and quantities of chemicals that could be released from the Site. In many cases the average of the maximum and minimum detection limits for a given chemical were so dominated by values reported for a particular quarter that they were still considered overly conservative. Given that none of target analytes in the group being discussed had ever been detected, the decision was made to use the lowest MDL reported for each chemical in that group.

3.1.4 SUMP LEACHATE

Knowledge of the types and concentrations of chemicals in the sumps was necessary in order to estimate potential emissions from the sumps only. The properties of the aggregate leachate stored in the leachate tank farm (discussed in a preceding section) were used for estimating potential emissions from all other leachate storage, handling and treatment activities.

The analysis of the composition of leachate present in the sumps is not a requirement of the RCRA permit for the Site or any other permits or rules applicable to the Site. However, the Trust has been analyzing leachate from the sumps on an annual basis for several years for periodically for forensic purposes. The list of target analytes for those tests was limited to those necessary for the forensic analyses.

Reports of chemical analyses of leachate from the individual sumps in each of the three sections of the landfill that were conducted annually during the period extending from 2005 through 2011 were reviewed to ascertain the chemical composition of the leachate and the concentrations of the chemicals. There are 16 primary sumps in Section I, 21 primary sumps in Section II, and 8 primary sumps in Section III. Altogether, a total of 270 different samples of leachate were analyzed from the 45 primary sumps during the period.

Because the three sections of the landfill were filled sequentially, it is believed that the cells within a given section are more likely to contain similar types of wastes (and hence contain similar leachate) than cells in other sections of the landfill. Accordingly, in order to simplify the consolidation and consideration of a very large amount of sump leachate data, data for sumps were grouped according to the section of the landfill.

A total of 96 different sump leachate samples were obtained from Section I during the period and analyzed. As with leachate data for the leachate tank farm, the results reported for the sump leachate were reported as detected or non-detects. The outcomes of the various analyses are summarized in Table 3-3. The list of target analytes for each annual test was compared to the list of 148 Standard 8 TAPs that was described earlier in the discussion of the tank farm leachate. The number of TAPs that were not included in the target analyte list for each year is categorized in the table as “Not a Target”.

TABLE 3-3. TARGET ANALYTE SUMMARY FOR SECTION I SUMPS

Outcome	2006	2007	2008	2009	2010	2011
Not a Target	78	77	80	70	45	44
Non-Detect	28	17	27	25	39	42
Detected	42	54	41	53	64	62
Total	70	71	68	78	103	104

As was observed for tank farm leachate, results reported for the target analytes included detected and not detected, with the detected concentrations and MDLs spanning a range over the years. Given that concentrations and MDLs have varied considerably for some individual chemicals, and some chemicals have only been detected occasionally during the period, it was necessary to formulate a strategy for selecting a concentration for each chemical for use in estimating potential emissions of that chemical. The strategy selected was identical to that selected for the tank farm leachate. Namely, the maximum detected concentration for each target analyte reported at any time during the period, and the lowest MDL reported for each target analyte that had never been detected during the period were used for the purposes of estimating potential emissions. The rationale for these selections is the same as discussed earlier for the tank farm leachate.

A total of 126 different sump leachate samples were obtained from Section II during the period of 2006 through 2011 and analyzed. As with leachate data for the leachate tank farm, the results reported for the sump leachate were reported as detected or non-detects. The outcomes of the various analyses are summarized in Table 3-4. The list of target analytes for each annual test was compared to the list of 148 Standard 8 TAPs that was described earlier in the discussion of the tank farm leachate. The number of TAPs that were not included in the target analyte list for each year is categorized in the table as "Not a Target".

TABLE 3-4. TARGET ANALYTE SUMMARY FOR SECTION II SUMPS

Outcome	2006	2007	2008	2009	2010	2011
Not a Target	77	88	80	77	45	44
Non-Detect	33	24	24	30	38	45
Detected	38	36	44	41	65	59
Total	71	60	68	71	103	104

The detected concentration data and MDLs reviewed for Section II sumps showed sufficient similarity to those of Section I that the strategy that was chosen for selection of target analyte concentrations was that used for Section I.

A total of 56 different sump leachate samples were obtained from Section III during the period of 2005 through 2011 and analyzed. As with leachate data for the leachate tank farm, the results reported for the sump leachate were reported as detected or non-detects. The outcomes of the various analyses are summarized in Table 3-5. The list of target analytes for each annual test was compared to the list of 148 Standard 8 TAPs that was described earlier in the discussion of the tank farm leachate. The number of TAPs that were not included in the target analyte list for each year is categorized in the table as "Not a Target".

TABLE 3-5. TARGET ANALYTE SUMMARY FOR SECTION III SUMPS

Outcome	2005	2006	2007	2008	2009	2010	2011
Not a Target	107	78	88	80	76	45	44
Non-Detect	10	40	28	34	42	66	67
Detected	31	30	32	34	30	37	37
Total	41	70	60	68	72	103	104

The detected concentration data and MDLs reviewed for Section III sumps showed sufficient similarity to those of Section II that the strategy that was chosen for selection of target analyte concentrations was that used for Sections I and II.

Analysis of leachate from the sumps indicates that the detected target analytes are similar for Sections I and II, and that sumps in these sections could have relatively high detected concentrations of various target analytes. The number of target analytes for which detections were reported was much lower for Section III, as were the reported detected concentrations. This is thought to be due to the fact that Section III was closed well before being filled, and thus contains the least quantity of waste of all three sections.

3.2 ESTIMATION OF EMISSIONS FROM THE LANDFILL COVER

Historically attempts have been made to estimate emissions of volatile chemicals through landfill covers. Such emissions might be expected due to migration of vapors through soils in landfills that have only soil covers or partial synthetic covers. However, all sections of the landfill at the Site have low permeability soil and synthetic covers. The synthetic cover material is considered effectively impermeable to vapors that may migrate to the synthetic cover. Unlike a municipal solid waste (MSW) landfill, hazardous waste landfills do not produce any significant amount of methane, and the landfill, which is effectively vented at each primary sump, should not be under positive pressure. It is therefore very unlikely that target analytes in the different sections of the landfill are being emitted through the unpenetrated expanse of the covers[8].

The synthetic cover material is penetrated at the locations of the primary sumps, and there may be some small gaps between the cover material and the sump riser at those locations. However, there should be no gap between the cover soils and the sump riser, so any emissions through the synthetic liner gaps at those locations would be expected to be extremely small in magnitude compared to the

[8] A VOC emission factor of 7.36×10^{-6} lb/ft^2 was developed and included in a synthetic minor air permit application for the semipermeable covers of the closed cells at the Chemical Waste Management RCRA landfill in Emelle, Alabama (which has similarities to the Site), using emission estimation equations for closed landfills in EPA-453/R-94-080A. Using that factor and the surface area of Sections I, II and III at the Site, VOC emissions of 30 lb/yr were estimated from all covers at the Site.

emissions from the sumps themselves. Therefore, it was assumed that no pollutants are emitted from the covers on the sections of the landfill.

3.3 Estimation of Emissions from Sumps

Potential emissions of criteria pollutants from the primary sumps in Sections I, II and III of the landfill are summarized in Table D-1. The total estimated potential VOC emission rate from the sumps in Sections I, II and III are 0.27 tons per year, 0.98 tons per year, and 0.023, respectively. Estimated potential emissions of HAPs and TAPs from the sumps in Sections I, II and III are summarized in Table D-2. The total estimated potential HAP and TAP emission rates from sumps in Sections I, II and III are each 0.62 tons per year, 1.88 tons per year and 0.00790 tons per year, respectively. The manner in which the emissions from the primary sumps were estimated is discussed below.

Emissions were not estimated for the secondary sumps for reasons discussed later in this section.

3.3.1 Primary Sumps

Emissions of VOCs, TAPs and HAPs from the primary sumps are anticipated to arise from evaporation of small quantities of organic compounds that are present in the leachate at low concentrations. There are three sections of sumps in the landfill: Section I has 16 primary sumps, Section II has 21 primary sumps, and Section III has 8 primary sumps. Section III was being filled when the landfill closed, so it has the least number of sumps and the lowest hazardous waste quantities.

Sumps are essentially vertical concrete pipes that extend from a concrete pad located on the bottom surface of a cell (above the liner) to just above the vegetated surface of the landfill. Each sump has a dedicated pump and liquid level sensors. Each sump is covered with a heavy duty plastic cap that is designed to keep precipitation out of the sump, and allow piping and control lines to pass through. The cap is not hermetically sealed to the sump, rather each cap contains a small (approximately 1” i.d.) opening that allows equalization of any pressure differences between the gas in the headspace of the sump and the atmosphere. It is assumed that any emissions from leachate in the sump exit through the aforementioned hole, and that surface winds would have no effect on the rates of emission of chemicals contained in the sump headspace.

Sumps in the landfill are of very similar design and dimensions. The depth from the top cap of a sump to its pad and the working height of leachate above the pad vary from sump to sump. However, the details of the cap and the diameter of the concrete piping are essentially the same for each sump.

For the purposes of estimating emissions from leachate contained in the sumps, the sumps were presumed to behave like storage tanks. Emissions were expected to occur due to the filling and draining of the sumps (equivalent to “working” emissions for a tank), and the expansion and contraction of the vapor in the headspace due to temperature fluctuations (equivalent to “breathing” emissions for a tank). Filling of the sumps occurs at a rate determined by the contents of the landfill cell(s) which drain into the sump. Each sump has a dedicated positive displacement (PD) or centrifugal pump which lowers the level of leachate in the sump to a known height whenever the surface of the liquid leachate reaches a predetermined height in the sump (known as the action level).

The quantity of leachate removed from a sump can be estimated by flow measuring techniques such as flow meters and/or volume measurements. For the PD pumps, the number of strokes the leachate pump is commanded to make between the action level and the lower level. The Site measures and records the number of strokes and stroke volume for each sump pump, and can report the estimated volume pumped from each sump on a monthly basis, as discussed in Section 3.1.1.

Certain assumptions were made in order to reduce the complexity of calculating sump emissions. Otherwise, emission estimates would be required for 45 sumps, each having its own set of height, concentration and flow data. The assumptions made are considered to be very conservative (i.e., based on either average or worst-case data), and therefore the emissions estimated using the assumptions should be very conservative. The assumptions include the following:

1. With one exception, all sumps have common set of dimensions. The only dimension that varies among sumps in a given section is the height of the sump cap above the pad. In this case the heights of all sumps located in a given section of the landfill were averaged to arrive at a representative depth for use in that section. The dimensions of the "average" sumps assumed for each section of the landfill are listed in Table 3-6 below.

TABLE 3-6. SUMP PHYSICAL PARAMETERS

Parameter	Section I	Section II	Section III
Diameter (m)	1.219	1.219	1.219
Height of liquid surface (m)	0.253	0.716	1.823
Height of Vapor Space (m)	18.849	25.853	35.963

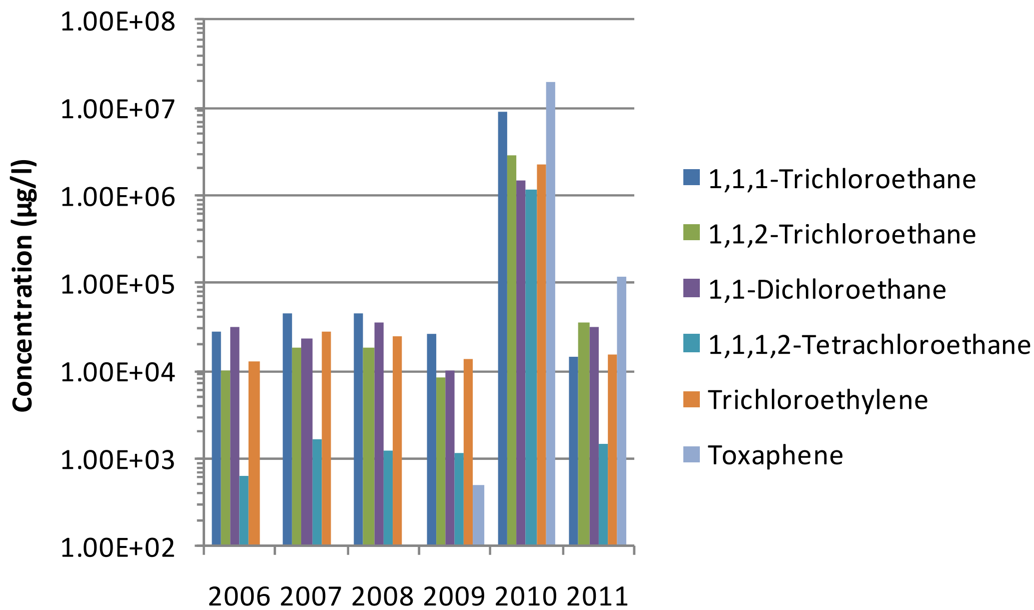
2. All sumps in a given section would have the same monthly leachate flow rates. As discussed in Section 3.1.1, the monthly leachate production rate for the worst case sump was arrived at for each section by totaling the sump flow rates for all sumps in that section each month during the period of January 2006 through May 2011, and dividing the highest monthly total during that period by the number of sumps in that section. This was a conservative estimate, as sump flow rates can vary widely from one sump to another, and sump flow rates are expected to decrease in time as the residual water is further drained from the cells of the landfill sections.

The assumed flow rates (in gallons per month) for the worst case sumps in Sections I, II and III were 3,279, 904 and 11,764, respectively. For comparison, the sump flow rates (in gallons per month) calculated using the averages of all monthly flow rates for Sections I, II and III (rather than the maximums) are 1,789, 594 and 2,668, respectively. Clearly the worst case estimates are conservative. It is important to note that the aforementioned sump flow rates are multi-year averages of estimated flow rates, and their sum is likely to differ from the annual volume of leachate collected in the leachate tank from all sections, which is based on actual volumetric measurements.

3. The leachate composition would be the same for all sumps in a given section of the landfill. The composition data used were those discussed for each landfill section in section 3.1.2.2 above. Based on review of sump leachate data, this assumption is considered to be very conservative, because (with one exception) the concentration of each target analyte was assumed to be either the highest detected concentration of that target analyte in any sump in a given section, or the lowest MDL for target analytes that were not detected.

   The one exception to the aforementioned assumptions about leachate concentration was the elimination from consideration of the analytical data from the analysis conducted in 2010 on leachate from Sump 1E2P, which is located in Section I. Analysis of sump and leachate tank farm data for the period indicated that the concentration of certain volatile organics and pesticides in the leachate from sump 1E2P spiked on or about the date on which the sample had been taken from that sump. As can be seen in the example target analytes included in the logarithmic chart in Figure 3-2, the concentrations reported for that sample were between approximately two and three orders of magnitude greater that those measured in that sump in the years preceding or following the measurement.

FIGURE 3-2. CHARACTERISTICS OF CONCENTRATION SPIKE IN SUMP IE2P



The concentrations of selected target analytes seen to spike in sump 1E2P reported in the quarterly analyses of leachate from the tank farm were reviewed to ascertain the approximate duration of the spike. As exemplified by the concentration of 1,1,1-trichloroethane, it can be seen in Figure 3-3 that a similar spike in chlorinated volatile organic compounds was noted in the tank farm leachate only during the second quarter of 2010. The same very high spike in concentrations was not observed in any of the other Section I sumps, nor in the results of tank farm leachate analyses for quarters 1 or 3 of 2010.[9]

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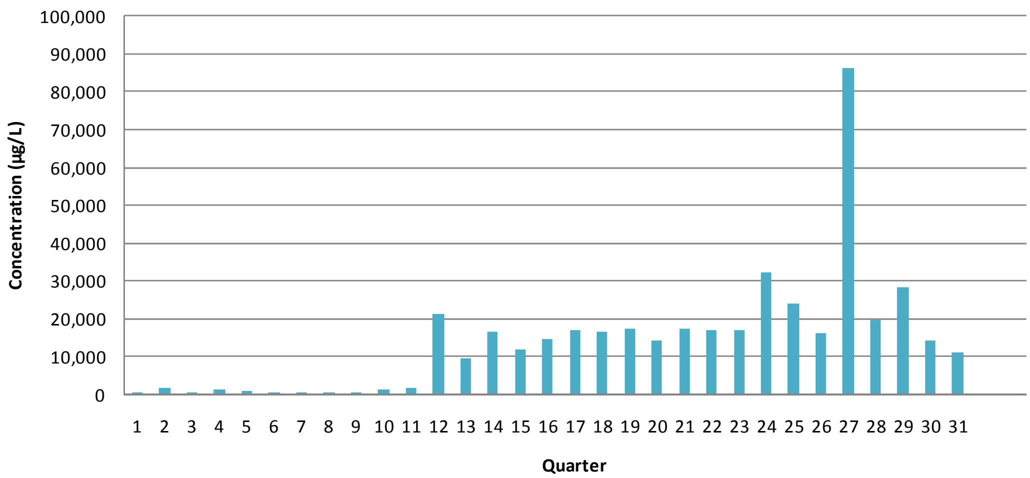
[9] The relatively low concentrations of 1,1,1 trichloroethane indicated during quarters 1 through 11 in Figure 3-3 were due to the substantially higher volumes of rainwater entering the leachate collection system during the period of time that Section III of the landfill had not been fully closed.

FIGURE 3-3. 1,1,1-TRICHLOROETHANE CONCENTRATIONS IN THE TANK FARM LEACHATE BY QUARTER SINCE 2004



Clearly, a transient event occurred during or just before the second quarter of 2011 that significantly affected the concentrations of target analytes in sump IE2P, but not in the other sumps. Such an event may have been the failure of a drum of waste located near the sump, resulting in release of a limited quantity of certain compounds. Such transient spiking behavior has been noted occasionally in sumps in other landfill sections.

Based on the review of all available data, the data reported for sump 1E2P for 2010 was determined to be an outlier. Had that data been included in the ensemble from which the maximum detected concentrations and minimum non-detect MDLs were selected, the resultant estimated emissions for all sumps in Section I sumps would have been overestimated by two to three orders of magnitude, which could have erroneously impacted other aspects of the application (e.g., Standard 8 modeling and HAP PTE estimation). Therefore it was decided to eliminate the 2010 analytical results for sump 1E2P from consideration in the emission estimate for Section I sumps.

4. Due to the ambient temperature of the leachate and lack of turbulence in the sumps, no PM or metals would be emitted from the sumps.

Potential VOC, HAP and TAP emissions for "representative" sumps in Sections I, II and III were estimated using the EPA emission estimation program WATER9, version 3.0.0[10]. This program was chosen over TANKS and other EPA emission estimation tools because it has the capability to estimate emissions of organic compounds dissolved in water at low concentrations, and includes routines for estimating activity

[10] Note that compounds that were neither Clean Air Act VOCs, HAPs or TAPs were not included in the estimate. WATER9 V3 obtained from http://www.epa.gov/ttn/chief/software/water/water9_3/index.html

coefficients for complex compounds that are not present in other readily available tools.

The sumps were entered in the WATER9 program as the storage tank unit type. The sump dimensions, average leachate flow rates, and leachate compositions discussed in the preceding sections were used to define the storage tank unit, its contents, and the number of turnovers per year for the representative sump for each section. Because the sumps are located below ground, the paint factor was set to 1, the diurnal temperature change was set to 1°C, and the leachate temperature set to 25°C. These settings caused the program to appropriately calculate emissions from the sump assuming that there would be no effect of wind turbulence.

The emission rates for the representative sumps for each section were multiplied by the number of primary sumps in that section to obtain the total estimated emission rate for all primary sumps in each section.

3.3.2 SECONDARY SUMPS

Secondary sumps exist on the portions of Section II and all of Section III where secondary liner systems were constructed. The purpose of the secondary sumps is to remove liquid collected on top of the secondary liners. The secondary sumps can be influenced by shallow groundwater around the perimeter of the landfill sections following significant rain events. However, all waters collected by secondary sumps are managed in the same manner as leachate. Periodic analysis of secondary waters consistently indicate only very trace concentrations of chemicals that may have originated from the wastes. Therefore, estimates of emissions from secondary sumps were not prepared.

3.4 ESTIMATION OF EMISSIONS FROM LEACHATE STORAGE TANKS

Estimated potential emissions of criteria pollutants from the storage tanks in the Central LTF and Auxiliary LTF are summarized in Table D-1. The total estimated potential VOC emission rate from the Central LTF and the Auxiliary LTF are 3.03 tons per year and 2.92 tons per year, respectively. Estimated potential emissions of HAPs and TAPs from the storage tanks in the Central LTF and Auxiliary LTF are summarized in Table D-2. The total estimated potential HAP and TAP emission rates from the primary leachate storage tanks in the Central LTF are 4.62 tons per year and 4.65 tons per year, respectively. The total estimated potential HAP and TAP emission rates from the leachate storage tanks in the Auxiliary LTF are 4.57 tons per year and 4.61 tons per year, respectively.

Estimated VOC and HAP emissions for the Central and Auxiliary LTFs were not included in the Site-wide total because the leachate composition used in estimating emissions from the LTS was not reduced by the amount of emissions from the LTFs. Therefore, subtracting the emissions estimated to occur upstream of the LTS in the LTFs would result in those emissions being counted twice in the Site-wide potential emissions. Furthermore, the Auxiliary LTF and the Central LTF would not need to be used at the same time.

Because the leachate remains at ambient temperature and there is no significant turbulence in the LTFs, it was assumed that no PM or metals would be emitted from the LTFs. The manner in which the emissions from the LTFs were estimated is discussed below.

3.4.1 CENTRAL LEACHATE TANK FARM

The Central LTF comprises ten identical 40,000 gallon vertical ASTs (CL01 – CL10) for primary leachate and one 1,500 gallon AST for secondary leachate. Certain assumptions were made in order to simplify estimation of emissions from the primary leachate storage tanks in the Central LTF. First, it was assumed that every tank would contain leachate having the chemical composition discussed in section 3.1.2.1. Second it was assumed that the total annual throughput of leachate in the Central LTF was 1.5 million gallons per year, as discussed in section 3.1.1. Third, it was assumed that the throughput for each tank would be one tenth of the assumed maximum annual leachate throughput of the Central LTF. The latter is a conservative assumption because it presumes all ten tanks are storing leachate at the same time, when in fact leachate might only be stored in a fraction of the tanks, or might possibly bypass tanks in the Central LTF and be sent directly to a tank in the LTS.

Potential VOC, HAP and TAP emissions for the primary leachate storage tanks were estimated using the EPA emission estimation program WATER9, version 3.0.0 for the same reasons as described in section 3.3.1 for the primary sumps.

As discussed in section 3.3.2, only very trace concentrations of chemicals have been reported in the analyses of secondary leachate. Because the concentrations of chemicals in the secondary leachate are so low, and because that leachate is mixed with all other leachate in the Central LTF (and hence emissions from storage of the secondary leachate in the 10 main storage tanks in the Central LTF would have already been accounted for in the estimates for those tanks), estimation of emissions from the secondary leachate storage tank were not made.

The aforementioned assumptions are considered very conservative because they will result in an estimate of emissions from the Central LTF assume all ten tanks are storing leachate at the same time, when in fact leachate might only be stored in a fraction of the tanks, or might possibly bypass tanks in the Central LTF and be sent directly to a tank in the LTS.

3.4.2 AUXILIARY LEACHATE TANK FARM

The Auxiliary LTF comprises two 40,000 gallon horizontal ASTs (AL01, AL02). The Auxiliary LTF is not currently in use, but could be used for storage of the leachate that is normally present in the Central LTF in the future if the Central LTF were ever out of service.

Certain assumptions were made in order to simplify estimation of emissions from the leachate storage tanks in the Auxiliary LTF. The assumptions are listed below.

1. Every tank would contain leachate having the chemical composition discussed in section 3.1.2.1.
2. The total annual throughput of leachate in the Auxiliary LTF was 1.5 million gallons per year, as discussed in section 3.1.1.
3. The throughput for each tank would be one half of the assumed maximum annual leachate throughput of the Central LTF.

Potential VOC, HAP and TAP emissions for the leachate storage tanks in the Auxiliary LTF were estimated using the EPA emission estimation program WATER9, version 3.0.0 for the same reasons as described in section 3.3.1 for the sumps. The estimated emission rates are slightly lower than those reported for the primary leachate storage tanks in the Central LTF.

3.5 Estimation of Emissions from the Leachate Treatment System

Operations in the LTS are expected to result in the emissions of VOC, HAPs, TAPs. PM, PM_{10} and $PM_{2.5}$ from evaporation or entrainment in mist of target analytes contained in the leachate. VOC, HAPs, TAPs, NO_X, CO, SO_2, PM, PM_{10} and $PM_{2.5}$ are expected to be released from the combustion of propane as a fuel in the evaporator.

Potential emissions of criteria pollutants from all operations in the LTS are summarized in Table D-1. The total VOC emission rate from all operations in the LTS is 18.59 tons per year. Estimated potential emissions of HAPs and TAPs from the LTS are summarized in Table D-2, and are 20.07 tons per year and 21.79 tons per year, respectively. The manner in which the emissions from the LTS were estimated is discussed below.

As discussed in Section 2.2, the LTS comprises four tanks for the treatment and temporary storage of leachate, a filter press and electrically heated sludge dryer, a 4.54 MMBtu/hr propane fired evaporator, and an electrically heated slurry dryer. All tanks containing leachate or slurry, and the sludge dryer, evaporator and slurry dryer are actively exhausted to a common stack. Several assumptions were made in the estimation of emissions from the LTS system of VOCs, HAPS and TAPS contained in the leachate. The assumptions are listed below.

1. The leachate entering the system has the same characteristics as the aggregate tank farm leachate described in Section 3.1.2.1. No reduction in concentration or flow rate was assumed to occur due to emissions of target analytes from the tanks in the tank farm. This conservative assumption ensures that the highest potential emissions, which could occur if the leachate is pumped directly to the LTS without storage in the Central LTF, are estimated from the LTS stack.

2. In order to simplify estimation of emissions from the LTS, all emissions from the components and operations in the LTS were assumed to come from the evaporator and the slurry dryer. The small amount of emissions from the various tanks, and sludge dryer in the LTS are actively exhausted to the LTS stack, which is also the emissions point for the evaporator and

slurry dryer. Given that exhaust design, it should make no difference for the purposes of estimating potential emissions or estimating emissions for the purpose of Standard No. 8 modeling whether emissions from the relatively small sources in the LTS are estimated separately and added to the total emissions from the evaporator and slurry dryer, or just assumed to originate completely from the evaporator and slurry dryer.

3. The estimation of potential short term (24 hour) emissions rates from the LTS, which would be necessary for Standard 8 modeling, was based on the assumption that the LTS would have four primary stack exhaust profiles. The first, designated LTSA, would occur when the evaporator is operating at the same time as the slurry dryer and the building ventilation system is turned off. This profile would result in the maximum volumetric flow from the stack without the ventilation system and the maximum mass flow of the target analytes. This profile assumes that the evaporator was being fed 400 gallons per hour for 24 hours per day, and the slurry dryer is being fed at 800 gallons per day. The second profile, designated LTSB, would occur when the slurry dryer is operated without the evaporator operating and the ventilation system is turned off. It is anticipated that the slurry dryer will be operated with the evaporator turned off for a period of time at the very end each multi-day operating campaign. This profile would result in the lowest volumetric flow from the stack, and a higher ratio of semivolatile organics to volatile organics in the stack gas (as is discussed later in this section). The third profile, LTSC, is equivalent to LTSA with added volumetric flow from operation of the building ventilation system. The fourth profile, LTSD, is equivalent to LTSB with added volumetric flow from operation of the building ventilation system. It is important to remember that because the LTS operates in a batch mode, the annual emission rates cannot be estimated by multiplying the daily rates by 365.

4. The estimation of long term (annual) potential emissions from the LTS was based on the treatment of a maximum volume of 1.5 million gallons of leachate.

5. The precipitation process in the LTS, which occurs prior to evaporation, was assumed to remove a minimum of 50% of all the metals (including arsenic) contained in the leachate[11]. No additional removal has been assumed for the mist eliminators that are built into the evaporator and slurry dryer systems, though they would most likely result in additional removal of metals entrained in mist from that equipment.

6. It was assumed that all target analytes present in the leachate entering the evaporator would be completely evaporated by the system, regardless of their boiling points or vapor pressures. This unprecedented assumption was made to ensure that the PTE was very conservatively estimated, and to provide ultra-conservative short-term emission rates to be used in demonstration of compliance with Standard No. 8. In reality, many of the organic compounds have boiling points in excess (in some cases well in excess) of the anticipated operating temperatures of the evaporator and slurry dryer. The metals are likely to be present in forms that have negligible vapor pressures at the dryer operating temperatures, meaning that emissions of metals should also be significantly lower than estimated for the PTE.

[11] As reported by the LTS system designers, based on bench scale studies.

Emissions of combustion products from the evaporator were calculated using the AP-42 emission factors for propane. Greenhouse gas (GHG) emissions from the evaporator were estimated using emission factors found in 40 CFR 98 Subpart C Tables C-1 and C-2 and global warming potentials from Subpart A Table A-1. The sludge and slurry dryers will run on electricity and will not have emissions from combustion.

3.6 ESTIMATION OF EMISSIONS FROM THE AERATION BASINS

The North and South Aeration Basins, located west of the Central LTF, treat groundwater and rain water collected in sand blanket drains. Each basin has a 2 horsepower electrically-driven aerator which promotes evaporation of low-level volatile contaminants before the water is discharged to the Site's storm water management system. Aeration is expected to result in the emissions of VOC, HAPs and TAPs from evaporation of target analytes contained in the liquid in the basins. .

Potential emissions of criteria pollutants from the Aeration Basins are summarized in Table D-1. The total potential VOC emission rate from both basins is 0.010 tons per year. Potential emissions of HAPs and TAPs from the Aeration Basins are summarized in Table D-2. The total estimated potential HAP and TAP emission rates from the Aeration Basins are both 0.012 tons per year. Estimated potential speciated emissions of HAPs and TAPs from the Aeration Basins are summarized in Table D-3. Assumptions made in the estimation of emissions from the Aeration Basins include the following:

1. Both basins contain the maximum concentrations of all target analytes detected in the water contained in those basins during samples taken between 2004 and 2011 and the minimum detection limits of target analytes that were never detected during that time period.
2. No removal of target analytes from biological activity occurs in the basins.
3. Due to the ambient temperature of the water and the absence of any significant metals or semivolatile organic compounds in the water, it was assumed that no PM would be emitted from the Aeration Basins.
4. Both basins were conservatively assumed to operate 8,760 hours per year.

Emissions from the basins were estimated using WATER9 V3.0.0, for the reasons discussed in Section 3.3.1. The aerated biotreatment emission unit was used for the WATER9 run with parameters adjusted to indicate no biotreatment.

3.7 ESTIMATION OF EMISSIONS FROM WP2 OPERATIONS

As described in Section 2.1, sludge from the periodic cleanout of the filter box at the Central LTF and other vessels on-Site is stabilized in the WP2 building. It is possible that VOCs, HAPs and TAPs may be emitted during the stabilization process.

Results of the emission estimate are provided in Appendix D. The results indicate that a total of approximately 2.39 pounds per year of total VOC, HAP and TAP is estimated to be released during stabilization. Because this is clearly a trivial quantity of emissions, operations in WP2 were not included in the site wide potential emissions.

For the purposes of estimating emissions from WP2, it was assumed that the sludge contained organic compounds at concentrations identical to those assumed for the leachate stored in the Central LTF. Because the unstablized sludge is primarily liquid and contains primarily water, it was decided that the EPA WATER9 emission estimation program would be the best tool to use for preparing the estimate. Because stabilization is conducted by placing the liquid sludge into a large, open vessel (similar to a 12 foot by 8 foot roll off box), and the sludge is agitated with the bucket of a backhoe following addition of vermiculite, the agitated tank was chosen as the type of unit in WATER9 for preparation of the estimate. That unit was assumed to remain filled with leachate at a constant level, and be agitated by one 1 horsepower blade.

Note that in practice stabilization occurs inside the building with all doors and windows closed, and that the stabilization vessel is covered during periods of inactivity when it contains any material undergoing stabilization.

3.8 ESTIMATION OF EMISSIONS FROM THE EMERGENCY GENERATOR

A stationary 200 kW diesel-fired emergency generator with a 366 gallon diesel sub-base tank is located at the Site. Emissions for the generator were calculated using AP-42 emission factors for diesel fuel, and emissions from the 366 gallon sub-base diesel tank were calculated using TANKS 4.09d. The maximum fuel consumption of the 200 kW emergency generator is 43.0 gallons per hour, and it operates at a maximum of 500 hours per year; therefore, the annual diesel fuel throughput for the sub-base tank is 21,500 gallons per year. All diesel emissions from the tank were assumed to be VOC. HAP emissions were also calculated for the generator.

Emissions from the generator were calculated despite the generator being an exempt air emissions source. Per South Carolina Regulation 61-62.1 (II)(B)(2)(f), generators that either have a rated capacity of 150 kW or less or that are for emergency purposes only and operate no more than 500 hours per year are exempt air emissions sources. The 200 kW emergency generator is equipped with an hour meter and will not operate more than 500 hours a year.

The Site also has a 100 gallon oil AST that stores 15W/40 motor oil for equipment maintenance. According to the Material Safety Data Sheet for 15W/40 motor oil, its volatile content is negligible making it an exempt source under SC Regulation 61-62.1 (II)(B)(2)(h).

4. REGULATORY APPLICABILITY ANALYSIS

The proposed LTS is potentially subject to both state and federal air regulations. The federal air regulations examined in this analysis include New Source Review (NSR), New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), and Title V operating permit program regulations. South Carolina DHEC Chapter 61, Regulation 61-62 (Air Pollution Control Regulations and Standards), has been examined to evaluate the applicability to the proposed project.

4.1 PERMITTING PROGRAMS

The following State and Federal permitting programs were reviewed for applicability to the construction and operation of the LTS.

4.1.1 FEDERAL PERMITTING PROGRAMS

Federal permitting programs comprise requirements for construction of new sources or modification of existing sources (New Source Review) and for operation of major sources of air pollutants (Title V Operating Permit Program).

4.1.2 NEW SOURCE REVIEW

New Source Review (NSR) requires that construction of new emission sources or modifications to existing emission sources be evaluated when significant net emission increases result. Two distinct NSR permitting programs apply depending on whether the facility is located in an attainment or nonattainment area for a particular pollutant.

Sumter County is designated under 40 CFR 81.301 as "attainment/unclassified for all the criteria pollutants for which National Ambient Air Quality Standards have been set. As such, the Site would be subject to PSD review if the Site is making a major modification (major modification thresholds vary depending on whether the source is a major or minor source with respect to PSD).

According to the South Carolina PSD regulations at 61-62.5 Standard No. 7, a stationary source is considered a PSD major source if potential emissions exceed 100 tons per year for "listed" source categories or 250 tons per year for all other source categories. Neither the Source nor any individual equipment at the Source is included on the list of sources with the 100 tons per year threshold. Thus, the Source is a PSD major source if potential emissions of any regulated pollutant exceed 250 tons per year. As shown in Table 3-1, potential criteria emissions for the Site are each less than 250 tons per year. Therefore, the Site is not as currently configured and will not after the proposed project be a PSD major source under 61-62.5.

Because Sumter County is currently in attainment with all NAAQS, the nonattainment new source review program at 61-62.5, Standard No. 7.1 does not apply to the Site.

4.1.2.1 TITLE V OPERATING PERMIT PROGRAM

Federally enforceable Title V operating permits are required for major stationary sources of air pollutants as defined in 40 CFR Part 70 and implemented in the Regulation 61-62.70. The Title V major source thresholds in Sumter County are 100 tons per year for criteria pollutants, 10 tons per year for a single HAP, and 25 tons per year for aggregate HAPs. Potential emissions are less that 100 tons per year for each criteria pollutant, less than 10 tons per year for any single HAP, and less than 25 tons per year for aggregate HAPs. Potential GHG emissions are less than 100,000 tons per year. The potential emissions from the Site are based on the inherent characteristics of the landfill, and not air pollution control devices or operational limits. Therefore, the Site is not subject to Title V permitting, and should be permitted as a minor source.

4.1.3 SOUTH CAROLINA PERMITTING PROGRAMS

South Carolina Regulation 61-62.1 requires that before a facility acts to construct, alter or add to a source of air contaminants, a construction permit must be obtained prior to commencement of construction, unless the proposed activity is otherwise exempt from permitting. The Trust proposes to add the LTS to the existing equipment and activities at the Site. Because the Site has not been required to operate under an air quality permit for the last few years, it will be necessary to obtain an air quality permit to construct the LTS and operate the LTS and other non-exempt emission units on the Site. As described in the preceding paragraph, the Site may be permitting as a true minor source.

4.2 NEW SOURCE PERFORMANCE STANDARDS

The applicability of New Source Performance Standards (NSPS), located at 40 CFR 60, can be determined through a review of the affected facilities for each NSPS, which are generally described in the title of each NSPS. South Carolina has incorporated the Federal NSPS by reference at Regulation 61-62.60.

4.2.1 SUBPART A – GENERAL PROVISIONS

Due to the operation of equipment subject to individual NSPS (the emergency generator), the Site is subject to the requirements of 40 CFR Part 60 Subpart A General Provisions.

4.2.2 SUBPART CC/WWW/AAAA – MUNICIPAL SOLID WASTE LANDFILLS

NSPS Subpart Cc, WWW, and AAAA contain guidelines and standards for municipal solid waste landfills. In the subparts, the definition of municipal solid waste requires that a disposal facility receive or have received household waste. The Pinewood Site has never received household waste. As such, the Site is not subject to any of these subparts.

4.2.3 Subpart Dc – Steam Generating Units

NSPS Subpart Dc applies to those steam generators with maximum design heat input capacities less than 100 MMBtu/hr, but greater than or equal to 10 MMBtu/hr with construction, modification, or reconstruction completed after June 9, 1989. The proposed evaporator will have a maximum heat input level of 4.54 MMBtu/hr and is not designed to generate steam. Therefore, the evaporator will not be subject to NSPS Subpart Dc.

4.2.4 Subpart Kb – Volatile Organic Liquid Storage Vessels

NSPS Subpart Kb sets standards for volatile organic liquid storage vessels that were constructed, reconstructed, or modified after July 23, 1984 and that have a capacity of 75 m^3 or greater. While the leachate and filtrate aboveground storage tanks in the Central Tank Farm and the Auxiliary Tank Farm have capacities greater than 75 m^3, the true vapor pressure of the leachate is less than 15.0 kPa, which puts them below the threshold listed in the subpart. Therefore, this rule is not applicable to those tanks. The holding tank that will be constructed as part of the proposed LTS will be less than 75 m^3, and is also not subject to this subpart.

4.2.5 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

NSPS Subpart IIII was published in the Federal Register on July 11, 2006, and aims to reduce NO_X, CO, and VOC emissions from stationary compression ignition internal combustion engines. The trailer-mounted diesel-fired emergency pump and trailer-mounted 110 kW emergency generators are not considered stationary sources as defined in the subpart and are, as such, not subject to this rule. The 200 kW emergency generator, however, is subject to this standard.

4.2.6 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

NSPS Subpart JJJJ was published in the Federal Register on January 18, 2008, in order to reduce NO_X, CO, and VOC emissions from stationary spark ignition internal combustion engines. The portable well wizards are spark ignition engines, but they are not considered stationary sources as defined in the subpart; therefore, there are no units at the Pinewood Landfill that are subject to this rule.

4.2.7 Non-Applicability of All Other NSPS

NSPS standards are developed for particular industrial source categories. Other than NSPS developed for steam generating units (Subpart Dc) and turbines (Subpart GG), the applicability of a particular NSPS to a facility can be readily ascertained based on the industrial source category covered. All other NSPS besides Subpart A are categorically not applicable to hazardous waste landfills or the proposed LTS.

4.3 National Emission Standards for HAP

National Emissions Standards for Hazardous Air Pollutants at 40 CFR 61 and 40 CFR 63 are emission standards that regulate HAP emissions. 40 CFR 61 are chemical specific standards. Review of existing and proposed activities at the Site indicate that there are none to which standards in 40 CFR 61 are applicable.

40 CFR 63 are source category specific standards which may be applicable to both major sources of HAP and area sources of HAP. South Carolina has incorporated by reference the NESHAP at 40 CFR 63 in Regulation 61-62.63.

A HAP major source is defined as a source that has potential emissions in excess of 25 tpy for total combined HAP and/or potential emissions in excess of 10 tpy for any individual HAP. An area source is defined as any source that is not a major sources. The Pinewood Site does not have potential emissions in excess of 10 tpy for individual HAP or 25 tpy for aggregate HAP. Therefore, the Site is a HAP ***area*** source, and major source HAP standards are not applicable. The area source NESHAPs were reviewed, and those which appeared to be applicable or potentially applicable to the Site are discussed below.

4.3.1 Subpart A – General Provisions

Due to its classification as a HAP area source and the operation of equipment subject to individual NESHAP, the facility is subject to the requirements of 40 CFR Part 63 Subpart A General Provisions.

4.3.2 Subpart ZZZZ – National Emission Standards for Stationary Reciprocating Internal Combustion Engines

Subpart ZZZZ, also known as the RICE MACT, was issued on March 18, 2008, and applies to both major and area sources of HAP. According to the definition in the subpart, the trailer mounted diesel-fired emergency pump, the 110 kW trailer-mounted emergency generator, and the four portable well wizards are not stationary sources and are not subject to this rule. The 200 kW emergency generator, however, is a stationary source and is subject to this regulation. The Site will meet the requirements of the RICE MACT by meeting the requirements set forth in NSPS Subpart IIII.

4.3.3 Subpart JJJJJJ – National Emission Standards for Area Sources: Industrial/ Commercial/ Institutional Boilers and Process Heaters

Subpart JJJJJJ, also known as the area source Boiler MACT, was promulgated on March 21, 2011. The proposed evaporator or slurry dryer are not considered boilers as defined by this subpart. Furthermore, under the rule, gas-fired boilers are not subject to Subpart JJJJJJ per 63.11195(e). Therefore, the proposed propane gas-fired evaporator will not be subject to Subpart JJJJJJ.

4.3.4 INAPPLICABILITY OF OTHER SUBPARTS

After a review of all other NESHAP subparts, it was determined no other NESHAPs are currently applicable to the Site.

4.4 RISK MANAGEMENT PLAN

Subpart B of 40 CFR 68 outlines requirements for risk management prevention plans pursuant to Section 112(r) of the Clean Air Act. Applicability of the subpart is determined based on the type and quantity of chemicals stored at a facility. The Site will not store any chemicals above the triggering threshold and is therefore not subject to the RMP program.

4.5 SOUTH CAROLINA REGULATION 61-62

South Carolina DHEC Chapter 61, Regulation 61-62, Air Pollution Control Regulations and Standards, apply to any emission source operated in the state. Pursuant to SC Regulation 61-62.1, Section II (A)(1)(a), an air permit must be obtained for any new or modified facility that may result in emissions to the atmosphere. Construction permits must be issued by the agency upon determination that the facility can reasonably be expected to comply with all applicable state and federal requirements. The major provisions of the rules containing applicable emission/work practice standards are discussed below.

4.5.1 STANDARD NO. 1 – FUEL BURNING OPERATIONS

Regulation 61-62.5 Standard No. 1 regulates emissions of PM, SO_2, and opacity from fuel burning operations. Fuel burning operations is defined in Regulation 61-62.1 as:

> *Use of furnace, boiler, device or mechanism used principally but not exclusively, to burn any fuel for the purpose of indirect heating in which the material being heated is not contacted by and adds no substance to the products of combustion.*

The proposed evaporator will be subject to this standard as it will be used for indirect heating. This Standard requires that the operation shall not emit smoke that exceeds 20% opacity, except in cases of soot blowing, but shall in no case exceed 60% opacity. The allowable discharges of PM and SO_2 resulting from fuel burning operations are limited to 0.6 lb/MMBtu and 3.5 lb/MMBtu heat input, respectively. Compliance with this rule will be by combustion of only a clean-burning fuel (propane).

4.5.2 STANDARD NO. 2 – AMBIENT AIR QUALITY

Regulation 61-62.5 Standard No. 2 regulates ambient air quality and largely restates the allowable ambient concentrations in the National Ambient Air Quality Standards (NAAQS). Compliance with Standard No. 2 is typically addressed with an air dispersion modeling analysis when changes at a facility are made that result in emission increases of greater than one (1) pound per hour of any regulated pollutant. Site-wide emissions are below one pound per hour for each of the regulated criteria pollutants; therefore, a Standard 2 evaluation was not conducted for the Pinewood Landfill.

4.5.3 Standard No. 3 – Waste Combustion and Reduction

Regulation 61-62.5 Standard No. 3 generally regulates all sources that burn any waste other than virgin fuel for any purpose. The proposed evaporator will fire propane only, and the proposed sludge and slurry dryers will run on electricity. Leachate will not be incinerated as part of the proposed LTS. Therefore, the Pinewood Landfill is not subject to this standard.

4.5.4 Standard No. 4 – Emissions from Process Industries

Regulation 61-62.5 Standard No. 4 regulates PM emissions from process sources not subject to other emissions or opacity limitations. The emission limit in Section VIII – "Other Manufacturing" is calculated from the following equations:

$$E = (F)\ 4.10\ P^{0.67}, \text{ for process weights} < 30 \text{ ton/hr}$$
$$E = (F)(55.0\ P^{0.11} - 40) \text{ for process weights} > 30 \text{ ton/hr}$$

where:

E = PM emissions limit in lb/hr;
P = Process weight rate in tons/hr; and
F = Effect factor (defined as 1)

Assuming a processing rate of 400 gallons per hour of leachate and a density of 8.4 pounds per gallon, the calculated Standard No. 4 PM emissions limit is 5.85 pounds per hour. As can be seen in Table 3-1, the estimated PM emission rate from the entire site is only 0.39 tons per year. For the purposes of Standard No. 4 applicability, the LTS will emit negligible amounts of PM emissions, and the Site will comply with the applicable emissions limit.

The proposed process units subject to this standard will be installed after December 31, 1985. Therefore, emissions, including fugitive emissions, shall not exhibit opacity greater than 20% from a subject source.

4.5.5 Standard No. 5 – Volatile Organic Compounds

Regulation 61-62.5 Standard No. 5 regulates VOC from certain specific processes. However, the proposed project will not meet the potential emissions threshold of potential VOC emissions more than 550 pounds in any one day or more than 150 pounds in any one hour to trigger applicability. Thus, Standard No. 5 is not applicable to the Site.

4.5.6 Standard No. 5.1 – LAER for VOC Emissions

Regulation 61-62.5 Standard No. 5.1 requires new or modified sources to meet the Best Available Control Technology (BACT) for VOC when the total of all VOC increases since

1979 exceeds 100 tpy. Potential emissions for the Site will not exceed 100 tpy of VOC. Therefore, the Site is not subject to this standard.

4.5.7 Standard No. 5.2 – Control of Oxides of Nitrogen Emissions

Regulation 61-62.5 Standard No. 5.2 requires new combustion equipment to meet specified reduction for NO_X emissions. The proposed LTS includes the installation of a propane gas-fired evaporator at 4.54 MMBtu/hr. Because the heat capacities of the proposed evaporator is less than the 10 MMBtu/hr, this standard does not apply.

4.5.8 Standard No. 7 – Prevention of Significant Deterioration

As discussed in Section 4.1.1.1, the Site will remain a minor source with regards to the PSD program and is exempt from the PSD regulations.

4.5.9 Standard No. 8 – Toxic Air Pollutants

Regulation 61-62.5 Standard No. 8 regulates ambient air quality of certain toxic air pollutants (TAPs). The Site will emit TAPs listed in this standard and will comply with the requirements set forth in the rule. This rule does not regulate TAPs emitted from virgin fuels; therefore, the Site is not subject to regulations on TAP emissions resulting from the combustion of propane gas.

4.5.10 61-62.6 – Control of Fugitive Particulate Matter

Standard 61-62.6 requires facilities in attainment areas to control their fugitive dust emissions to the degree that it does not create an undesirable level of air pollution. The Site has paved and graveled the roads on-site, and planted and maintains vegetative covers on-site that minimize fugitive dust emissions. The Site will take reasonable precautions to limit fugitive dust emissions during the construction of the proposed leachate treatment system. Truck traffic on-site, and associated fugitive dust emissions, is expected to decrease following commencement of operation of the LTS.

4.5.11 61-62.7 – Good Engineering Practice Stack Height

The stack height of the LTS stack is in accordance with the Good Engineering Practice (GEP) stack height. Simply stated, GEP is a guideline criterion for determining stack height equal to <u>the greater of</u>:

$H_g = H + [1.5 \times (L)]$ **<u>OR</u>** 65 meters

Where, H_g = GEP stack height
H = height of nearby structure
L = lesser dimension, height or projected width, of nearby structure

Each structure within the 5L distance of a stack is used to calculate a respective GEP stack height. The greatest GEP stack height calculated from each structure is then determined to be the required GEP height for the stack. Note that multiple nearby structures may act as one larger structure and create a greater downwash effect. As discussed in Section 5.7, for conservatism on-site terrain features were included into the model, represented as buildings, to determine the effective GEP height and provide a more representative downwash analysis.

The stack height for the leachate treatment system is 50 ft. (15.2 meters). Therefore, this stack would meet the requirements of GEP.

5. DISPERSION MODELING ANALYSIS

The methods used in this modeling analysis are consistent with current U.S. Environmental Protection Agency (EPA) and DHEC procedures and follow the procedures outlined in the SC Air Quality Modeling Guidelines and AERMOD Guidelines.[12,13,14] The modeling analysis used an EPA-approved refined dispersion model. Details of the modeling analysis, dispersion model techniques, and results are provided in the following sections.

5.1 MODELING REQUIREMENTS

DHEC regulates emission impacts by requiring air dispersion modeling to demonstrate compliance with specific standards. Three standards address compliance demonstrations through the use of air dispersion modeling: Standard No. 2, Standard No. 7, and Standard No. 8 of South Carolina Regulation No. 62.5. These three standards are briefly discussed below.

5.1.1 STANDARD NO. 2

Standard No. 2, *Ambient Air Quality Standards*, establishes the Ambient Air Quality Standards (AAQS) for all criteria pollutants. Criteria pollutants include nitrogen oxides (NO_X), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter less than ten microns (PM_{10}), total suspended particulate (TSP), and VOC. The ambient air quality standards for these pollutants are adopted from the National Ambient Air Quality Standards (NAAQS). Dispersion modeling was not performed for any criteria pollutants and is not included in this report due to either one or all of the following reasons per DHEC guidance document *Facilities/Sources Exempt or Deferred from Modeling Standard No. 2 and Standard No. 7:*[15]

- Per Section 1.2, C, facility-wide potential emissions totaling less than 1 pound per hour are exempt from dispersion modeling. All criteria pollutant emissions, including PM, NO_X, and SO_2 are all less than 1 pound per hour, and CO emissions are less than 10 lb/hr. Note that because the Pinewood Site is no longer an active landfill, PM sources from site-wide sources such as fugitive road dust or earth moving activities are negligible due to limited site vehicle traffic.

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[12] 40 CFR 51, Appendix W, *Guideline on Air Quality Models*.

[13] South Carolina Department of Health and Environmental Control, *Air Quality Modeling Guidelines*, July 2001.

[14] http://www.scdhec.gov/environment/baq/Modeling/SCmodeling_guidance.asp (AERMOD Guidelines)

[15] Dated 11-2010.

- Per Section 1.2, B, 3, boilers and space heaters of less than 10 MMBtu/hr rated heat input capacity that only burn virgin gas fuels are exempt from air dispersion modeling requirements. The evaporator burner within the leachate treatment system will have a heat input capacity of 4.54 MMBtu/hr and will only burn propane.

- Per Section 1.2,B, 1, emergency power generators, or other emergency equipment, of less than or equal to 150KW rated capacity or those which operate 500 hours per year or less and have a method to record the actual hours of use such as an hour meter are exempt from dispersion modeling requirements. Infrequently used units at the Site include emergency generators, a mobile emergency pump, and small, mobile well wizards and all of these units will be limited in the number of hours they will operate in a year.

5.1.2 STANDARD NO. 7

Standard No. 7, *Prevention of Significant Deterioration*, requires increment modeling to be performed for each proposed PSD major modification and minor modification after a Minor Source Baseline Date has been established for the county in which the facility is located. The minor source baseline date for PM, NO_X, and SO_2 has been triggered for Sumter County.[16] However, this permitting action is not a PSD major modification. Additionally, as noted previously, all criteria pollutants are exempt from modeling per the DHEC Standard 2 and Standard 7 modeling exemptions. Therefore, no Standard 7 modeling has been conducted for this application.

5.1.3 STANDARD NO. 8

DHEC regulates emissions and impacts of toxic air pollutants under Standard No. 8, "Toxic Air Pollutants," the modeling analysis procedures for which are described in Appendix D of DHEC's *Air Quality Modeling Guidelines*. DHEC's assessment procedure includes a *de minimis* emissions level, expressed in pounds per day, against which facility-wide potential emissions can be assessed to determine whether refined modeling is necessary to demonstrate compliance. The sources of emissions listed in Section 3 of this application will result in emissions of TAPs. Per the July 2001 DHEC modeling guidance document, Standard No. 8 is not required for combustion units which burn virgin fuels; therefore TAP emission as a result of combustion are not included.[17]

5.2 EMISSION SOURCES AND CHEMICALS MODELED

Standard No. 8 requires that all sources of emissions in a facility of listed TAPs that have a site-wide emission rates in excess of their de minimis emission rate must be included in the model. The estimated potential site-wide TAP emission rates reported in pounds per day in Table D-2 were

[16] http://www.scdhec.gov/environment/baq/docs/modeling/psd_msbd.pdf

[17] *Air Quality Modeling Guidelines*, SC DHEC, July 2001, Page 50

compared to the de minimis emission rates for those chemicals to determine which chemicals would require Standard No. 8 modeling. The results are shown in Table E-1. A total of 24 target analytes that are TAPs have estimated potential emission rates exceeding the de minimis emission rates.

Note that the site-wide daily emission rate of TAPs used in the above determination assume the worst case emission rates from the sources, and assume that the leachate processed in the LTS has the same concentrations of target analytes as the leachate that enters the Central LTF. The determination also assumes that the Aeration Basins are continuously operated.

Emission sources to be modeled are the primary sumps, the Central LTF, the LTS, and the Aeration Basins. The Auxiliary LTF has not been modeled because it is a backup to the Central LTF and would not normally be used at the same time as the Central LTF.

5.3 AIR DISPERSION MODEL

The air dispersion modeling analysis was conducted using the version 11103[18] of the American Meteorological Society Environmental Protection Agency Regulatory Model (AERMOD) to estimate maximum ground-level concentrations. AERMOD is a steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain.

5.4 METEOROLOGICAL DATA

Per South Carolina modeling guidelines, the dispersion modeling was performed using 2002 through 2006 preprocessed meteorological data based on surface observations take from Florence, Sumter County, South Carolina (station number 13744) and upper air measurements from Greensboro, North Carolina (station number 13723). The Florence-Greensboro concatenated meteorological data set was obtained from the DHEC dispersion modeling website.[19] Because the Standard No. 8 modeling analysis procedure states that a resultant concentration should be evaluated against a MAAC, which is based on a 24-hour averaging period, the use of a concatenated meteorological data set is appropriate for evaluation of Standard No. 8 TAP impacts.

5.5 RECEPTOR GRIDS

Ground-level concentrations were calculated within one Cartesian receptor grid and at receptors placed along the property line. The property line grid receptors were spaced 50 meters apart and the grid extending out beyond the Site boundary to 1,500 meters were spaced 100 meters apart in all directions. All resultant maximum concentrations occur well within this distance.

[18] EPA released a newer version of the AERMOD air dispersion model (dated 11353) on December 19, 2011, simply to fix bugs in version 11103. Therefore, due to the timing of the release during the modeling analyses and the only changes to the model were identified as being related to fixing bugs in the last version, Trinity did not utilize the latest version.

[19] http://www.scdhec.gov/environment/baq/Modeling/modeling_data.asp

5.6 TERRAIN

AERMOD uses advanced terrain characterization to account for the effects of terrain features on plume dispersion and travel. AERMOD's terrain pre-processor, AERMAP (latest version 11103), imports digital terrain data and computes a height scale for each receptor from National Elevation Dataset (NED) data files. A height scale is assigned to each individual receptor and is used by AERMOD to determine whether the plume will go over or around a hill.

The receptor terrain elevations input into AERMAP are the highest elevations extracted from United States Geological Survey (USGS) 1:24,000 scale (7.5-minute series) NED data for the area surrounding the Site. For each receptor, the maximum possible elevation within a box centered on the receptor of concern and extending halfway to each adjacent receptor was chosen. This is a conservative technique for estimating terrain elevations in that it ensures that the highest terrain elevations are accounted for in the analysis. However, surveyed elevations for the leachate treatment system building (139ft), leachate treatment system point source emission (139ft), the tank farm building (122.11ft), and the tank farm volume source emission (122.11ft) were updated in the model after AERMAP was run as these elevations were believed to be more accurate than the AERMAP results.[20] A plot of the modeled receptors is included as Figure E-1 with colors denoting the elevations of each receptor. Impacts were calculated at all of these receptors.

In addition to AERMAP estimated terrain, the Site has constructed "terrain" in the form of landfill cells that is not captured by the NED data file and the AERMAP terrain pre-processor. This additional topography should be considered as a possible inhibitor of plume dispersion and, thus, can be represented as building downwash in the model evaluation. This is discussed in the next section of this report.

Appendix E includes NED files used in this analysis on CD-ROM.

5.7 BUILDING DOWNWASH ANALYSIS

The emission units at the Pinewood Landfill were evaluated in terms of their proximity to nearby structures. The purpose of this evaluation was to determine if stack discharge might become caught in the turbulent wakes of these structures leading to downwash of the plume. Wind blowing around a building creates zones of turbulence that are greater than if the building were absent. The current version of the AERMOD dispersion model treats building wake effects following the algorithms developed by Schulman and Scire.[21] This approach requires the modeler to input wind direction-specific building dimensions for structures located within 5*L* of a stack, where *L* is the lesser of the height or projected width of a nearby structure. Stacks taller than the structure height plus 1.5*L* are not subject to the effects of downwash in the AERMOD model.

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[20] *Pinewood Equipment Sizing Calculations.pdf* received in email to Bryan Williams from URS Corporation on, September 7, 2011

[21] Earth Tech, Inc., *Addendum to the ISC3 User's Guide, The PRIME Plume Rise and Building Downwash Model,* Concord, MA.

The LTS stack height is less than the GEP stack height. Therefore, further evaluation of cavity or wake effects is required by the modeling guidelines. The current version of the AERMOD dispersion model treats the trajectory of the plume near the building and uses the position of the plume relative to the building to calculate interactions with the building wake. AERMOD calculates fields of turbulence intensity, wind speed, and slopes of the mean streamlines as a function of the projected building dimensions. Therefore, the use of AERMOD assists in conducting a more technically accurate evaluation of building cavity and wake effects than with ISCST3.

The direction-specific building dimensions used as input to the AERMOD model were calculated using the Building Profile Input Program PRIME (BPIP PRIME), version 04274.[22] BPIP PRIME is sanctioned by U.S. EPA and is designed to incorporate the concepts and procedures expressed in the GEP Technical Support document, the Building Downwash Guidance document, and other related documents.[23]

The input and output files used in the BPIP downwash analysis are provided in electronic form in Appendix E of this report. The output file lists the names and dimensions of the structures considered and the emissions unit locations and heights in addition to a summary of the dominant structure for each emissions unit (considering all wind directions) and the actual building height and projected widths for all wind directions. As mentioned in the previous section, additional on-site terrain based on a topographic survey of the site in 2006, including berms, or landfill cells, was incorporated into the AERMOD modeling analysis by representing the artificially raised sections as stacked, tiered buildings increasing in height, but decreasing in diameter. Therefore, the elevations used for on-site terrain were based on site survey information, and not information provided by AERMAP. These artificial buildings were included in BPIP downwash analysis.

5.8 LAND USE ANALYSIS

One of the upgrades to the AERMOD modeling system is the incorporation of land use into the meteorological parameters for use in the AERMET calculations. Varying land use will produce different environmental responses to heating, cooling, albedo, and other characteristics of the Planetary Boundary Layer (PBL), which have an effect on the vertical stability and subsequent behavior pollutant dispersion. In accordance with the modeling guidelines, the land use surrounding the meteorological dataset is assumed to be representative of the land use around the Site. As stated in the July 2001 DHEC modeling guidance document, with few exceptions all of South Carolina is considered to be rural. Typically only areas in the large metropolitan areas of the State (i.e. Columbia) are considered urban.[24] The area surrounding the facility is decidedly rural with no large housing, industrial, or commercial developments in the immediate area surrounding the facility.

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[22] U.S. EPA, *User's Guide to the Building Profile Input Program,* (Research Triangle Park, NC: U.S. EPA), EPA-454/R-93-038.

[23] U.S. EPA, Office of Air Quality Planning and Standards, *Guidelines for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) (Revised),* (Research Triangle Park, NC: U.S. EPA), EPA 450/4-80-023R, June 1985.

[24] *Air Quality Modeling Guidelines*, SC DHEC, July 2001, Page 7

5.9 Site Layout

Appendix E, Figure E-2, contains a diagram of the site including stack locations, building locations, and property boundaries in Universal Transverse Mercator (UTM) coordinates.

5.10 Source Parameters and Emission Rates

The AERMOD dispersion model allows for emission units to be represented as point, area, or volume sources. For point sources with unobstructed vertical releases, as is the leachate treatment system stack, it is appropriate to use actual stack parameters (i.e., height, diameter, exhaust gas temperature, and gas exit velocity) in the modeling analyses.

It was determined that four operational scenarios exist from the leachate treatment system stack that could be considered the worst case for resultant concentrations downwind from the stack and all four were included as separate point sources in the model analysis:[25]

1. All sources are operating at the same time on a continuous basis without the ventilation system (Model ID LTSA). This includes emissions from the entire leachate treatment system, represented primarily by the evaporator and the dryer system within the leachate treatment system as well as other site-wide sources.

2. Only the dryer is operating on a continuous basis, assuming all dryer emissions occur from the single dryer in addition to other site-wide sources, without the ventilation system (Model ID LTSB).

3. All sources are operating at the same time on a continuous basis while the ventilation system is running (Model ID LTSC). This scenario assumes the same pollutant emission rates as with the first scenario; however, the ventilation system provides an increased exit air velocity from the stack.

4. Only the dryer is operating on a continuous basis while the ventilation system is running (Model ID LTSD). This scenario assumes the same pollutant emission rates as with the second scenario; however, the ventilation system provides an increased exit air velocity from the stack.

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[25] It should be clearly stated that there is only one physical stack present for the leachate treatment system. The operating scenario stacks listed (LTSA, LTSB, LTSC, LTSD) represent the same physical stack, having the same stack height and diameter, but with different operating scenarios having different exit velocities and pollutant emission rates. Source groups were established in the model setup to provide four sets of results: all other site sources with the leachate treatment system operating without the ventilation system in Scenario A (stack LTSA) and with the ventilation system in Scenario C (LTSC), and all other site sources with the leachate treatment system operating without the ventilation system in Scenario B (stack LTSB) and with the ventilation system in Scenario D (LTSD). These scenarios were chosen as they would represent the scenarios with the poorest dispersion with and without the ventilation system (LTSB, LTSD), and the scenarios which would represent the greatest amount of emissions with and without the ventilation system (LTSA, LTSC).

The emission rate of an individual toxic compound from the leachate treatment system was based on the maximum leachate flow rate into the treatment system of 400 gallons/hour. The emission rate from the operation of evaporator E800 and slurry dryer D901 together was assumed to be the emission rate listed for LTS1 in pounds per day in Table D-2 converted to grams per second. In the cases where only slurry dryer 901 was assumed to be operating, the emission rate was based on evaporation of 800 gallons/day of slurry. In order to provide a more conservative emission estimate from slurry dryer D901, it was assumed that 90% of the target analytes in the leachate had been emitted by evaporator E800, and that the concentration of target analytes in the residual from E800 entering the slurry dryer would be equivalent to 10% of that of the tank farm leachate multiplied by 16.67, which is the degree of reduction of leachate volume attained by evaporator E800. Modeled emission rates for facility sources can be found in Table E-2.

The LTS was represented within the model as a point source having four different operating scenarios (designated LTSA, LTSB, LTSC, and LTSD) having the source parameters listed in Table 5-1. The Central LTF was represented within the model as a volume source having the source parameters listed in Table 5-2. The sump sections and Aeration Basins were represented as area sources within the model having the source parameters listed in Table 5-3.

TABLE 5-1. POINT SOURCE PARAMETERS[26]

Model ID	Description	UTM East (X)	UTM North (Y)	Base Elevation		Height		Temperature		Velocity		Diameter	
		meters	meters	feet	meters	feet	meters	F	K	ft/s	m/s	feet	meters
LTSA	Leachate Treatment System Stack: Evaporator & Dryer, No Ventilation	544,371.9	3,728,161.5	139	42.37	50	15.24	212	373.15	8.46	2.58	4	1.22
LTSB	Leachate Treatment System Stack: Dryer Only, No Ventilation	544,371.9	3,728,161.5	139	42.37	50	15.24	212	373.15	0.20	0.06	4	1.22
LTSC	Leachate Treatment System Stack: Evaporator & Dryer, With Ventilation	544,371.9	3,728,161.5	139	42.37	50	15.24	Ambient		48.91	14.91	4	1.22
LTSD	Leachate Treatment System Stack: Dryer Only, With Ventilation	544,371.9	3,728,161.5	139	42.37	50	15.24	Ambient		40.65	12.39	4	1.22

TABLE 5-2. VOLUME SOURCE PARAMETERS

Model ID	Description	UTM East (X)	UTM North (Y)	Base Elevation		Release Height[1]		Init Lat. Dimen[2]		Init Vert. Dimen[3]	
		meters	meters	feet	meters	feet	meters	feet	meters	feet	meters
CTF1	Central Tank Farm	544,327.7	3,728,116.7	122.11	37.22	25.00	7.62	18.60	5.67	23.26	7.09

1. Based on a building height of approximately 50 feet (RH = Height / 2).
2. Based on a building width of approximately 80 feet and considered a stand alone source (σ_y = Width / 4.3).
3. Based on a building height of approximately 50 feet and considered on or adjacent to a building (σ_z = Height / 2.15).

26 Please note that although multiple dryers may be in operation at a given time, the worst case assumption was used that the total amount of dryer emissions would occur from a single dryer, and that the air flow system contribution would only be from a single dryer.

TABLE 5-3. AREA SOURCE PARAMETERS

Model ID	Description	UTM East (X) meters	UTM North (Y) meters	Base Elevation feet	Base Elevation meters	Release Height meters	Area[1] m^2
S1	Sump Section 1	544,418.3	3,727,536.9	138.32	42.16	1	94,809.41
S2	Sump Section 2	543,942.4	3,728,503.7	180.18	54.92	1	186,191.80
S3	Sump Section 3	544,388.6	3,728,194.2	175.26	53.42	1	112,790.90
AE1	Aeration Basin 1	544,183.4	3,728,064.0	115.00	35.05	1	1,731.35
AE2	Aeration Basin 2	544,200.6	3,728,026.5	104.00	31.70	1	2,422.16

1. Section 1 is based on 16 sumps, Section 2 is based on 21 sumps, and Section 3 is based on 8 sumps.

5.11 MODELING RESULTS

For Standard No. 8, the maximum modeled off-property 24-hour average impacts for all modeled pollutants for the entire concatenated meteorological dataset were compared to the MAAC. All impacts of all toxics were less than 50% of the MAAC. The results of the analyses are presented in Table E-3 and illustrate the Site will be in compliance with Standard No. 8 for all pollutants.

The input and output modeling files for each pollutant analyzed, the BPIP files, the AERMAP and NED files, and the meteorological data files are included in electronic format in Appendix E.

6. PROPOSED MEANS OF COMPLIANCE DEMONSTRATION

One of the key assumptions on which this application is based is that the Site is a true minor source. As discussed in preceding sections, the Site cannot arbitrarily increase production of leachate, so the potential to emit of the Site is inherently tied to the rate at which leachate is produced by the landfill sections and the concentration of HAPs and VOCs in the leachate. Therefore, in order to track emissions of VOC and HAP against the respective major source thresholds, it will be necessary to periodically estimate emissions from the Site based on measured leachate flow and chemical concentrations.

Review of the different source types and estimated emission rates indicates that the leachate tank farm and the evaporator and slurry dryer in the LTS are the only significant sources of emissions at the Site that have the potential to change to the extent that might affect the minor source status of the Site. As described in Section 3, sump emissions are quite low and have been very conservatively overestimated to the extent that actual emissions from the sumps should be a fraction of estimated potential emissions. Multifold increases in total actual sump emissions should have an insignificant affect on total emissions from the Site. The Aeration Basins and WP2 operations are true de minimis sources that should not require permitting, and the emergency generator will have a 500 hour per year operating limit.

The Trust proposes to estimate emissions from the Central LTF using the same approach as was used for this application, except that actual leachate throughput and actual, non-qualified detected concentrations of target analytes will be used in the estimate. The Trust proposes to conduct such estimates on an annual basis as the sum of estimated emissions using the throughput and concentration data from the preceding fourth calendar quarters.

The Trust proposes to estimate emissions from the LTS using a mass balance method rather than by source testing. Conducting source testing on the LTS stack to establish VOC emission rates is expected to be inaccurate and potentially challenging. There have been well over different 100 organic compounds reported as detected in the leachate over the past eight years. This wide range of organic compounds that may be in the stack gas could include numerous classes of compounds (e.g., alcohols, glycols, chlorinated hydrocarbons) having differing responses to EPA Method 25. Also, there are organic compounds present at non-trivial concentrations in the leachate that are not VOCs per the regulatory definition (e.g., acetone, methylene chloride, trichloroethane, tetrachloroethylene), and which would not be separable from true VOCs using test methods that cannot speciate large numbers of chemicals, and/or is adversely affected by high stack gas moisture.

Similarly, source testing to determine HAP or TAP emission rates from the LTS is also expected to be difficult and inaccurate due primarily to the presence of dozens of HAPs and TAPs in the stack gas, some at concentrations several orders of magnitude higher than others. Difficulties are expected due to the need to use different methods to collect different types of compounds (e.g., VOCs, semivolatile organics, glycols, pesticides, alcohols), and due to the likelihood of saturation of collection media during long sampling periods that may needed to obtain reasonable detection limits for certain target analytes. Attempting to obtain speciated emission rates for the number and types of HAPs in the exhaust from the LTS by stack testing is expected to be quite challenging if not completely impractical, and carries the risk of unknown accuracy. Therefore, the Trust would prefer not to use stack testing to establish the emission rates of VOCs, HAPs and TAPs from the LTS.

The Trust proposes to periodically estimate emissions from the evaporators and dryers in the LTS using a mass balance type method based on measuring the concentrations of target analytes in the leachate before evaporation and in the liquid and solid residues remaining after evaporation and slurry drying. The Trust has for years demonstrated through sampling and analysis of leachate and solid residues the ability to analyze the leachate for the presence and concentrations of the majority of HAPs and TAPs, most of which are also VOCs. The Trust believes that the use of a mass balance method will provide the best, most accurate basis for estimating emissions of VOC, HAP and TAP from the LTS.

Evaporator E800 and slurry dryer D901 are the only significant sources of emissions in the LTS.[27] Using the mass balance approach, the mass of target analyte i emitted from a known quantity of leachate processed by the evaporator and slurry dryer would be calculated as follows

$$M_{e,i} = C_{l,i} \text{ x } M_l – C_{s,i} \text{ x } M_s$$

Where:

$C_{l,i}$ is the concentration of target analyte i measured in leachate from the leachate holding tank immediately upstream of the evaporator
$C_{s,i}$ is the concentration of target analyte i in the slurry dryer residue
M_l is the mass of leachate entering the evaporator during the test period
M_s is the mass of slurry dryer residue generated during the test period

An emission factor F_i can be calculated in terms of pounds of target analyte i emitted per pound of leachate processed as follows:

$$F_i = M_{e,i}/M_l$$

The Trust proposes to initiate sampling necessary to calculate the emissions factors as described above within 30 days of the LTS achieving operational status.[28] The Trust proposes to conduct the testing semiannually and at that time estimate emissions from the LTS for the preceding 12 month period. The Trust will prepare a sampling protocol based on the LTS operating schedule and procedures prior to commencing operation. It is anticipated that the protocol would include the following:

1. Obtaining composite samples of leachate entering evaporator E800 and of residue generated by slurry dryer D901 during a treatment cycle that might span one day to several days.

2. Analyzing the samples using EPA SW846 analytical methods currently in use at the Site for leachate and residue analysis.

3. Having the ability to review the analytical results, reject results that may be qualified or considered of questionable accuracy based on laboratory QA/QC data or being statistical outliers, and retest or resample as appropriate to resolve the questionable data.

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[27] The small tanks used to hold leachate and filtrate during processing are not storage tanks and are not expected to contain any significant quantity of leachate for three days out of each week.

[28] Defined as being after installation, testing and start-up shake down of the LST is complete.

4. Having at least 60 days after submitting samples to be analyzed to complete calculations

5. Using only concentrations measured above the detection limits for target analytes in estimation of actual emissions.

The Trust proposes to submit the protocol to DHEC for approval prior to testing.

The Trust wishes to emphasize that the compliance method described above will be potentially subject to unforeseen challenges and will most likely have to be adjusted somewhat after experience has been gained with the LTS system and the residues it generates. The Trust would appreciate DHEC's consideration of such challenges.

7. DHEC APPLICATION FORMS

The DHEC forms required for this permit application are attached in Appendix F. The forms included in that Appendix include:

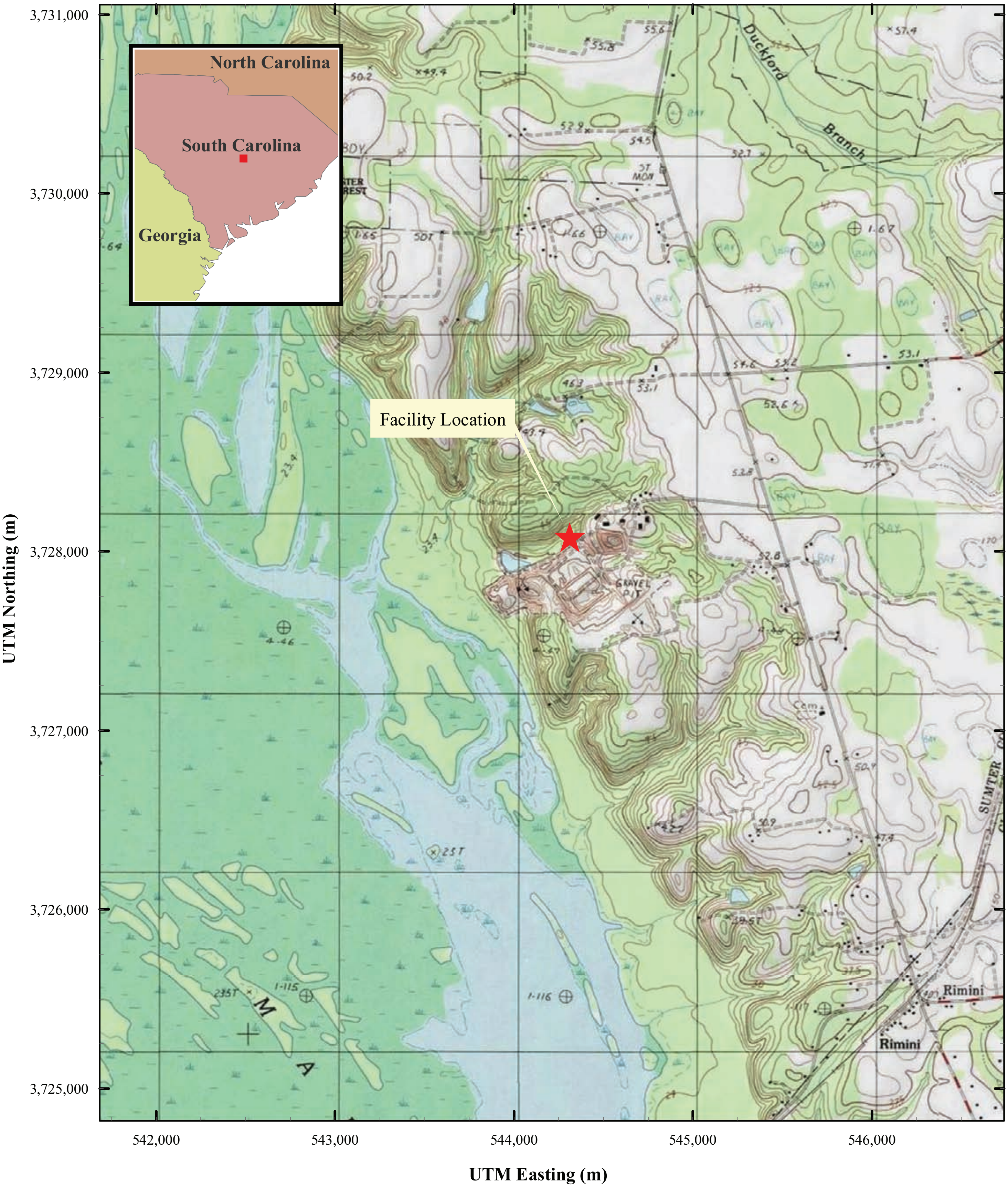
- General Forms
- Process Forms
- Storage Vessels
- Modeling Questionnaire Forms

Appendix A

Area Map

Facility Plot Plan

Figure A-1. Area Map, Pinewood Site
Pinewood, Sumter County, South Carolina



Coordinates reflect UTM projection Zone 17, NAD83.

Trinity Consultants


Figure A-2. Site Layout
Pinewood Site Custodial Trust
Date Created:
July 7, 2011
N
Section II
Section III
Section I
Cell 2D
Cell 2E
Cell 2F
Cell 2G
Cell 2C
Cell 2A & 2B
Cell 3A
Cell 3B
Cell 3B Ext
Cell 3C
Cell 1A
Cell 1B
Cell 1C
Cell 1D
Cell 1E
LTS1
LTSA/LTSB/LTSC/LTSD
CTF1
AE1
AE2
ATF
WP2
EG01
Legend
Monitoring Well
Primary Sumps
Secondary Sumps
FrenchDrainManHoles
FrenchDrains
Roads
RCRA Boundary
Ponds
Topography (1' Contours)
Landfill Cells
0
200
400
800
1,200
1,600
Feet

APPENDIX B

PROCESS FLOW DIAGRAMS

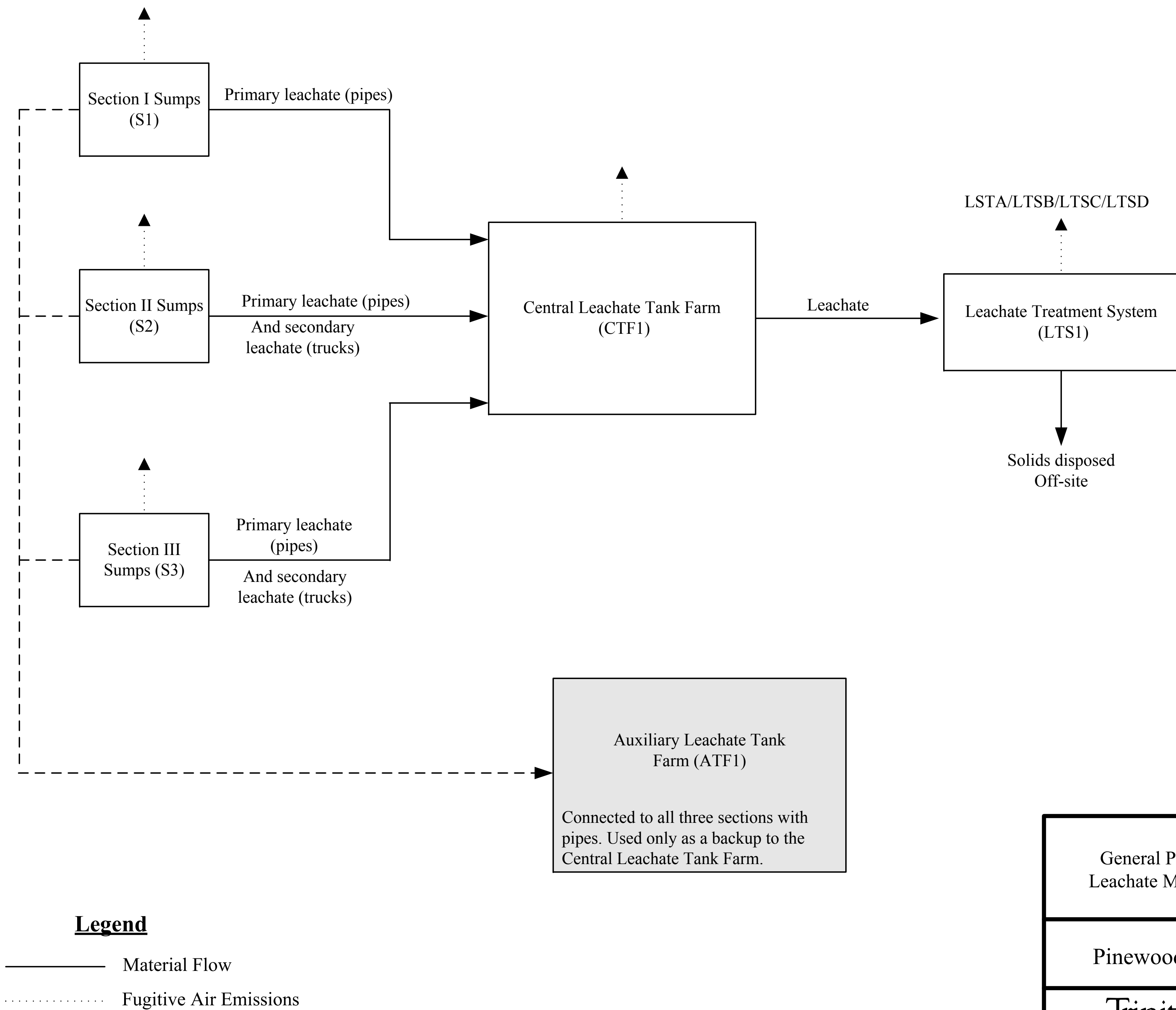


Figure B-1.
General Process Flow Diagram for
Leachate Management and Treatment
Pinewood Site

Pinewood Site Custodial Trust

Trinity Consultants

111101.0050
January 6, 2012

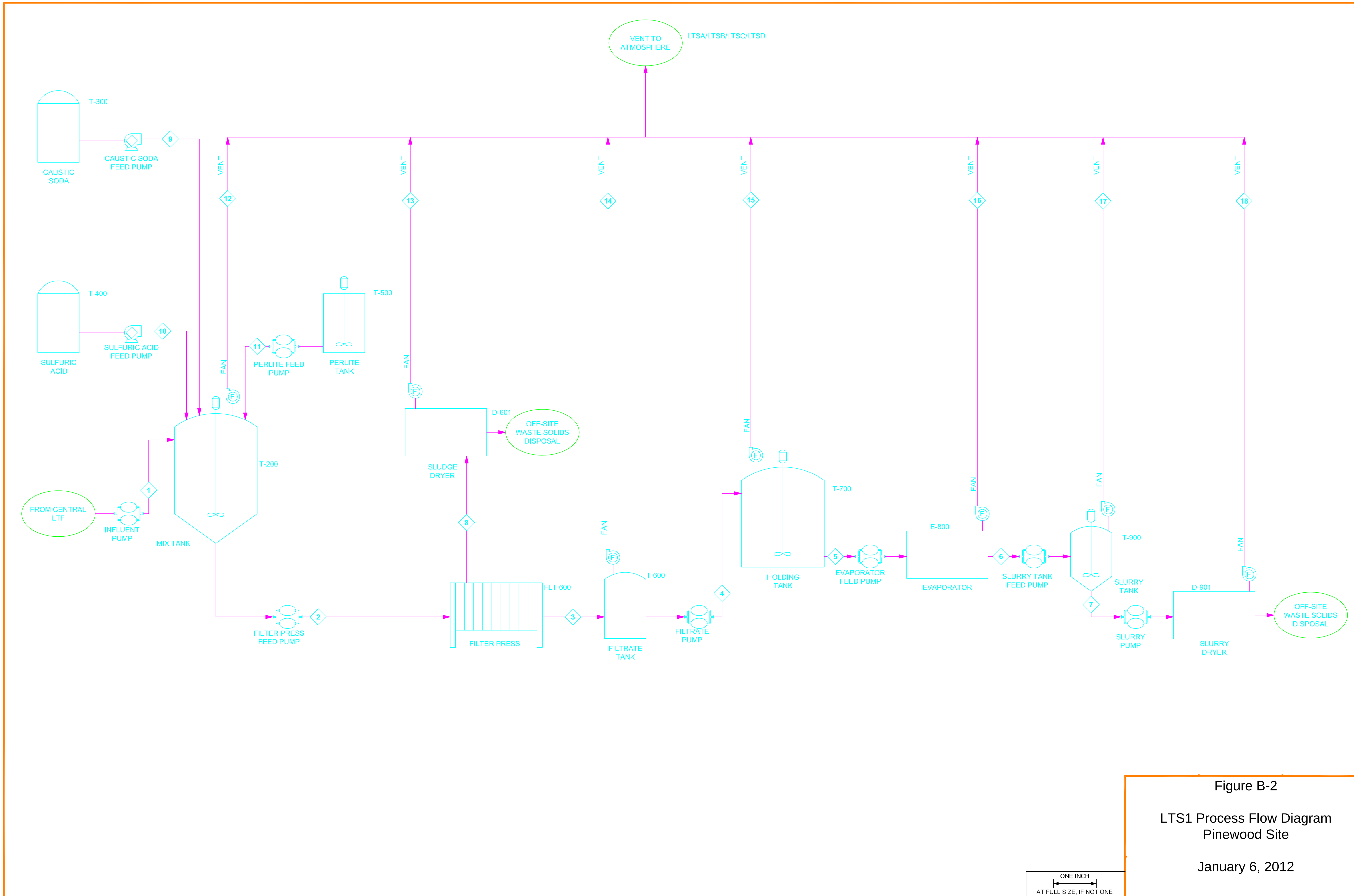


Figure B-2

LTS1 Process Flow Diagram
Pinewood Site

January 6, 2012

APPENDIX C

LEACHATE CHEMICALS AND CONCENTRATIONS

Table C-1. Tank Farm Leachate Composition and Concentrations Used in Emission Estimates
Pinewood Site

Leachate Concentration Data for Chemicals Having at Least One Detection above the Minimm Detection Limit

Chemical Name	Footnote Reference[1]	CAS No.	TAP	HAP	VOC	Fraction	Maximum Detected Concentration (µg/L)[2] 2004	2005	2006	2007	2008	2009	2010	2011	Maximum Detected Concentration for All Years (µg/L)
Dissolved Organic Carbon Average			No	No	No	G	NM	2390000	4570000	5410000	6100000	6460000	9570000	6130000	9,570,000
Total Organic Carbon Average			No	No	No	G	NM	NM	4870000	5710000	9420000	NM	8730000	6120000	9,420,000
Total Suspended Solids			No	No	No	G	NM	NM	294000	483000	2500000	NM	2500000	970000	2,500,000
Hardness as CaCO3			No	No	No	METALS	NM	NM	NM	1760000	NM	NM	NM	2690000	2,690,000
Methanol		67-56-1	Yes	Yes	Yes	ALC	NM	NM	NM	NM	NM	NM	462000	814000	814,000
Methylene chloride	2	75-09-2	Yes	Yes	No	VOA	8630	8420	292000	305000	254000	393000	674000	285000	674,000
Iron		7439-89-6	No	No	No	METALS	NM	NM	NM	898000	1030000	957000	NM	1300000	1,300,000
Total Organic Halogens			No	No	No	G	NM	NM	540000	227000	256000	NM	623000	516000	623,000
Calcium		7440-70-2	No	No	No	METALS	NM	NM	NM	738000	727000	809000	NM	855000	855,000
Ethylene glycol		107-21-1	Yes	Yes	Yes	Glycol	NM	NM	NM	NM	NM	NM	NM	662000	662000
2-Butanone		78-93-3	Yes	No	Yes	VOA	13000	12300	173000	144000	225000	120000	274000	189000	274,000
Acetone	2	67-64-1	No	No	No	VOA	30300	21800	174000	163000	260000	124000	266000	265000	266,000
Benzoic acid		65-85-0	No	No	Yes	SVOA	151000	10300	9790	ND	17400	113000	75100	6650	151,000
Magnesium		7439-95-4	No	No	No	METALS	NM	NM	NM	192000	193000	213000	NM	222000	222,000
Zinc		7440-66-6	No	No	No	METALS	NM	NM	NM	112000	86100	NM	NM	164000	164,000
1,1,1-Trichloroethane	2	71-55-6	Yes	Yes	No	VOA	1630	1020	21200	17100	17200	32400	86100	14400	86,100
Trichloroethylene		79-01-6	Yes	Yes	Yes	VOA	1390	1010	13500	9320	14700	NM	73500	13400	73,500
1,4-Dioxane		123-91-1	Yes	Yes	Yes	SVOA	1450	2720	12400	14000	14200	48400	54800	7080	54,800
Triethylene glycol	4	112-27-6	Yes	Yes	Yes	Glycol	NM	NM	NM	NM	NM	NM	NM	93700	93700
Chloroform		67-66-3	Yes	Yes	Yes	VOA	658	433	10200	8490	9140	25200	43700	10900	43,700
Isobutyl alcohol		78-83-1	No	No	Yes	VOA	2910	ND	42400	15700	ND	ND	NM	ND	42,400
1,1-Dichloroethane		75-34-3	Yes	Yes	Yes	VOA	986	728	11800	9180	9470	19000	40600	10300	40,600
Toluene		108-88-3	Yes	Yes	Yes	VOA	7280	3750	11800	8490	12000	NM	31600	11900	31,600
Fluoride			No	No	No	G	NM	NM	NM	NM	NM	NM	26800	NM	26,800
Benzyl alcohol		100-51-6	No	No	Yes	SVOA	26700	2220	2470	4130	4540	6960	ND	1700	26,700
1,2-Dichloroethane		107-06-2	Yes	Yes	Yes	VOA	203	248	11500	6640	7620	9890	26500	9500	26,500
Carbon disulfide		75-15-0	Yes	Yes	Yes	VOA	ND	216	2380	ND	ND	19100	4030	ND	19,100
Arsenic		7440-38-2	Yes	Yes	No	METALS	NM	NM	NM	16100	11100	30400	72200	30500	72,200
Phenol		108-95-2	Yes	Yes	Yes	SVOA	26000	3960	17100	21700	12800	35700	33600	8250	35,700
4-Methyl-2-pentanone		108-10-1	Yes	Yes	Yes	VOA	4790	4730	8960	8020	19700	33300	19900	7800	33,300
1,2-Dichlorobenzene		95-50-1	No	No	Yes	SVOA	378	363	791	884	2510	3230	15000	1550	15,000
Tetrachloroethylene	2	127-18-4	Yes	Yes	No	VOA	2030	1330	8670	6840	10300	19500	21700	9050	21,700
m,p-Cresols		65794-96-9	Yes	Yes	Yes	SVOA	17600	1150	1670	3570	3660	5110	6210	1110	17,600
Acetonitrile		75-05-8	Yes	Yes	Yes	VOA	ND	ND	8560	1260	ND	ND	ND	ND	8,560
1,1,2-Trichloroethane		79-00-5	Yes	Yes	Yes	VOA	305	299	5250	2080	3040	5760	8230	2550	8,230
bis(2-Ethylhexyl)phthalate		117-81-7	Yes	Yes	Yes	SVOA	292	562	278	150	202	289	16400	5940	16,400
Acid Soluble Sulfides			No	No	No	G	NM	NM	NM	NM	NM	NM	NM	6160	6,160
1,2,4,5-Tetrachlorobenzene		95-94-3	No	No	Yes	SVOA	445	491	ND	122	23.6	ND	5490	2550	5,490
Pentachlorobenzene		608-93-5	No	No	Yes	SVOA	388	404	ND	ND	ND	ND	5190	2220	5,190
Nickel		7440-02-0	Yes	Yes	No	METALS	NM	NM	NM	9570	9750	12900	19300	13800	19,300
Benzene		71-43-2	Yes	Yes	Yes	VOA	116	66.6	313	666	827	1820	3750	ND	3,750
Phosphorus		7723-14-0	Yes	Yes	No	METALS	NM	NM	NM	NM	NM	NM	NM	14800	14,800
1,4-Dichlorobenzene		106-46-7	Yes	Yes	Yes	SVOA	911	679	906	391	158	848	7060	957	7,060
Styrene		100-42-5	Yes	Yes	Yes	VOA	ND	35	28.9	ND	6920	ND	ND	ND	6,920
Dibromomethane		74-95-3	No	No	Yes	VOA	ND	ND	3280	920	1390	ND	875	ND	3,280
o-Cresol		95-48-7	Yes	Yes	Yes	SVOA	6410	976	614	1360	625	1410	3790	422	6,410
Xylenes (total)		1330-20-7	Yes	Yes	Yes	VOA	1640	1270	4550	2930	3120	NM	4750	ND	4,750
Aniline		62-53-3	Yes	Yes	Yes	SVOA	1150	645	1500	ND	1140	ND	5480	1330	5,480
2-Chlorophenol		95-57-8	No	No	Yes	SVOA	ND	30.4	813	1280	517	1100	2400	510	2,400
1,1-Dichloroethylene		75-35-4	Yes	Yes	Yes	VOA	ND	ND	544	888	ND	2330	ND	ND	2,330
cis-1,2-Dichloroethylene		156-59-2	No	No	Yes	VOA	NM	NM	165	693	868	1670	2250	ND	2,250
2,4-Dinitrophenol		51-28-5	Yes	Yes	Yes	SVOA	ND	456	ND	ND	ND	ND	4360	1460	4,360
Cadmium		7440-43-9	Yes	Yes	No	METALS	NM	NM	NM	130	21.6	236	8310	1750	8,310
1,2,4-Trichlorobenzene		120-82-1	Yes	Yes	Yes	SVOA	433	347	271	237	62.4	ND	4120	1270	4,120
m,p-Xylenes			Yes	Yes	Yes	VOA	NM	NM	NM	NM	NM	NM	NM	3710	3710
Cobalt		7440-48-4	Yes	Yes	No	METALS	NM	NM	NM	2720	3400	3100	6990	3470	6,990
Pyridine		110-86-1	No	No	Yes	SVOA	207	128	292	1690	364	377	84.6	71.9	1,690
2-Hexanone		591-78-6	No	No	Yes	VOA	1640	ND	ND	ND	ND	ND	ND	ND	1,640
Chlordane (tech.)		57-74-9	Yes	Yes	Yes	PEST	ND	44.8	ND	ND	ND	1050	653	2880	2,880
o-Xylene		95-47-6	Yes	Yes	Yes	VOA	NM	NM	NM	NM	NM	NM	NM	1380	1380
2,4-Dichlorophenol		120-83-2	No	No	Yes	SVOA	ND	47.7	145	ND	ND	226	1290	220	1,290
4-Chloro-3-methylphenol		59-50-7	No	No	Yes	SVOA	ND	ND	ND	1230	ND	ND	ND	ND	1,230
Isophorone		78-59-1	Yes	Yes	Yes	SVOA	ND	88.2	667	805	409	476	1220	259	1,220
Chromium		7440-47-3	Yes	Yes	No	METALS	NM	NM	NM	1960	1170	2030	4660	1780	4,660
Pentachlorophenol		87-86-5	Yes	Yes	Yes	SVOA	2200	28.4	562	206	1420	ND	77.8	108	2,200
Tributylphosphate		126-73-8	No	No	Yes	SVOA	100	148	105	1100	307	NM	ND	39.8	1,100
Chlorobenzene		108-90-7	Yes	Yes	Yes	VOA	71.6	91.5	1080	323	ND	ND	ND	ND	1,080
Ethylbenzene		100-41-4	Yes	Yes	Yes	VOA	358	267	961	534	730	637	1080	ND	1,080
2,3,4,6-Tetrachlorophenol		58-90-2	No	No	Yes	SVOA	1070	ND	ND	ND	ND	ND	ND	ND	1,070
Phenanthrene	3	85-01-8	Yes	Yes	Yes	SVOA	141	162	95.6	27.3	7.54	ND	1060	448	1,060
Acetophenone		98-86-2	Yes	Yes	Yes	SVOA	ND	105	956	ND	366	448	ND	188	956
Diethylphthalate		84-66-2	Yes	No	Yes	SVOA	ND	ND	198	265	223	499	955	84.1	955
Dimethylphthalate		131-11-3	Yes	Yes	Yes	SVOA	ND	49.3	380	660	420	854	1790	223	1,790
1,1,2,2-Tetrachloroethane		79-34-5	Yes	Yes	Yes	VOA	83.7	314	1410	532	730	1770	1330	ND	1,770
Caprolactam		105-60-2	Yes	No	Yes	SVOA	NM	NM	NM	NM	NM	NM	NM	877	877
Barium		7440-39-3	No	No	No	METALS	NM	NM	NM	358	297	378	NM	1480	1,480
bis(2-Chloroethyl) ether		111-44-4	No	Yes	Yes	SVOA	ND	832	1260	ND	ND	ND	1390	ND	1,390
Naphthalene		91-20-3	Yes	Yes	Yes	SVOA	538	322	548	252	286	477	1390	773	1,390
Propionitrile		107-12-0	No	No	Yes	VOA	ND	ND	661	ND	ND	ND	NM	ND	661
1,3-Dichlorobenzene		541-73-1	No	No	Yes	SVOA	10.2	25.2	407	386	164	ND	640	158	640
Lead		7439-92-1	No	Yes	No	METALS	NM	NM	NM	24.5	ND	69	1210	248	1,210
2,4-Dimethylphenol		105-67-9	No	No	Yes	SVOA	510	138	440	575	348	424	ND	ND	575
Acenaphthene	3	83-32-9	Yes	Yes	Yes	SVOA	72.9	79.4	67.5	36.6	9.68	ND	549	199	549
Chloroethane		75-00-3	Yes	Yes	Yes	VOA	ND	ND	536	88	ND	ND	ND	ND	536
2-Methylnaphthalene	3	91-57-6	Yes	Yes	Yes	SVOA	86.1	66.3	56.2	42.5	16.9	ND	506	241	506
Heptachlor		76-44-8	Yes	Yes	Yes	PEST	19.1	3.12	5.69	ND	ND	168	301	937	937
Hexachlorocyclopentadiene		77-47-4	Yes	Yes	Yes	SVOA	ND	ND	ND	ND	ND	ND	903	ND	903
Endrin		72-20-8	No	No	Yes	PEST	ND	ND	ND	ND	ND	112	442	ND	442
Fluoranthene	3	206-44-0	Yes	Yes	Yes	SVOA	70.9	87.4	43.3	ND	ND	ND	439	224	439
4,4'-DDT		50-29-3	No	No	Yes	PEST	ND	2.54	4.41	ND	ND	0.25	110	424	424

Table C-1. Tank Farm Leachate Composition and Concentrations Used in Emission Estimates
Pinewood Site

Leachate Concentration Data for Chemicals Having at Least One Detection above the Minimm Detection Limit (continued)

Chemical Name	Footnote Reference[1]	CAS No.	TAP	HAP	VOC	Fraction	Maximum Detected Concentration (µg/L)[2] 2004	2005	2006	2007	2008	2009	2010	2011	Maximum Detected Concentration for All Years
N-Nitrosopiperidine		100-75-4	No	No	Yes	SVOA	413	ND	ND	ND	ND	ND	ND	ND	413
Selenium		7782-49-2	Yes	Yes	No	METALS	NM	NM	NM	1590	562	ND	172	335	1,590
Toxaphene		8001-35-2	Yes	Yes	Yes	PEST	ND	ND	ND	ND	ND	390	ND	ND	390
Hexachlorobenzene		118-74-1	Yes	Yes	Yes	SVOA	8.22	ND	ND	ND	ND	ND	382	61.5	382
Pyrene	3	129-00-0	Yes	Yes	Yes	SVOA	ND	54	ND	ND	ND	ND	373	133	373
Di-n-octylphthalate		117-84-0	Yes	No	Yes	SVOA	ND	ND	ND	ND	ND	ND	365	60.1	365
Dieldrin		60-57-1	No	No	Yes	PEST	ND	1.06	ND	ND	ND	49.9	125	354	354
Fluorene	3	86-73-7	Yes	Yes	Yes	SVOA	58.6	68.5	43.3	7.25	5.97	ND	354	163	354
Cyanide, Total		57-12-5	Yes	Yes	No	G	NM	NM	129	285	349	122	262	114	349
Vinyl chloride		75-01-4	Yes	Yes	Yes	VOA	ND	ND	335	ND	ND	NM	ND	ND	335
Dicamba		1918-00-9	No	No	Yes	HERB	NM	NM	NM	NM	NM	NM	NM	330	330
Vanadium		7440-62-2	No	No	No	METALS	NM	NM	NM	490	320	NM	NM	632	632
4-Isopropyltoluene		99-87-6	No	No	Yes	VOA	NM	NM	258	NM	NM	NM	NM	NM	258
Carbon tetrachloride		56-23-5	Yes	Yes	Yes	VOA	ND	ND	216	257	ND	ND	ND	190	257
1-Methylnaphthalene	3	90-12-0	Yes	Yes	Yes	SVOA	49.3	38.6	34.5	29.6	10.2	ND	248	140	248
2-Picoline		109-06-8	No	No	Yes	SVOA	182	76.7	68.5	239	78.6	ND	ND	ND	239
1,2-Dibromoethane		106-93-4	Yes	Yes	Yes	VOA	ND	ND	230	69.9	ND	ND	ND	ND	230
Copper		7440-50-8	No	No	No	METALS	NM	NM	NM	28.6	15.8	444	NM	202	444
Endrin ketone		53494-70-5	No	No	Yes	PEST	ND	ND	ND	ND	1.65	42.2	219	29.2	219
o-Toluidine		95-53-4	Yes	Yes	Yes	SVOA	ND	190	216	ND	ND	ND	ND	ND	216
1,1,1,2-Tetrachloroethane		630-20-6	No	No	Yes	VOA	NM	NM	187	52.1	ND	ND	ND	NM	187
Butylbenzylphthalate		85-68-7	No	No	Yes	SVOA	ND	ND	167	ND	ND	ND	43.8	60.7	167
Dibenzofuran		132-64-9	Yes	Yes	Yes	SVOA	ND	60	ND	ND	ND	ND	54.3	143	143
Bromodichloromethane		75-27-4	No	No	Yes	VOA	ND	ND	126	22.3	ND	ND	ND	ND	126
4-Chloroaniline		106-47-8	No	No	Yes	SVOA	ND	112	ND	ND	ND	ND	ND	ND	112
Carbazole		86-74-8	No	No	Yes	SVOA	75.3	33	12.8	108	7.91	ND	96.3	20.7	108
Thallium		7440-28-0	No	No	No	METALS	NM	NM	NM	149	199	198	NM	ND	199
1,2-Dibromo-3-chloropropane		96-12-8	Yes	Yes	Yes	VOA	ND	ND	193	ND	ND	ND	ND	ND	193
Benzo(a)anthracene		56-55-3	Yes	Yes	Yes	SVOA	13.1	3.55	ND	ND	ND	ND	94.6	31.5	95
1,2-Diphenylhydrazine		122-66-7	Yes	Yes	Yes	SVOA	93.7	49	44.1	ND	43.5	ND	53.8	ND	94
2,4-D		94-75-7	Yes	Yes	Yes	HERB	NM	NM	84.5	ND	ND	ND	ND	ND	84.5
Anthracene	3	120-12-7	Yes	Yes	Yes	SVOA	ND	13.6	ND	ND	ND	ND	80.8	45	81
Di-n-butylphthalate		84-74-2	Yes	Yes	Yes	SVOA	18.7	15.3	ND	ND	ND	ND	22.6	79.8	80
trans-1,2-Dichloroethylene		156-60-5	No	No	Yes	VOA	ND	ND	77.4	17.8	ND	NM	NM	ND	77
Chrysene	3	218-01-9	Yes	Yes	Yes	SVOA	12.2	13.4	ND	ND	ND	ND	74	28.6	74
Antimony		7440-36-0	Yes	Yes	No	METALS	NM	NM	NM	37.4	98.6	131	110	90.5	131
Aldrin		309-00-2	No	No	Yes	PEST	ND	ND	ND	ND	ND	1.3	34.7	62.5	62.5
Trichlorofluoromethane	2	75-69-4	No	No	No	VOA	ND	ND	60	26.1	ND	NM	NM	ND	60
trans-1,3-Dichloropropylene		10061-02-6	No	No	Yes	VOA	ND	ND	ND	58.8	ND	NM	ND	ND	59
delta-BHC		319-86-8	No	No	Yes	PEST	ND	ND	ND	ND	ND	0.25	16.7	58	58
1,2-Dichloropropane		78-87-5	Yes	Yes	Yes	VOA	ND	ND	55.7	13.6	ND	ND	ND	ND	56
Silver		7440-22-4	No	No	No	METALS	NM	NM	NM	21.3	ND	17.5	NM	95.4	95.4
2-Chloronaphthalene	3	91-58-7	Yes	Yes	Yes	SVOA	ND	41.9	ND	ND	ND	ND	ND	ND	42
4,4'-DDE		72-55-9	No	Yes	Yes	PEST	ND	0.607	ND	ND	ND	0.25	32.2	ND	32.2
Vinyl acetate		108-05-4	Yes	Yes	Yes	VOA	ND	ND	10.6	27.7	ND	NM	ND	ND	28
Bromoform		75-25-2	Yes	Yes	Yes	VOA	ND	ND	27.4	19.7	ND	ND	ND	ND	27
Safrole		94-59-7	No	No	Yes	SVOA	ND	26.4	ND	ND	ND	ND	ND	ND	26
Aroclor-1221		11104-28-2	Yes	Yes	Yes	PCB	ND	ND	ND	ND	18.9	ND	ND	ND	19
Benzo(b)fluoranthene	3	205-99-2	Yes	Yes	Yes	SVOA	ND	3.07	ND	ND	ND	ND	ND	18.2	18
2,4,5-T		93-76-5	No	No	Yes	HERB	NM	NM	ND	18	ND	ND	ND	ND	18
4,4'-DDD		72-54-8	No	No	Yes	PEST	ND	2.94	ND	ND	ND	17.9	ND	ND	17.9
Acrylonitrile		107-13-1	Yes	Yes	Yes	VOA	ND	ND	ND	16.1	ND	ND	ND	ND	16
1-Naphthylamine		134-32-7	Yes	No	Yes	SVOA	ND	ND	31.7	ND	20.8	ND	ND	ND	32
Dibromochloromethane		124-48-1	No	No	Yes	VOA	ND	ND	3.18	13.1	ND	ND	ND	ND	13
Hexachlorobutadiene		87-68-3	Yes	Yes	Yes	SVOA	ND	ND	ND	ND	ND	ND	ND	26	26
Endosulfan I		959-98-8	No	No	Yes	PEST	ND	10.8	11.2	ND	ND	0.25	ND	ND	11.2
2,4,5-Trichlorophenol		95-95-4	Yes	Yes	Yes	SVOA	ND	ND	ND	ND	10.8	ND	ND	ND	11
1,2,3-Trichloropropane		96-18-4	No	No	Yes	VOA	ND	ND	ND	9.89	ND	ND	ND	ND	10
Benzo(a)pyrene		50-32-8	Yes	Yes	Yes	SVOA	ND	ND	ND	ND	ND	ND	ND	7.28	7.28
Benzo(k)fluoranthene		207-08-9	Yes	Yes	Yes	SVOA	ND	ND	ND	ND	ND	ND	ND	6.5	6.5
Chloromethane		74-87-3	Yes	Yes	Yes	VOA	ND	ND	3.47	6.34	ND	ND	ND	ND	6.3
Endosulfan II		33213-65-9	No	No	Yes	PEST	ND	ND	ND	ND	3.9	0.25	ND	ND	3.9
Benzo(ghi)perylene	3	191-24-2	Yes	Yes	Yes	SVOA	ND	ND	ND	ND	ND	ND	ND	3.25	3.25
Indeno(1,2,3-cd)pyrene		193-39-5	Yes	Yes	Yes	SVOA	ND	ND	ND	ND	ND	ND	ND	3.25	3.25
Heptachlor epoxide		1024-57-3	No	No	Yes	PEST	ND	ND	2.22	ND	ND	0.25	ND	ND	2.22
alpha-BHC		319-84-6	No	No	Yes	PEST	ND	ND	ND	ND	ND	1.3	ND	ND	1.3
Methoxychlor		72-43-5	Yes	Yes	Yes	PEST	ND	ND	ND	ND	ND	1.0	ND	ND	1.0
Mercury		7439-97-6	Yes	Yes	No	METALS	NM	NM	NM	1.01	0.412	ND	ND	ND	1.01
beta-BHC		319-85-7	No	No	Yes	PEST	ND	ND	ND	ND	ND	0.34	ND	ND	0.34
Endosulfan sulfate		1031-07-8	No	No	Yes	PEST	ND	ND	ND	ND	ND	0.25	ND	ND	0.25
Endrin aldehyde		7421-93-4	No	No	Yes	PEST	ND	ND	ND	ND	ND	0.25	ND	ND	0.25
gamma-BHC (Lindane)		58-89-9	Yes	Yes	Yes	PEST	ND	ND	ND	ND	ND	0.25	ND	ND	0.25

1. 2 = not VOC, 3 -= compound listed as polycyclic organic matter on EPA HAP list, 4 -= glycol ether on EPA HAP list
2. ND = not detected above the minimum detection limit, NM = not on target analyte list for that analysis.

Table C-1. Tank Farm Leachate Composition and Concentrations Used in Emission Estimates
Pinewood Site

Leachate Concentration Data for Chemicals Having No Detections above the Minimm Detection Limit

Chemical Name	Footnote Reference[1]	CAS No.	TAP	HAP	VOC	Fraction	Minimum Detection Limit (µg/L)								Minimum Detection Limit for All Years (µg/L)
							2004	2005	2006	2007	2008	2009	2010	2011	
1,3,5-Trinitrobenzene		99-35-4	No	No	Yes	SVOA	47.6	2.16	28.3	40	20	160	30	30	2.16
1,3-Dichloropropane		142-28-9	No	No	Yes	VOA			125						125
1,3-Dichloropropylene(total)		542-75-6	Yes	Yes	Yes	VOA							625	1250	625
1,4-Dinitrobenzene		100-25-4	No	No	Yes	SVOA							500		500
1,4-Naphthoquinone		130-15-4	No	No	Yes	SVOA	12.5	2.16	28.3	40	20	160	30	30	2.16
2,4,5-TP		93-72-1	No	No	Yes	HERB			5.05	1.66	8.38	8.3	8.3	8.3	1.66
2,4,6-Trichlorophenol		88-06-2	Yes	Yes	Yes	SVOA	3.71	2.16	28.3	40	20	160	20	20	2.16
2,4-DB		94-82-6	No	No	Yes	HERB								8.3	8.3
2,4-DDD		53-19-0	No	No	Yes	PEST							0.5		0.5
2,4-DDE		3424-82-6	No	No	Yes	PEST							0.6		0.6
2,4-DDT		50-29-3	No	No	Yes	PEST							0.5		0.5
2,4-Dinitrotoluene		121-14-2	Yes	Yes	Yes	SVOA	6.67	2.16	28.3	40	20	160	20	20	2.16
2,6-Dichlorophenol		87-65-0	No	No	Yes	SVOA	8.38	2.16	28.3	40	20	160	20	20	2.16
2,6-Dinitrotoluene		606-20-2	No	No	Yes	SVOA	4.76	2.16	28.3	40	20	160	20	20	2.16
2-Acetylaminofluorene		53-96-3	Yes	Yes	Yes	SVOA	7.24	2.16	28.3	40	20	160	30	30	2.16
2-Chloro-1,3-butadiene		126-99-8	Yes	Yes	Yes	VOA			150				600	1500	150
2-Chlorotoluene		95-49-8	No	No	Yes	VOA			125						125
2-Methyl-4,6-dinitrophenol		534-52-1	Yes	Yes	Yes	SVOA	9.52	3.24	42.4	60	30	240	30	30	3.24
2-Naphthylamine		91-59-8	Yes	No	Yes	SVOA	18.4	2.16	28.3	40	20	160	30	30	2.16
2-Nitrophenol		88-75-5	No	No	Yes	SVOA	5.62	2.16	28.3	40	20	160	20	20	2.16
2-Nitropropane		79-46-9	Yes	Yes	Yes	VOA							2500	500	500
3,3'-Dichlorobenzidine		91-94-1	Yes	Yes	Yes	SVOA	4.86	1.08	14.1	20	10	80	20	20	1.08
3,3'-Dimethylbenzidine		119-93-7	Yes	Yes	Yes	SVOA	16.3	2.16	28.3	40	20	160	33	33	2.16
3-Methylcholanthrene	2	56-49-5	Yes	Yes	Yes	SVOA	18	2.16	28.3	40	20	160	20	20	2.16
4,4'-Methylenebis(2-chloroaniline)		101-14-4	Yes	Yes	Yes	SVOA							250	250	250
4-Aminobiphenyl		92-67-1	Yes	Yes	Yes	SVOA	15.6	3.24	42.4	60	30	240	30	30	3.24
4-Bromophenylphenylether		101-55-3	No	No	Yes	SVOA	11.6	2.16	28.3	40	20	160	20	20	2.16
4-Chlorophenylphenylether		7005-72-3	No	No	Yes	SVOA	8	2.16	28.3	40	20	160	20	20	2.16
4-Chlorotoluene		106-43-4	No	No	Yes	VOA			125						125
4-Nitrophenol		100-02-7	Yes	Yes	Yes	SVOA	47.6	2.16	28.3	40	20	160	20	20	2.16
4-Nitroquinoline-1-oxide		56-57-5	No	No	Yes	SVOA	21	3.24	42.4	60	30	240	30	30	3.24
5-Nitro-o-toluidine		99-55-8	No	No	Yes	SVOA	14.9	2.16	28.3	40	20	160	30	30	2.16
7,12Dimethylbenz(a)anthracene		57-97-6	No	No	Yes	SVOA	47.6	2.16	28.3	40	20	160	30	30	2.16
a,a-Dimethylphenethylamine		122-09-8	No	No	Yes	SVOA	32.8	4.32	56.6	80	40	300	30	30	4.32
Acenaphthylene	2	208-96-8	Yes	Yes	Yes	SVOA	4.76	0.216	2.83	4	2	16	2	2	0.216
Acrolein		107-02-8	Yes	Yes	Yes	VOA	406	150	15	3	3130	2500	2500	6250	3
Allyl chloride		107-05-1	Yes	Yes	Yes	VOA	100	100	18.5	3.7	3750	3000	3000	7500	3.7
Aramite		140-57-8	No	No	Yes	SVOA	47.6	3.24	42.4	60	30	240	30	30	3.24
Aroclor-1016	3	12674-11-2	Yes	Yes	Yes	PCB	0.49	0.5	0.255	0.666	0.343	0.0351	1.7	0.167	0.0351
Aroclor-1232	3	11141-16-5	Yes	Yes	Yes	PCB	0.49	0.5	0.255	0.666	0.343	0.0351	1.7	0.167	0.0351
Aroclor-1242	3	53469-21-9	Yes	Yes	Yes	PCB	0.588	0.6	0.306	0.666	0.343	0.0351	1.7	0.167	0.0351
Aroclor-1248	3	12672-29-6	Yes	Yes	Yes	PCB	0.49	0.5	0.255	0.666	0.343	0.0351	1.7	0.167	0.0351
Aroclor-1254	3	11097-69-1	Yes	Yes	Yes	PCB	0.49	0.5	0.255	0.666	0.343	0.0351	1.7	0.167	0.0351
Aroclor-1260	3	11096-82-5	Yes	Yes	Yes	PCB	0.49	0.5	0.255	0.666	0.343	0.0351	1.7	0.167	0.0351
Aroclor-Total	3		Yes	Yes	Yes	PCB							6.66		6.66
Benzidine		92-87-5	Yes	Yes	Yes	SVOA	47.6	2.16	28.3	40	20	160	30	30	2.16
Benzyl chloride		100-44-7	Yes	Yes	Yes	SVOA			500					650	500
Beryllium		7440-41-7	Yes	Yes	No	METALS				1	1	1	10	10	1
Biphenyl		92-52-4	Yes	Yes	Yes	SVOA								300	300
bis(2-Chloroethoxy)methane		111-91-1	No	No	Yes	SVOA	4.57	3.24	42.4	60	30	240	30	30	3.24
bis(2-Chloroisopropyl)ether		39638-32-9	No	No	Yes	SVOA	7.62	2.16	7.5	1.5	20	160	20	20	1.5
Bromomethane		74-83-9	Yes	Yes	Yes	VOA	50	25	2.5	0.5	1000	1000	600	1500	0.5
Chloroacetic acid		79-11-8	Yes	Yes	No	G								100	100
Chlorobenzilate		510-15-6	Yes	Yes	Yes	SVOA	6	2.16	28.3	40	20	160	30	30	2.16
cis-1,3-Dichloropropylene		10061-01-5	No	No	Yes	VOA	30	12.5	1.25	0.25	500	500	500	1250	0.25
Cyanide, Amenable to CL			No	No	No	G							33.2		33.2
Cyclohexanone		108-94-1	No	No	Yes	VOA							30000		30000
Dalapon		75-99-0	No	No	Yes	HERB								125	125
Diallate		2303-16-4	No	No	Yes	SVOA	11.4	2.16	28.3	40	20	160	30	30	2.16
Dibenzo(a,e)pyrene	2	192-65-4	Yes	Yes	Yes	SVOA								300	300
Dibenzo(a,h)anthracene		53-70-3	No	No	Yes	SVOA	4.76	0.216	2.83	4	2	16	2	2	0.216
Dichlorodifluoromethane	4	75-71-8	No	No	No	VOA	43	25	2.5	0.5	1000	1000	600	1500	0.5
Dichlorprop		120-36-5	No	No	Yes	HERB								8.3	8.3
Dimethoate		60-51-5	No	No	Yes	SVOA	7.24	2.16	28.3	40	20	160	20	20	2.16
Dinoseb		88-85-7	No	No	Yes	HERB	12.2	2.16	28.3	40	20	160	8.3	8.3	2.16
Diphenylamine		122-39-4	No	No	Yes	SVOA	7.52	3.24	42.4	60	30	240	30	30	3.24
Disulfoton		298-04-4	No	No	Yes	SVOA	7.33	2.16	28.3	40	20	160	20	20	2.16
Ethyl methacrylate		97-63-2	No	No	Yes	SVOA	8.76	2.16	28.3	40	20	160	20	20	2.16
Ethyl Methanesulfonate		62-50-0	No	No	Yes	SVOA	9.33	2.16	28.3	40	20	160	20	20	2.16
Famphur		52-85-7	No	No	Yes	SVOA	7.05	2.16	28.3	40	20	160	30	30	2.16
Formaldehyde		50-00-0	Yes	Yes	Yes								0		0
Hexachloroethane		67-72-1	Yes	Yes	Yes	SVOA	4.1	2.16	28.3	40	20	160	20	20	2.16
Hexachlorophene		70-30-4	No	No	Yes	SVOA	2380	216	2830	4000	2000	16000	1850	1850	216
Hexachloropropene		1888-71-7	No	No	Yes	SVOA	13.7	2.16	28.3	40	20	160	30	30	2.16
Hexane		110-54-3	Yes	Yes	Yes	Solvent								300000	300000
Hydrazine		302-01-2	Yes	Yes	No	G								1320	1320
Iodomethane		74-88-4	Yes	Yes	Yes	VOA	188	62.5	6.25	1.25	2500	2500	2500	6250	1.25
Isodrin		465-73-6	No	No	Yes	SVOA	5.05	2.16	28.3	40	20	160	30	30	2.16
Isopropylbenzene		98-82-8	Yes	Yes	Yes	VOA							625	125	125
Isosafrole		120-58-1	No	No	Yes	SVOA	15.3	2.16	28.3	40	20	160	20	20	2.16
Kepone		143-50-0	Yes	No	Yes	SVOA	9.24	2.16	28.3	40	20	160	30	30	2.16
MCPA		94-74-6	No	No	Yes	HERB								1100	1100
MCPP		93-65-2	No	No	Yes	HERB								1000	1000
m-Dinitrobenzene		99-65-0	Yes	No	Yes	SVOA	47.6	2.16	28.3	40	20	160	20	20	2.16
Methacrylonitrile		126-98-7	No	No	Yes	VOA	101	50	5	1	2000	2000		5000	1
Methapyrilene		91-80-5	No	No	Yes	SVOA	4	2.16	28.3	40	20	160	30	30	2.16
Methyl methacrylate		80-62-6	Yes	Yes	Yes	SVOA	37	2.16	28.3	40	20	160	20	20	2.16
Methyl methanesulfonate		66-27-3	No	No	Yes	SVOA	7.71	2.16	28.3	40	20	160	20	20	2.16
Methyl parathion		298-00-0	No	No	Yes	SVOA	10.5	2.16	28.3	40	20	160	20	20	2.16
Mirex		2385-85-5	Yes	No	Yes	PEST								0.665	0.665

Table C-1. Tank Farm Leachate Composition and Concentrations Used in Emission Estimates
Pinewood Site

Leachate Concentration Data for Chemicals Having No Detections above the Minimm Detection Limit (continued)

Chemical name	Footnote Reference	CAS No.	TAP	HAP	VOC	Fraction	Minimum Detect Limit (µg/L) 2004	2005	2006	2007	2008	2009	2010	2011	Minimum Detect Limit for All Years (µg/L)
m-Nitroaniline		99-09-2	No	No	Yes	SVOA	9.52	2.16	28.3	40	20	160	20	20	2.16
Nitrobenzene		98-95-3	Yes	Yes	Yes	SVOA	6	3.24	42.4	60	30	240	30	30	3.24
Nitroglycerin		55-63-0	Yes	No	Yes	Explosives								32.5	32.5
N-Methyl-N-nitrosomethylamine		62-75-9	Yes	Yes	Yes	SVOA	47.6	2.16	28.3	40	20	160	20	20	2.16
N-Nitrosodiethylamine		55-18-5	No	No	Yes	SVOA	7.52	2.16	28.3	40	20	160	20	20	2.16
N-Nitrosodi-n-butylamine		924-16-3	No	No	Yes	SVOA	10.2	2.16	28.3	40	20	160	30	30	2.16
N-Nitrosodipropylamine		621-64-7	No	No	Yes	SVOA	7.14	2.16	28.3	40	20	160	20	20	2.16
N-Nitrosomethylethylamine		10595-95-6	No	No	Yes	SVOA	16.9	2.16	28.3	40	20	160	20	20	2.16
N-Nitrosomorpholine		59-89-2	Yes	Yes	Yes	SVOA	8	2.16	28.3	40	20	160	20	20	2.16
N-Nitrosopyrrolidine		930-55-2	No	No	Yes	SVOA	9.14	2.16	28.3	40	20	160	20	20	2.16
n-Propylbenzene		103-65-1	No	No	Yes	VOA			125						125
o-Nitroaniline		88-74-4	No	No	Yes	SVOA	6.1	2.16	28.3	40	20	160	20	20	2.16
p-(Dimethylamino)azobenzene		60-11-7	Yes	Yes	Yes	SVOA	20.6	2.16	28.3	40	20	160	30	30	2.16
Parathion		56-38-2	Yes	Yes	Yes	SVOA	11.7	3.24	42.4	60	30	240	30	30	3.24
p-Benzoquinone		106-51-4	Yes	Yes	Yes	SVOA								200	200
Pentachloroethane		76-01-7	No	No	Yes	SVOA	9.62	2.16	28.3	40	20	160	30	30	2.16
Pentachloronitrobenzene		82-68-8	Yes	Yes	Yes	SVOA	18.9	2.16	28.3	40	20	160	20	20	2.16
Phenacetin		62-44-2	No	No	Yes	SVOA	16.9	2.16	28.3	40	20	160	20	20	2.16
Phorate		298-02-2	No	No	Yes	SVOA	4.48	2.16	28.3	40	20	160	20	20	2.16
p-Nitroaniline		100-01-6	Yes	No	Yes	SVOA	6.38	3.24	42.4	60	30	240	30	30	3.24
p-Nitrotoluene		99-99-0	Yes	No	Yes	Explosives								8.12	8.12
p-Phenylenediamine		106-50-3	Yes	Yes	Yes	SVOA	47.6	2.16	28.3	40	20	160	20	20	2.16
Pronamide		23950-58-5	No	No	Yes	SVOA	16.6	2.16	28.3	40	20	160	30	30	2.16
Sulfotepp		3689-24-5	No	No	Yes	SVOA	10.2	2.16	28.3	40	20	160	20	20	2.16
tert-Butyl methyl ether		1634-04-4	Yes	Yes	Yes	VOA							625	125	125
Thionazin		297-97-2	No	No	Yes	SVOA	5.9	2.16	28.3	40	20	160	20	20	2.16
Tin		7440-31-5	No	No	No	METALS				2.5	2.5	25		25	2.5
Total Sulfide			No	No	No	G			150	750	1500	150	6000		150
trans-1,4-Dichloro-2-butene		110-57-6	No	No	Yes	VOA	117	50	5	1	2000	2000		500	1
Triethylphosphorothioate		126-68-1	No	No	Yes	SVOA	10.4	2.16	28.3	40	20	160	20	20	2.16

1. 2 = compounds listed under Polycyclic Organic Matter on the EPA list of HAPs, 3 = compounds listed under polychlorinated biphenyls under the EPA HAP list, 4 = not a VOC

APPENDIX D

EMISSION CALCULATIONS

Table D-1. Total Criteria Pollutant Emission Rates by Emission Unit
Pinewood Site

Emission Unit Description	Emission Unit ID	PM lb/hr	PM tpy	PM_{10} lb/hr	PM_{10} tpy	$PM_{2.5}$ lb/hr	$PM_{2.5}$ tpy	SO_2 lb/hr	SO_2 tpy	NO_X lb/hr	NO_X tpy	VOC[1] lb/hr	VOC[1] tpy[2]	CO lb/hr	CO tpy	CO_2e lb/hr	CO_2e tpy
Leachate Treatment System (all components)	LTS1	0.03	0.15	0.03	0.15	0.03	0.15	8.93E-04	3.91E-03	0.65	2.83	9.85	18.58	0.37	1.63	614	2,690
Central LTF (Primary Tanks CL01 - CL10)	CTF1	--	--	--	--	--	--	--	--	--	--	0.69	3.03	--	--	--	--
Auxiliary LTF (Tanks AL01, AL02)	ATF	--	--	--	--	--	--	--	--	--	--	0.67	2.92	--	--	--	--
North and South Aeration Basins	AE1-AE2	--	--	--	--	--	--	--	--	--	--	2.32E-03	0.010	--	--	--	--
Section I Sumps	S1	--	--	--	--	--	--	--	--	--	--	0.062	0.27	--	--	--	--
Section II Sumps	S2	--	--	--	--	--	--	--	--	--	--	0.22	0.98	--	--	--	--
Section III Sumps	S3	--	--	--	--	--	--	--	--	--	--	5.29E-03	0.023	--	--	--	--
200 kW Emergency Generator Sub-Base Diesel Tank	DST1	--	--	--	--	--	--	--	--	--	--	1.12E-03	2.80E-04	--	--	--	--
200 kW Emergency Generator	EG01	0.59	0.15	0.59	0.15	0.59	0.15	0.55	0.14	8.31	2.08	0.67	0.17	1.79	0.45	307	77
Totals		**0.62**	**0.30**	**0.62**	**0.30**	**0.62**	**0.30**	**0.55**	**0.14**	**8.95**	**4.90**	**12.17**	**20.03**	**2.16**	**2.08**	**921**	**2,767**

1. VOC emissions from leachate evaporation are calculated as the sum of emissions from analyzed VOC compounds. Based on maximum total organic carbon (TOC) analyses in the leachate tank farm, the maximum annual TOC emissions are still below the VOC major threshold.
2. Potential to emit for VOC in tons per year does not include emissions from the Central Leachate Tank Farm ofr Auxiliary Leachate Tank Farm. Short-term emissions for both the tank farms and the treatment system assume the same inlet chemical concentrations; however, in reality the mass flow of chemicals entering the leachate treatment system would be lower after accounting for the loss from the tank farm. Therefore, the emission rate from the leachate treatment system are inclusive of the emissions from the tank farm.

Table D-2. Speciated Estimated Potential Emissions of HAPs and TAPs by Emission Unit
Pinewood Site

Pollutant	Footnote Reference	CAS No.	LTS1		CTF1		ATF1		AE1-AE2		S1		S2		S3		EG01		FP01		Total	
			lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy[1]
1,1,1-Trichloroethane		71-55-6	6.90E+00	5.39E-01	2.30E+00	4.21E-01	2.20E+00	4.02E-01	8.91E-05	1.63E-05	4.69E-01	8.57E-02	1.80E+00	3.29E-01	5.21E-04	9.51E-05	--	--	--	--	1.15E+01	1.37E+00
1,1,2,2-Tetrachloroethane		79-34-5	1.42E-01	1.11E-02	2.32E-02	4.24E-03	2.61E-02	4.76E-03	7.62E-04	1.39E-04	3.11E-03	5.67E-04	5.12E-02	9.34E-03	1.20E-05	2.19E-06	--	--	--	--	2.20E-01	2.11E-02
1,1,2-Trichloroethane		79-00-5	6.59E-01	5.15E-02	1.04E-01	1.90E-02	1.17E-01	2.13E-02	1.91E-03	3.48E-04	1.35E-02	2.46E-03	1.42E-02	2.60E-03	1.66E-05	3.03E-06	--	--	--	--	7.93E-01	5.69E-02
1,1-Dichloroethane		75-34-3	3.25E+00	2.54E-01	8.11E-01	1.48E-01	8.27E-01	1.51E-01	7.54E-04	1.38E-04	1.55E-01	2.82E-02	5.76E-01	1.05E-01	4.16E-04	7.59E-05	--	--	--	--	4.80E+00	3.88E-01
1,1-Dichloroethylene		75-35-4	1.87E-01	1.46E-02	7.47E-02	1.36E-02	6.82E-02	1.24E-02	6.48E-04	1.18E-04	3.08E-02	5.62E-03	3.14E-01	5.74E-02	1.24E-04	2.26E-05	--	--	--	--	6.07E-01	7.77E-02
1,2,4-Trichlorobenzene		120-82-1	3.30E-01	2.58E-02	8.02E-02	1.46E-02	8.34E-02	1.52E-02	--	--	2.60E-03	4.74E-04	2.50E-02	4.56E-03	5.85E-04	1.07E-04	--	--	--	--	4.38E-01	3.09E-02
1,2-Dibromo-3-chloropropane		96-12-8	1.55E-02	1.21E-03	3.03E-03	5.53E-04	3.31E-03	6.03E-04	1.44E-04	2.63E-05	1.25E-03	2.28E-04	9.44E-07	1.72E-07	9.37E-07	1.71E-07	--	--	--	--	1.99E-02	1.46E-03
1,2-Dibromoethane		106-93-4	1.84E-02	1.44E-03	4.32E-03	7.89E-04	4.57E-03	8.34E-04	7.35E-05	1.34E-05	1.59E-03	2.90E-04	9.32E-07	1.70E-07	1.17E-06	2.14E-07	--	--	--	--	2.44E-02	1.74E-03
1,2-Dichloroethane		107-06-2	2.12E+00	1.66E-01	2.78E-01	5.08E-02	3.17E-01	5.78E-02	7.43E-05	1.36E-05	6.34E-02	1.16E-02	4.72E-02	8.61E-03	2.73E-05	4.98E-06	--	--	--	--	2.51E+00	1.86E-01
1,2-Dichloropropane		78-87-5	4.46E-03	3.49E-04	1.67E-03	3.05E-04	1.55E-03	2.84E-04	7.43E-05	1.36E-05	2.06E-03	3.76E-04	8.24E-06	1.50E-06	4.04E-06	7.37E-07	--	--	--	--	8.28E-03	7.40E-04
1,2-Diphenylhydrazine		122-66-7	7.51E-03	5.86E-04	1.52E-06	2.78E-07	2.07E-06	3.78E-07	--	--	--	--	--	--	--	--	--	--	--	--	7.51E-03	5.86E-04
1,3-Dichloropropylene(total)		542-75-6	5.01E-02	3.91E-03	1.61E-03	2.93E-04	1.54E-03	2.81E-04	--	--	4.02E-04	7.34E-05	2.61E-04	4.77E-05	--	--	--	--	--	--	5.23E-02	4.03E-03
1,4-Dichlorobenzene		106-46-7	5.66E-01	4.42E-02	1.47E-01	2.69E-02	1.50E-01	2.75E-02	8.61E-05	1.57E-05	1.47E-03	2.69E-04	9.08E-02	1.66E-02	3.79E-05	6.92E-06	--	--	--	--	8.05E-01	6.11E-02
1,4-Dioxane		123-91-1	4.39E+00	3.43E-01	1.70E-02	3.10E-03	2.27E-02	4.14E-03	--	--	1.12E-02	2.05E-03	1.34E-03	2.45E-04	6.48E-05	1.18E-05	--	--	--	--	4.42E+00	3.45E-01
1-Methylnaphthalene	2	90-12-0	1.99E-02	1.55E-03	4.44E-03	8.10E-04	4.72E-03	8.62E-04	--	--	--	--	--	--	--	--	--	--	--	--	2.43E-02	1.55E-03
1-Naphthylamine	3	134-32-7	2.54E-03	1.98E-04	7.12E-06	1.30E-06	9.68E-06	1.77E-06	--	--	--	--	--	--	--	--	--	--	--	--	2.55E-03	1.98E-04
2,4,5-Trichlorophenol		95-95-4	8.65E-04	6.76E-05	7.98E-05	1.46E-05	9.75E-05	1.78E-05	--	--	--	--	--	--	--	--	--	--	--	--	9.45E-04	6.76E-05
2,4,6-Trichlorophenol		88-06-2	1.73E-04	1.35E-05	1.19E-06	2.17E-07	1.60E-06	2.92E-07	--	--	--	--	--	--	--	--	--	--	--	--	1.74E-04	1.35E-05
2,4-D		94-75-7	6.77E-03	5.29E-04	8.23E-09	1.50E-09	1.12E-08	2.04E-09	--	--	1.23E-09	2.24E-10	5.32E-10	9.71E-11	5.32E-12	9.71E-13	--	--	--	--	6.77E-03	5.29E-04
2,4-Dinitrophenol		51-28-5	3.49E-01	2.73E-02	7.94E-06	1.45E-06	1.08E-05	1.97E-06	--	--	--	--	--	--	--	--	--	--	--	--	3.49E-01	2.73E-02
2,4-Dinitrotoluene		121-14-2	1.73E-04	1.35E-05	1.36E-06	2.48E-07	1.83E-06	3.34E-07	--	--	--	--	--	--	--	--	--	--	--	--	1.74E-04	1.35E-05
2-Acetylaminofluorene		53-96-3	1.73E-04	1.35E-05	4.30E-05	7.86E-06	4.50E-05	8.20E-06	--	--	--	--	--	--	--	--	--	--	--	--	2.16E-04	1.35E-05
2-Butanone	3	78-93-3	2.20E+01	1.71E+00	1.81E-01	3.30E-02	2.35E-01	4.30E-02	3.55E-04	6.47E-05	2.16E-02	3.94E-03	1.80E-02	3.29E-03	3.49E-04	6.37E-05	--	--	--	--	2.22E+01	1.72E+00
2-Chloro-1,3-butadiene		126-99-8	1.20E-02	9.39E-04	5.09E-03	9.28E-04	4.53E-03	8.27E-04	--	--	7.28E-05	1.33E-05	1.57E-06	2.87E-07	6.64E-06	1.21E-06	--	--	--	--	1.72E-02	9.54E-04
2-Chloronaphthalene	2	91-58-7	3.36E-03	2.62E-04	8.44E-04	1.54E-04	8.76E-04	1.60E-04	--	--	--	--	--	--	--	--	--	--	--	--	4.20E-03	2.62E-04
2-Methyl-4,6-dinitrophenol		534-52-1	2.60E-04	2.03E-05	6.25E-08	1.14E-08	8.50E-08	1.55E-08	--	--	--	--	--	--	--	--	--	--	--	--	2.60E-04	2.03E-05
2-Methylnaphthalene	2	91-57-6	4.05E-02	3.17E-03	8.15E-03	1.49E-03	8.84E-03	1.61E-03	--	--	--	--	--	--	--	--	--	--	--	--	4.87E-02	3.17E-03
2-Naphthylamine	3	91-59-8	1.73E-04	1.35E-05	9.26E-07	1.69E-07	1.25E-06	2.28E-07	--	--	--	--	--	--	--	--	--	--	--	--	1.74E-04	1.35E-05
2-Nitropropane		79-46-9	4.01E-02	3.13E-03	3.70E-03	6.74E-04	4.50E-03	8.20E-04	--	--	1.80E-04	3.28E-05	1.60E-04	2.92E-05	--	--	--	--	--	--	4.41E-02	3.19E-03
3,3'-Dichlorobenzidine		91-94-1	8.65E-05	6.76E-06	2.88E-06	5.25E-07	3.75E-06	6.85E-07	--	--	--	--	--	--	--	--	--	--	--	--	8.94E-05	6.76E-06
3,3'-Dimethylbenzidine		119-93-7	1.73E-04	1.35E-05	8.08E-09	1.47E-09	1.10E-08	2.00E-09	--	--	--	--	--	--	--	--	--	--	--	--	1.73E-04	1.35E-05
3-Methylcholanthrene	2	56-49-5	1.73E-04	1.35E-05	5.22E-05	9.52E-06	5.18E-05	9.46E-06	--	--	--	--	--	--	--	--	--	--	--	--	2.25E-04	1.35E-05
4,4'-DDE	4	72-55-9	2.58E-03	2.02E-04	4.82E-04	8.79E-05	5.33E-04	9.73E-05	--	--	3.54E-06	6.45E-07	2.89E-05	5.27E-06	3.61E-06	6.59E-07	--	--	--	--	3.10E-03	2.08E-04
4,4'-Methylenebis(2-chloroaniline)		101-14-4	2.00E-02	1.56E-03	6.15E-03	1.12E-03	6.06E-03	1.11E-03	--	--	--	--	--	--	--	--	--	--	--	--	2.62E-02	1.56E-03
4-Aminobiphenyl		92-67-1	2.60E-04	2.03E-05	1.89E-06	3.45E-07	2.55E-06	4.65E-07	--	--	--	--	--	--	--	--	--	--	--	--	2.61E-04	2.03E-05
4-Methyl-2-pentanone		108-10-1	2.67E+00	2.08E-01	1.94E-01	3.55E-02	2.35E-01	4.30E-02	3.67E-04	6.70E-05	1.40E-02	2.55E-03	8.64E-02	1.58E-02	1.94E-03	3.53E-04	--	--	--	--	2.96E+00	2.27E-01
4-Nitrophenol		100-02-7	1.73E-04	1.35E-05	1.66E-08	3.04E-09	2.26E-08	4.13E-09	--	--	--	--	--	--	--	--	--	--	--	--	1.73E-04	1.35E-05
Acenaphthene	2	83-32-9	4.40E-02	3.44E-03	5.03E-03	9.18E-04	5.98E-03	1.09E-03	--	--	--	--	--	--	--	--	6.39E-05	6.66E-07	2.39E-06	2.49E-08	4.91E-02	3.44E-03
Acenaphthylene	2	208-96-8	1.73E-05	1.35E-06	5.83E-06	1.06E-06	5.60E-06	1.02E-06	--	--	--	--	--	--	--	--	2.28E-04	2.37E-06	8.50E-06	8.86E-08	2.59E-04	3.81E-06
Acenaphthylene	2	208-96-8	1.73E-05	1.35E-06	5.83E-06	1.06E-06	5.60E-06	1.02E-06	--	--	--	--	--	--	--	--	2.28E-04	2.37E-06	8.50E-06	8.86E-08	2.59E-04	3.81E-06
Acetaldehyde		75-07-0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.45E-02	3.60E-04	1.29E-03	1.34E-05	3.58E-02	3.73E-04
Acetonitrile		75-05-8	6.86E-01	5.36E-02	7.16E-03	1.31E-03	9.52E-03	1.74E-03	--	--	5.52E-04	1.01E-04	7.72E-04	1.41E-04	1.54E-05	2.81E-06	--	--	--	--	6.94E-01	5.38E-02
Acetophenone		98-86-2	7.66E-02	5.98E-03	1.34E-03	2.44E-04	1.77E-03	3.23E-04	--	--	--	--	--	--	--	--	--	--	--	--	7.79E-02	5.98E-03
Acrolein		107-02-8	2.40E-04	1.88E-05	5.83E-05	1.06E-05	6.10E-05	1.11E-05	3.64E-04	6.65E-05	1.53E-06	2.80E-07	1.86E-06	3.39E-07	1.16E-06	2.12E-07	4.16E-03	4.34E-05	1.55E-04	1.62E-06	4.99E-03	1.31E-04
Acrolein		107-02-8	2.40E-04	1.88E-05	5.83E-05	1.06E-05	6.10E-05	1.11E-05	3.64E-04	6.65E-05	1.53E-06	2.80E-07	1.86E-06	3.39E-07	1.16E-06	2.12E-07	4.16E-03	4.34E-05	1.55E-04	1.62E-06	4.99E-03	1.31E-04
Acrylonitrile		107-13-1	1.29E-03	1.01E-04	2.38E-04	4.35E-05	2.64E-04	4.82E-05	2.92E-04	5.33E-05	1.99E-04	3.63E-05	1.56E-06	2.84E-07	9.84E-07	1.80E-07	--	--	--	--	2.02E-03	1.91E-04
Allyl chloride		107-05-1	2.96E-04	2.32E-05	1.23E-04	2.25E-05	1.11E-04	2.02E-05	--	--	1.10E-02	2.01E-03	2.93E-05	5.35E-06	1.74E-05	3.17E-06	--	--	--	--	1.15E-02	2.05E-03
Aniline		62-53-3	4.39E-01	3.43E-02	1.24E-03	2.26E-04	1.67E-03	3.05E-04	--	--	--	--	--	--	--	--	--	--	--	--	4.40E-01	3.43E-02
Anthracene	2	120-12-7	6.47E-03	5.06E-04	8.53E-04	1.56E-04	9.98E-04	1.82E-04	--	--	--	--	--	--	--	--	8.42E-05	8.77E-07	3.14E-06	3.27E-08	7.41E-03	5.07E-04
Antimony		7440-36-0	5.25E-03	4.10E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.25E-03	4.10E-04
Aroclor-1016	5	12674-11-2	2.81E-06	2.20E-07	1.09E-06	1.99E-07	1.00E-06	1.83E-07	--	--	--	--	--	--	--	--	--	--	--	--	3.90E-06	2.20E-07
Aroclor-1221	5	11104-28-2	1.51E-03	1.18E-04	3.92E-04	7.16E-05	4.04E-04	7.37E-05	--	--	--	--	--	--	--	--	--	--	--	--	1.91E-03	1.18E-04
Aroclor-1232	5	11141-16-5	2.81E-06	2.20E-07	1.16E-06	2.12E-07	1.05E-06	1.91E-07	--	--	--	--	--	--	--	--	--	--	--	--	3.98E-06	2.20E-07
Aroclor-1242	5	53469-21-9	2.81E-06	2.20E-07	1.15E-06	2.10E-07	1.04E-06	1.90E-07	--	--	--	--	--	--	--	--	--	--	--	--	3.96E-06	2.20E-07
Aroclor-1248	5	12672-29-6	2.81E-06	2.20E-07	1.15E-06	2.09E-07	1.04E-06	1.90E-07	--	--	--	--	--	--	--	--	--	--	--	--	3.96E-06	2.20E-07
Aroclor-1254	5	11097-69-1	2.81E-06	2.20E-07	1.14E-06	2.08E-07	1.03E-06	1.88E-07	--	--	--	--	--	--	--	--	--	--	--	--	3.95E-06	2.20E-07
Aroclor-1260	5	11096-82-5	2.81E-06	2.20E-07	1.14E-06	2.08E-07	1.04E-06	1.89E-07	--	--	--	--	--	--	--	--	--	--	--	--	3.95E-06	2.20E-07

Table D-2. Speciated Estimated Potential Emissions of HAPs and TAPs by Emission Unit
Pinewood Site (Continued)

Pollutant	Footnote Reference	CAS No.	LTS1		CTF1		ATF1		AE1-AE2		S1		S2		S3		EG01		FP01		Total	
			lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy[1]
Aroclor-Total	5		5.34E-04	4.17E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.34E-04	4.17E-05
Arsenic		7440-38-2	2.89E+00	2.26E-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.89E+00	2.26E-01
Benzene		71-43-2	3.00E-01	2.35E-02	9.20E-02	1.68E-02	9.03E-02	1.65E-02	8.91E-05	1.63E-05	1.53E-02	2.79E-03	7.28E-02	1.33E-02	9.17E-04	1.67E-04	4.20E-02	4.38E-04	1.57E-03	1.63E-05	5.25E-01	4.02E-02
Benzidine		92-87-5	1.73E-04	1.35E-05	5.56E-09	1.02E-09	7.58E-09	1.38E-09	--	--	--	--	--	--	--	--	--	--	--	--	1.73E-04	1.35E-05
Benzo(a)anthracene	2	56-55-3	7.58E-03	5.92E-04	4.65E-05	8.48E-06	6.25E-05	1.14E-05	--	--	--	--	--	--	--	--	7.56E-05	7.88E-07	2.82E-06	2.94E-08	7.70E-03	5.93E-04
Benzo(a)pyrene	2	50-32-8	5.83E-04	4.56E-05	7.98E-06	1.46E-06	1.07E-05	1.95E-06	--	--	--	--	--	--	--	--	8.46E-06	8.82E-08	3.16E-07	3.29E-09	6.00E-04	4.57E-05
Benzo(b)fluoranthene	2	205-99-2	1.46E-03	1.14E-04	1.90E-05	3.48E-06	2.56E-05	4.67E-06	--	--	--	--	--	--	--	--	4.46E-06	4.65E-08	1.66E-07	1.73E-09	1.48E-03	1.14E-04
Benzo(ghi)perylene	2	191-24-2	2.60E-04	2.03E-05	3.92E-07	7.16E-08	5.33E-07	9.73E-08	--	--	--	--	--	--	--	--	2.20E-05	2.29E-07	8.22E-07	8.56E-09	2.84E-04	2.06E-05
Benzo(k)fluoranthene	2	207-08-9	5.21E-04	4.07E-05	1.67E-06	3.05E-07	2.26E-06	4.13E-07	--	--	--	--	--	--	--	--	6.98E-06	7.27E-08	2.60E-07	2.71E-09	5.30E-04	4.08E-05
Benzyl chloride		100-44-7	4.01E-02	3.13E-03	6.74E-03	1.23E-03	7.58E-03	1.38E-03	--	--	2.54E-05	4.64E-06	2.70E-06	4.93E-07	2.33E-06	4.25E-07	--	--	--	--	4.68E-02	3.14E-03
Beryllium		7440-41-7	4.01E-05	3.13E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.01E-05	3.13E-06
Biphenyl		92-52-4	2.40E-02	1.88E-03	4.88E-03	8.90E-04	5.30E-03	9.66E-04	--	--	--	--	--	--	--	--	--	--	--	--	2.89E-02	1.88E-03
bis(2-Chloroethyl) ether	4	111-44-4	1.11E-01	8.70E-03	8.06E-03	1.47E-03	1.00E-02	1.83E-03	--	--	--	--	--	--	--	--	--	--	--	--	1.19E-01	8.70E-03
bis(2-Ethylhexyl)phthalate		117-81-7	1.31E+00	1.03E-01	7.77E-05	1.42E-05	1.06E-04	1.93E-05	--	--	--	--	--	--	--	--	--	--	--	--	1.31E+00	1.03E-01
Bromoform		75-25-2	2.20E-03	1.71E-04	6.99E-04	1.28E-04	6.82E-04	1.24E-04	7.31E-05	1.33E-05	1.40E-03	2.55E-04	9.84E-07	1.80E-07	1.37E-06	2.50E-07	--	--	--	--	4.37E-03	4.40E-04
Bromomethane		74-83-9	4.01E-05	3.13E-06	1.68E-05	3.07E-06	1.51E-05	2.75E-06	8.95E-04	1.63E-04	5.03E-06	9.18E-07	1.48E-06	2.69E-07	4.16E-06	7.59E-07	--	--	--	--	9.63E-04	1.68E-04
Cadmium		7440-43-9	3.33E-01	2.60E-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.33E-01	2.60E-02
Caprolactam	3	105-60-2	7.03E-02	5.49E-03	7.75E-06	1.41E-06	1.06E-05	1.93E-06	--	--	--	--	--	--	--	--	--	--	--	--	7.03E-02	5.49E-03
Carbon disulfide		75-15-0	1.53E+00	1.20E-01	5.90E-01	1.08E-01	5.41E-01	9.87E-02	3.72E-04	6.79E-05	1.26E-01	2.30E-02	2.11E-03	3.85E-04	7.56E-03	1.38E-03	--	--	--	--	2.26E+00	1.44E-01
Carbon tetrachloride		56-23-5	2.06E-02	1.61E-03	8.59E-03	1.57E-03	7.70E-03	1.40E-03	7.43E-05	1.36E-05	2.33E-02	4.26E-03	4.60E-02	8.40E-03	8.32E-05	1.52E-05	--	--	--	--	9.87E-02	1.43E-02
Chlordane (tech.)		57-74-9	2.31E-01	1.80E-02	1.42E-03	2.60E-04	1.92E-03	3.50E-04	--	--	3.29E-05	6.01E-06	5.04E-05	9.20E-06	5.38E-06	9.82E-07	--	--	--	--	2.32E-01	1.80E-02
Chloroacetic acid		79-11-8	8.01E-03	6.26E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.01E-03	6.26E-04
Chlorobenzene		108-90-7	8.65E-02	6.76E-03	2.76E-02	5.04E-03	2.68E-02	4.89E-03	7.43E-05	1.36E-05	1.49E-02	2.73E-03	7.80E-02	1.42E-02	7.79E-04	1.42E-04	--	--	--	--	2.08E-01	2.39E-02
Chlorobenzilate		510-15-6	1.73E-04	1.35E-05	2.15E-06	3.93E-07	2.89E-06	5.27E-07	--	--	--	--	--	--	--	--	--	--	--	--	1.75E-04	1.35E-05
Chloroethane		75-00-3	4.29E-02	3.35E-03	1.64E-02	2.99E-03	1.51E-02	2.76E-03	8.95E-05	1.63E-05	2.12E-02	3.86E-03	1.97E-04	3.60E-05	7.47E-05	1.36E-05	--	--	--	--	8.08E-02	7.28E-03
Chloroform		67-66-3	3.50E+00	2.74E-01	8.34E-01	1.52E-01	8.61E-01	1.57E-01	7.73E-05	1.41E-05	2.71E-01	4.94E-02	1.99E-01	3.63E-02	3.15E-06	5.76E-07	--	--	--	--	4.80E+00	3.59E-01
Chloromethane		74-87-3	5.08E-04	3.97E-05	2.10E-04	3.82E-05	1.89E-04	3.45E-05	9.22E-05	1.68E-05	1.30E-03	2.38E-04	2.00E-04	3.65E-05	2.00E-04	3.64E-05	--	--	--	--	2.51E-03	3.67E-04
Chromium		7440-47-3	1.87E-01	1.46E-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.87E-01	1.46E-02
Chrysene	2	218-01-9	5.93E-03	4.63E-04	5.41E-06	9.87E-07	7.35E-06	1.34E-06	--	--	--	--	--	--	--	--	1.59E-05	1.66E-07	5.93E-07	6.18E-09	5.95E-03	4.63E-04
Cobalt		7440-48-4	2.80E-01	2.19E-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.80E-01	2.19E-02
Cyanide, Total		57-12-5	2.80E-02	2.18E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.80E-02	2.18E-03
Dibenzo(a,e)pyrene	2	192-65-4	2.40E-02	1.88E-03	2.42E-04	4.41E-05	3.24E-04	5.91E-05	--	--	--	--	--	--	--	--	--	--	--	--	2.43E-02	1.88E-03
Dibenzo(a,h)anthracene	2	53-70-3	1.73E-05	1.35E-06	2.17E-07	3.96E-08	5.79E-08	1.06E-08	--	--	--	--	--	--	--	--	2.62E-05	2.73E-07	9.79E-07	1.02E-08	4.48E-05	1.64E-06
Dibenzofuran		132-64-9	1.15E-02	8.95E-04	2.29E-03	4.17E-04	2.49E-03	4.54E-04	--	--	--	--	--	--	--	--	--	--	--	--	1.37E-02	8.95E-04
Diethylphthalate	3	84-66-2	7.65E-02	5.98E-03	2.65E-04	4.83E-05	3.57E-04	6.52E-05	--	--	--	--	--	--	--	--	--	--	--	--	7.68E-02	5.98E-03
Dimethylphthalate		131-11-3	1.43E-01	1.12E-02	3.01E-04	5.49E-05	4.08E-04	7.44E-05	--	--	--	--	--	--	--	--	--	--	--	--	1.44E-01	1.12E-02
Di-n-butylphthalate		84-74-2	6.39E-03	4.99E-04	4.27E-05	7.79E-06	5.75E-05	1.05E-05	--	--	--	--	--	--	--	--	--	--	--	--	6.44E-03	4.99E-04
Di-n-octylphthalate	3	117-84-0	2.92E-02	2.28E-03	6.10E-05	1.11E-05	8.27E-05	1.51E-05	--	--	--	--	--	--	--	--	--	--	--	--	2.93E-02	2.28E-03
Ethylbenzene		100-41-4	8.65E-02	6.76E-03	3.12E-02	5.70E-03	2.94E-02	5.36E-03	7.43E-05	1.36E-05	3.41E-02	6.23E-03	3.87E-01	7.06E-02	5.53E-04	1.01E-04	--	--	--	--	5.39E-01	8.37E-02
Ethylene glycol		107-21-1	5.30E+01	4.14E+00	3.18E-03	5.81E-04	4.30E-03	7.86E-04	--	--	--	--	--	--	1.30E-06	2.36E-07	--	--	--	--	5.30E+01	4.14E+00
Fluoranthene	2	206-44-0	3.52E-02	2.75E-03	6.57E-04	1.20E-04	8.72E-04	1.59E-04	--	--	--	--	--	--	--	--	3.43E-04	3.57E-06	1.28E-05	1.33E-07	3.62E-02	2.75E-03
Fluorene	2	86-73-7	2.84E-02	2.22E-03	2.95E-03	5.39E-04	3.55E-03	6.48E-04	--	--	--	--	--	--	--	--	1.31E-03	1.37E-05	4.91E-05	5.11E-07	3.27E-02	2.23E-03
Formaldehyde		50-00-0	0.00E+00	0.00E+00	3.43E-22	6.26E-23	3.05E-22	5.57E-23	--	--	--	--	--	--	--	--	5.31E-02	5.53E-04	1.98E-03	2.07E-05	5.51E-02	5.74E-04
Formaldehyde		50-00-0	0.00E+00	0.00E+00	3.43E-22	6.26E-23	3.05E-22	5.57E-23	--	--	--	--	--	--	--	--	5.31E-02	5.53E-04	1.98E-03	2.07E-05	5.51E-02	5.74E-04
gamma-BHC (Lindane)		58-89-9	2.00E-05	1.56E-06	2.97E-06	5.42E-07	3.41E-06	6.22E-07	--	--	2.44E-07	4.45E-08	3.16E-07	5.77E-08	1.13E-07	2.06E-08	--	--	--	--	2.37E-05	1.69E-06
Heptachlor		76-44-8	7.51E-02	5.86E-03	1.11E-02	2.02E-03	1.27E-02	2.32E-03	--	--	3.93E-04	7.17E-05	5.96E-04	1.09E-04	4.10E-06	7.48E-07	--	--	--	--	8.71E-02	6.05E-03
Hexachlorobenzene		118-74-1	3.06E-02	2.39E-03	1.37E-03	2.51E-04	1.76E-03	3.22E-04	--	--	--	--	--	--	--	--	--	--	--	--	3.20E-02	2.39E-03
Hexachlorobutadiene		87-68-3	2.08E-03	1.63E-04	8.61E-04	1.57E-04	7.77E-04	1.42E-04	--	--	4.82E-05	8.79E-06	1.27E-06	2.32E-07	4.39E-06	8.01E-07	--	--	--	--	3.00E-03	1.73E-04
Hexachlorocyclopentadiene		77-47-4	7.23E-02	5.65E-03	2.97E-02	5.42E-03	2.68E-02	4.89E-03	--	--	--	--	--	--	--	--	--	--	--	--	1.02E-01	5.65E-03
Hexachloroethane		67-72-1	1.73E-04	1.35E-05	7.26E-05	1.32E-05	6.51E-05	1.19E-05	--	--	--	--	--	--	--	--	--	--	--	--	2.46E-04	1.35E-05
Hexane		110-54-3	2.40E+01	1.88E+00	9.45E+00	1.72E+00	8.61E+00	1.57E+00	--	--	--	--	--	--	--	--	--	--	--	--	3.35E+01	1.88E+00
Hydrazine		302-01-2	1.06E-01	8.26E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.06E-01	8.26E-03
Indeno(1,2,3-cd)pyrene	2	193-39-5	2.60E-04	2.03E-05	3.92E-07	7.16E-08	5.33E-07	9.73E-08	--	--	--	--	--	--	--	--	1.69E-05	1.76E-07	6.30E-07	6.56E-09	2.78E-04	2.05E-05
Iodomethane		74-88-4	1.00E-04	7.82E-06	4.17E-05	7.61E-06	3.74E-05	6.83E-06	--	--	1.10E-05	2.01E-06	6.72E-06	1.23E-06	1.31E-05	2.39E-06	--	--	--	--	1.73E-04	1.34E-05
Isophorone		78-59-1	9.77E-02	7.64E-03	1.12E-03	2.05E-04	1.50E-03	2.74E-04	--	--	--	--	--	--	--	--	--	--	--	--	9.89E-02	7.64E-03
Isopropylbenzene		98-82-8	1.00E-02	7.82E-04	4.06E-03	7.40E-04	3.68E-03	6.72E-04	--	--	1.42E-03	2.60E-04	5.28E-04	9.64E-05	--	--	--	--	--	--	1.60E-02	1.14E-03
Kepone	3	143-50-0	1.73E-04	1.35E-05	1.35E-05	2.46E-06	1.68E-05	3.06E-06	--	--	--	--	--	--	--	--	--	--	--	--	1.87E-04	1.35E-05
Lead	4	7439-92-1	4.85E-02	3.79E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.85E-02	3.79E-03

Table D-2. Speciated Estimated Potential Emissions of HAPs and TAPs by Emission Unit
Pinewood Site (Continued)

Pollutant	Footnote Reference	CAS No.	LTS1 lb/day	LTS1 tpy	CTF1 lb/day	CTF1 tpy	ATF1 lb/day	ATF1 tpy	AE1-AE2 lb/day	AE1-AE2 tpy	S1 lb/day	S1 tpy	S2 lb/day	S2 tpy	S3 lb/day	S3 tpy	EG01 lb/day	EG01 tpy	FP01 lb/day	FP01 tpy	Total lb/day	Total tpy[1]
m,p-Cresols		108-39-4	1.41E+00	1.10E-01	1.92E-03	3.51E-04	2.61E-03	4.76E-04	--	--	--	--	--	--	--	--	--	--	--	--	1.41E+00	1.10E-01
m,p-Xylenes		108-38-3	2.97E-01	2.32E-02	9.94E-02	1.81E-02	9.52E-02	1.74E-02	--	--	--	--	--	--	--	--	--	--	--	--	3.97E-01	2.32E-02
m-Dinitrobenzene	3	99-65-0	1.73E-04	1.35E-05	2.78E-05	5.08E-06	3.15E-05	5.74E-06	--	--	--	--	--	--	--	--	--	--	--	--	2.01E-04	1.35E-05
Mercury		7439-97-6	4.05E-05	3.16E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.05E-05	3.16E-06
Methanol		67-56-1	6.52E+01	5.09E+00	8.32E-02	1.52E-02	1.09E-01	1.99E-02	--	--	1.25E-02	2.27E-03	1.47E-02	2.69E-03	6.86E-04	1.25E-04	--	--	--	--	6.53E+01	5.10E+00
Methoxychlor		72-43-5	8.01E-05	6.26E-06	1.23E-05	2.25E-06	1.41E-05	2.57E-06	--	--	6.80E-07	1.24E-07	3.60E-07	6.58E-08	9.08E-07	1.66E-07	--	--	--	--	9.44E-05	6.61E-06
Methyl methacrylate		80-62-6	1.73E-04	1.35E-05	5.68E-05	1.04E-05	5.49E-05	1.00E-05	--	--	6.34E-04	1.16E-04	2.56E-06	4.68E-07	2.12E-06	3.87E-07	--	--	--	--	8.68E-04	1.30E-04
Methylene chloride		75-09-2	5.40E+01	4.22E+00	6.50E+00	1.19E+00	7.12E+00	1.30E+00	5.94E-04	1.08E-04	1.18E+00	2.15E-01	2.88E+00	5.25E-01	2.71E-04	4.95E-05	--	--	--	--	6.45E+01	4.96E+00
Mirex	3	2385-85-5	5.33E-05	4.16E-06	2.13E-05	3.89E-06	1.95E-05	3.55E-06	--	--	--	--	--	--	--	--	--	--	--	--	7.46E-05	4.16E-06
Naphthalene	2	91-20-3	1.11E-01	8.70E-03	2.55E-02	4.66E-03	2.69E-02	4.91E-03	7.39E-05	1.35E-05	4.30E-03	7.84E-04	2.13E-02	3.88E-03	9.43E-04	1.72E-04	3.82E-03	3.98E-05	1.42E-04	1.48E-06	1.67E-01	1.36E-02
Nickel		7440-02-0	7.73E-01	6.04E-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.73E-01	6.04E-02
Nitrobenzene		98-95-3	2.60E-04	2.03E-05	3.75E-05	6.85E-06	4.34E-05	7.93E-06	--	--	--	--	--	--	--	--	--	--	--	--	2.97E-04	2.03E-05
Nitroglycerin	3	55-63-0	2.60E-03	2.03E-04	7.50E-06	1.37E-06	1.02E-05	1.86E-06	--	--	--	--	--	--	--	--	--	--	--	--	2.61E-03	2.03E-04
N-Methyl-N-nitrosomethylamine		62-75-9	1.73E-04	1.35E-05	3.37E-06	6.15E-07	4.50E-06	8.20E-07	--	--	--	--	--	--	--	--	--	--	--	--	1.76E-04	1.35E-05
N-Nitrosomorpholine		59-89-2	1.73E-04	1.35E-05	3.09E-05	5.63E-06	3.44E-05	6.29E-06	--	--	--	--	--	--	--	--	--	--	--	--	2.04E-04	1.35E-05
o-Cresol		95-48-7	5.14E-01	4.01E-02	1.23E-03	2.24E-04	1.66E-03	3.03E-04	--	--	--	--	--	--	--	--	--	--	--	--	5.15E-01	4.01E-02
o-Toluidine		95-53-4	1.73E-02	1.35E-03	1.90E-04	3.48E-05	2.56E-04	4.67E-05	--	--	--	--	--	--	--	--	--	--	--	--	1.75E-02	1.35E-03
o-Xylene		95-47-6	1.11E-01	8.64E-03	3.62E-02	6.60E-03	3.50E-02	6.39E-03	--	--	--	--	--	--	--	--	--	--	--	--	1.47E-01	8.64E-03
p-(Dimethylamino)azobenzene		60-11-7	1.73E-04	1.35E-05	2.04E-07	3.72E-08	2.77E-07	5.06E-08	--	--	--	--	--	--	--	--	--	--	--	--	1.73E-04	1.35E-05
Parathion		56-38-2	2.60E-04	2.03E-05	1.57E-06	2.87E-07	2.12E-06	3.87E-07	--	--	--	--	--	--	--	--	--	--	--	--	2.61E-04	2.03E-05
p-Benzoquinone		106-51-4	1.60E-02	1.25E-03	9.90E-05	1.81E-05	1.34E-04	2.44E-05	--	--	--	--	--	--	--	--	--	--	--	--	1.61E-02	1.25E-03
Pentachloronitrobenzene		82-68-8	1.73E-04	1.35E-05	1.29E-05	2.36E-06	1.61E-05	2.93E-06	--	--	--	--	--	--	--	--	--	--	--	--	1.86E-04	1.35E-05
Pentachlorophenol		87-86-5	1.76E-01	1.38E-02	1.52E-06	2.77E-07	2.06E-06	3.77E-07	--	--	--	--	--	--	--	--	--	--	--	--	1.76E-01	1.38E-02
Phenanthrene	2	85-01-8	8.49E-02	6.63E-03	3.85E-03	7.02E-04	4.91E-03	8.97E-04	--	--	--	--	--	--	--	--	1.32E-03	1.38E-05	4.94E-05	5.15E-07	9.01E-02	6.65E-03
Phenol		108-95-2	2.86E+00	2.23E-01	2.65E-03	4.83E-04	3.59E-03	6.55E-04	--	--	--	--	--	--	--	--	--	--	--	--	2.86E+00	2.23E-01
Phosphorus		7723-14-0	5.93E-01	4.63E-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.93E-01	4.63E-02
p-Nitroaniline	3	100-01-6	2.60E-04	2.03E-05	7.14E-08	1.30E-08	9.71E-08	1.77E-08	--	--	--	--	--	--	--	--	--	--	--	--	2.60E-04	2.03E-05
p-Nitrotoluene	3	99-99-0	6.51E-04	5.08E-05	3.50E-05	6.40E-06	4.50E-05	8.20E-06	--	--	--	--	--	--	--	--	--	--	--	--	6.86E-04	5.08E-05
p-Phenylenediamine		106-50-3	1.73E-04	1.35E-05	3.31E-08	6.05E-09	4.50E-08	8.20E-09	--	--	--	--	--	--	--	--	--	--	--	--	1.73E-04	1.35E-05
Pyrene	2	129-00-0	2.99E-02	2.33E-03	4.10E-04	7.47E-05	5.49E-04	1.00E-04	--	--	--	--	--	--	--	--	2.15E-04	2.24E-06	8.03E-06	8.37E-08	3.05E-02	2.34E-03
Selenium		7782-49-2	6.37E-02	4.98E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.37E-02	4.98E-03
Styrene		100-42-5	5.54E-01	4.33E-02	1.32E-01	2.41E-02	1.37E-01	2.50E-02	7.43E-05	1.36E-05	1.24E-03	2.26E-04	5.72E-04	1.04E-04	5.49E-05	1.00E-05	--	--	--	--	6.88E-01	4.37E-02
tert-Butyl methyl ether		1634-04-4	1.00E-02	7.82E-04	2.42E-03	4.41E-04	2.53E-03	4.61E-04	7.39E-05	1.35E-05	2.00E-04	3.64E-05	1.53E-04	2.80E-05	4.10E-05	7.48E-06	--	--	--	--	1.29E-02	8.68E-04
Tetrachloroethylene		127-18-4	1.74E+00	1.36E-01	6.13E-01	1.12E-01	5.79E-01	1.06E-01	4.72E-02	8.62E-03	4.18E-01	7.62E-02	1.09E+00	1.99E-01	4.05E-04	7.40E-05	--	--	--	--	3.91E+00	4.19E-01
Toluene		108-88-3	2.53E+00	1.98E-01	6.74E-01	1.23E-01	6.78E-01	1.24E-01	7.43E-05	1.36E-05	1.44E-01	2.63E-02	9.12E-01	1.66E-01	1.37E-02	2.50E-03	1.84E-02	1.92E-04	6.87E-04	7.16E-06	4.30E+00	3.93E-01
Total polycyclic aromatic hydrocarbon (	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.56E-03	7.88E-05	2.82E-04	2.94E-06	7.85E-03	8.17E-05
Toxaphene		8001-35-2	3.12E-02	2.44E-03	7.89E-04	1.44E-04	1.04E-03	1.90E-04	--	--	2.40E-05	4.37E-06	6.08E-07	1.11E-07	1.44E-06	2.63E-07	--	--	--	--	3.21E-02	2.45E-03
Trichloroethylene		79-01-6	5.89E+00	4.60E-01	1.74E+00	3.18E-01	1.71E+00	3.12E-01	7.70E-03	1.40E-03	1.96E-01	3.58E-02	1.22E+00	2.22E-01	3.87E-04	7.06E-05	--	--	--	--	9.05E+00	7.19E-01
Triethylene glycol	6	112-27-6	7.51E+00	5.86E-01	6.46E-06	1.18E-06	8.80E-06	1.61E-06	--	--	--	--	--	--	9.72E-09	1.77E-09	--	--	--	--	7.51E+00	5.86E-01
Vinyl acetate		108-05-4	2.22E-03	1.73E-04	6.11E-04	1.12E-04	6.21E-04	1.13E-04	--	--	4.21E-06	7.68E-07	4.04E-06	7.37E-07	3.47E-06	6.34E-07	--	--	--	--	2.84E-03	1.76E-04
Vinyl chloride		75-01-4	2.68E-02	2.10E-03	1.09E-02	1.99E-03	9.87E-03	1.80E-03	1.49E-04	2.72E-05	2.04E-02	3.73E-03	1.34E-02	2.45E-03	7.45E-05	1.36E-05	--	--	--	--	7.18E-02	8.31E-03
Xylenes (total)		1330-20-7	3.81E-01	2.97E-02	1.54E-01	2.81E-02	1.49E-01	2.72E-02	7.43E-05	1.36E-05	1.12E-01	2.05E-02	3.45E-01	6.29E-02	1.27E-02	2.32E-03	1.28E-02	1.34E-04	4.79E-04	4.99E-06	1.02E+00	1.16E-01
Total HAP Emissions			256.81	20.06	25.30	4.62	25.05	4.57	6.40E-02	1.17E-02	3.38	0.62	10.29	1.88	4.33E-02	7.90E-03	2.38E-01	2.48E-03	8.87E-03	9.24E-05	296.13	23.00
Total TAP Emissions			278.78	21.78	25.47	4.65	25.27	4.61	6.43E-02	1.17E-02	3.40	0.62	10.30	1.88	4.36E-02	7.96E-03	2.38E-01	2.48E-03	8.87E-03	9.24E-05	318.31	24.72

1. Total site wide potential emissions of HAP and TAP are the sum of worst case emissions from all of the listed sources except the leachate storage tanks. Worst case annual emissions from the leachate treatment system assume that leachate bypasses the leachate tank farm, and therefore any chemicals that would have been emitted from the storage tanks are included in emissions estimated for the treatment system.

2. Compounds are listed under Polycyclic Organic Matter (POM) on the EPA list of HAPs.
3. Compounds on the SC Standard 8 list of TAPs but not the EPA list of HAPs.
4. Compounds on the EPA list of HAPs but not the SC Standard 8 list of TAPs.
5. Compounds are listed under Polychlorinated Biphenyls (PCB) on the EPA list of HAPs.
6. Compounds are listed under Glycol Ethers on the EPA list of HAPs.

APPENDIX E

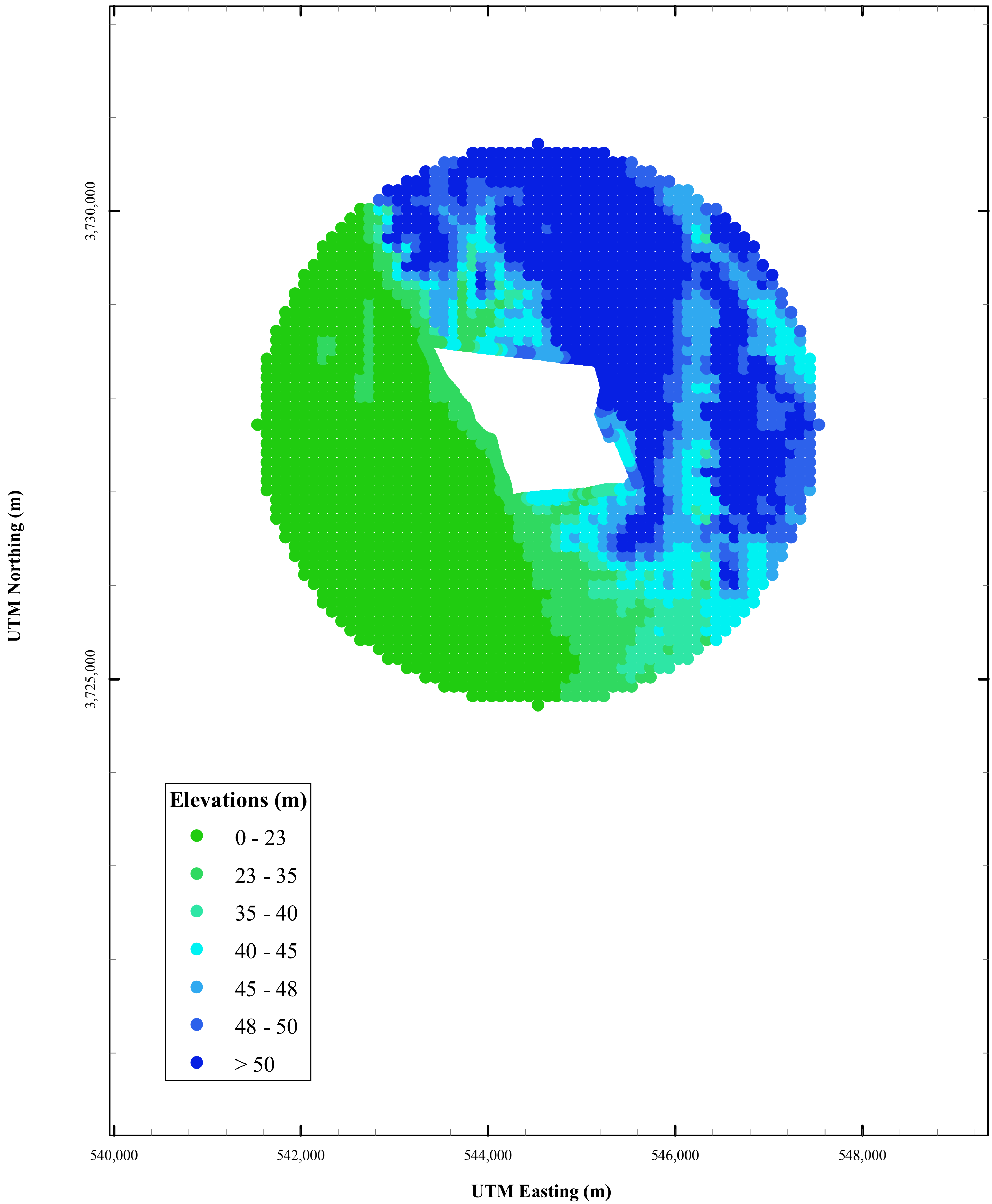
MODELING FIGURES

MODELING FILES

MODELING RESULTS

Figure E-1. Std. 8 Modeling Grid and Elevations

Pinewood Landfill
Pinewood, Sumter County, South Carolina



Coordinates reflect UTM projection Zone 17, NAD83.

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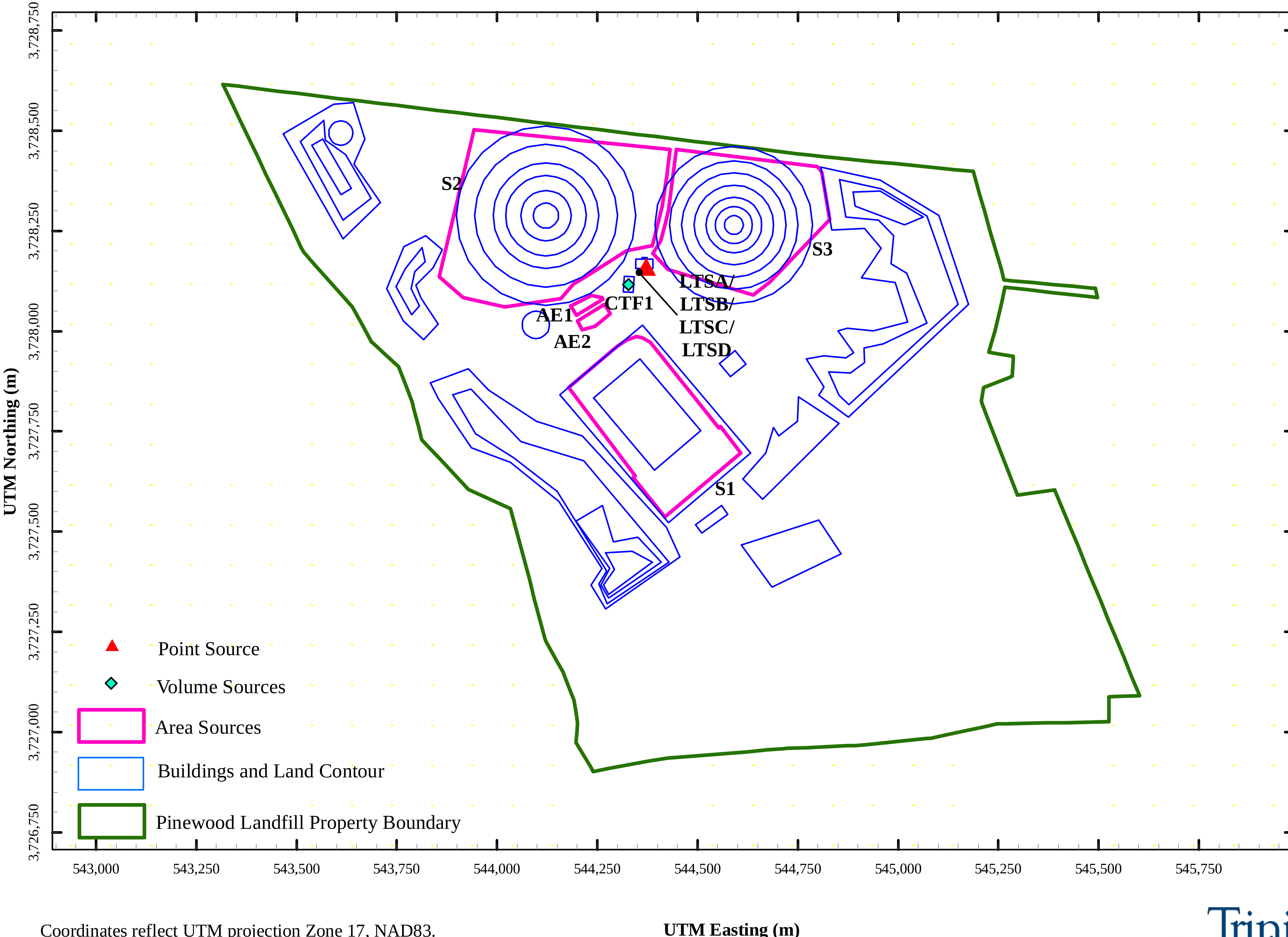
Figure E-2. Modeled Site Layout

Pinewood Site
Pinewood, Sumter County, South Carolina



Coordinates reflect UTM projection Zone 17, NAD83.

Pinewood Site Custodial Trust
Pinewood, SC
Modeling Files
111101.0050
January 2012

Tel: (678) 441-9977
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Table E-1. Comparison of Site-Wide TAP Emission Rates to De Minimis Emission Rates
Pinewood Site

Pollutant	Footnote Reference	CAS No.	Site-Wide Emissions lb/day	tpy	De minimis[6] lb/day	Above de minimis?
1,1,1-Trichloroethane		71-55-6	1.15E+01	1.37E+00	114.6	No
1,1,2,2-Tetrachloroethane		79-34-5	2.20E-01	2.11E-02	0.42	No
1,1,2-Trichloroethane		79-00-5	7.93E-01	5.69E-02	3.276	No
1,1-Dichloroethane		75-34-3	4.80E+00	3.88E-01	24.3	No
1,1-Dichloroethylene		75-35-4	6.07E-01	7.77E-02	1.188	No
1,2,4-Trichlorobenzene		120-82-1	4.38E-01	3.09E-02	4.8	No
1,2-Dibromo-3-chloropropane		96-12-8	1.99E-02	1.46E-03	0.001	Yes
1,2-Dibromoethane		106-93-4	2.44E-02	1.74E-03	9.24	No
1,2-Dichloroethane		107-06-2	2.51E+00	1.86E-01	2.4	Yes
1,2-Dichloropropane		78-87-5	8.28E-03	7.40E-04	21	No
1,2-Diphenylhydrazine		122-66-7	7.51E-03	5.86E-04	+	No
1,3-Dichloropropylene(total)		542-75-6	5.23E-02	4.03E-03	0.24	No
1,4-Dichlorobenzene		106-46-7	8.05E-01	6.11E-02	54	No
1,4-Dioxane		123-91-1	4.42E+00	3.45E-01	5.4	No
1-Methylnaphthalene	1	90-12-0	2.43E-02	1.55E-03	1.92	No
1-Naphthylamine	2	134-32-7	2.55E-03	1.98E-04	0	No
2,4,5-Trichlorophenol		95-95-4	9.45E-04	6.76E-05	+	No
2,4,6-Trichlorophenol		88-06-2	1.74E-04	1.35E-05	+	No
2,4-D		94-75-7	6.77E-03	5.29E-04	0.6	No
2,4-Dinitrophenol		51-28-5	3.49E-01	2.73E-02	+	No
2,4-Dinitrotoluene		121-14-2	1.74E-04	1.35E-05	0.018	No
2-Acetylaminofluorene		53-96-3	2.16E-04	1.35E-05	+	No
2-Butanone	2	78-93-3	2.22E+01	1.72E+00	177	No
2-Chloro-1,3-butadiene		126-99-8	1.72E-02	9.54E-04	2.1	No
2-Chloronaphthalene	1	91-58-7	4.20E-03	2.62E-04	1.92	No
2-Methyl-4,6-dinitrophenol		534-52-1	2.60E-04	2.03E-05	0.024	No
2-Methylnaphthalene	1	91-57-6	4.87E-02	3.17E-03	1.92	No
2-Naphthylamine	2	91-59-8	1.74E-04	1.35E-05	0	No
2-Nitropropane		79-46-9	4.41E-02	3.19E-03	2.184	No
3,3'-Dichlorobenzidine		91-94-1	8.94E-05	6.76E-06	0.002	No
3,3'-Dimethylbenzidine		119-93-7	1.73E-04	1.35E-05	+	No
3-Methylcholanthrene	1	56-49-5	2.25E-04	1.35E-05	1.92	No
4,4'-DDE	3	72-55-9	3.10E-03	2.08E-04	-	No
4,4'-Methylenebis(2-chloroaniline)		101-14-4	2.62E-02	1.56E-03	0.013	Yes
4-Aminobiphenyl		92-67-1	2.61E-04	2.03E-05	0	No
4-Methyl-2-pentanone		108-10-1	2.96E+00	2.27E-01	24.6	No
4-Nitrophenol		100-02-7	1.73E-04	1.35E-05	0	No
Acenaphthene	1	83-32-9	4.91E-02	3.44E-03	1.92	No
Acenaphthylene	1	208-96-8	2.59E-04	3.81E-06	1.92	No
Acenaphthylene	1	208-96-8	2.59E-04	3.81E-06	1.92	No
Acetaldehyde		75-07-0	3.58E-02	3.73E-04	21.6	No
Acetonitrile		75-05-8	6.94E-01	5.38E-02	21	No
Acetophenone		98-86-2	7.79E-02	5.98E-03	+	No
Acrolein		107-02-8	4.99E-03	1.31E-04	0.015	No
Acrolein		107-02-8	4.99E-03	1.31E-04	0.015	No
Acrylonitrile		107-13-1	2.02E-03	1.91E-04	0.27	No
Allyl chloride		107-05-1	1.15E-02	2.05E-03	0.36	No
Aniline		62-53-3	4.40E-01	3.43E-02	0.6	No
Anthracene	1	120-12-7	7.41E-03	5.07E-04	1.92	No
Antimony		7440-36-0	5.25E-03	4.10E-04	0.03	No
Aroclor-1016	4	12674-11-2	3.90E-06	2.20E-07	0.03	No
Aroclor-1221	4	11104-28-2	1.91E-03	1.18E-04	0.03	No
Aroclor-1232	4	11141-16-5	3.98E-06	2.20E-07	0.03	No
Aroclor-1242	4	53469-21-9	3.96E-06	2.20E-07	0.03	No
Aroclor-1248	4	12672-29-6	3.96E-06	2.20E-07	0.03	No
Aroclor-1254	4	11097-69-1	3.95E-06	2.20E-07	0.03	No
Aroclor-1260	4	11096-82-5	3.95E-06	2.20E-07	0.03	No
Aroclor-Total	4		5.34E-04	4.17E-05	0.03	No
Arsenic		7440-38-2	2.89E+00	2.26E-01	0.012	Yes
Benzene		71-43-2	5.25E-01	4.02E-02	1.8	No
Benzidine		92-87-5	1.73E-04	1.35E-05	0	No
Benzo(a)anthracene	1	56-55-3	7.70E-03	5.93E-04	1.92	No
Benzo(a)pyrene	1	50-32-8	6.00E-04	4.57E-05	1.92	No
Benzo(b)fluoranthene	1	205-99-2	1.48E-03	1.14E-04	1.92	No
Benzo(ghi)perylene	1	191-24-2	2.84E-04	2.06E-05	1.92	No
Benzo(k)fluoranthene	1	207-08-9	5.30E-04	4.08E-05	1.92	No
Benzyl chloride		100-44-7	4.68E-02	3.14E-03	0.3	No
Beryllium		7440-41-7	4.01E-05	3.13E-06	0	No
Biphenyl		92-52-4	2.89E-02	1.88E-03	0.072	No
bis(2-Chloroethyl) ether	3	111-44-4	1.19E-01	8.70E-03	-	No
bis(2-Ethylhexyl)phthalate		117-81-7	1.31E+00	1.03E-01	0.3	Yes
Bromoform		75-25-2	4.37E-03	4.40E-04	0.31	No
Bromomethane		74-83-9	9.63E-04	1.68E-04	1.2	No
Cadmium		7440-43-9	3.33E-01	2.60E-02	0.003	Yes
Caprolactam	2	105-60-2	7.03E-02	5.49E-03	6	No
Carbon disulfide		75-15-0	2.26E+00	1.44E-01	1.8	Yes
Carbon tetrachloride		56-23-5	9.87E-02	1.43E-02	1.8	No
Chlordane (tech.)		57-74-9	2.32E-01	1.80E-02	0.03	Yes
Chloroacetic acid		79-11-8	8.01E-03	6.26E-04	10.8	No
Chlorobenzene		108-90-7	2.08E-01	2.39E-02	20.7	No
Chlorobenzilate		510-15-6	1.75E-04	1.35E-05	+	No
Chloroethane		75-00-3	8.08E-02	7.28E-03	316.8	No
Chloroform		67-66-3	4.80E+00	3.59E-01	3	Yes

Table E-1. Comparison of Site-Wide Emission Rates to De Minimis Emission Rates
Pinewood Site (continued)

Pollutant	Footnote Reference	CAS No.	Site-Wide Emissions lb/day	tpy	De minimis lb/day	Above de minimis?
Chloromethane		74-87-3	2.51E-03	3.67E-04	6.18	No
Chromium		7440-47-3	1.87E-01	1.46E-02	0.03	Yes
Chrysene	1	218-01-9	5.95E-03	4.63E-04	1.92	No
Cobalt		7440-48-4	2.80E-01	2.19E-02	0.003	Yes
Cyanide, Total		57-12-5	2.80E-02	2.18E-03	1.5	No
Dibenzo(a,e)pyrene	1	192-65-4	2.43E-02	1.88E-03	1.92	No
Dibenzo(a,h)anthracene	1	53-70-3	4.48E-05	1.64E-06	1.92	No
Dibenzofuran		132-64-9	1.37E-02	8.95E-04	+	No
Diethylphthalate	2	84-66-2	7.68E-02	5.98E-03	0.3	No
Dimethylphthalate		131-11-3	1.44E-01	1.12E-02	0.3	No
Di-n-butylphthalate		84-74-2	6.44E-03	4.99E-04	0.3	No
Di-n-octylphthalate	2	117-84-0	2.93E-02	2.28E-03	0.6	No
Ethylbenzene		100-41-4	5.39E-01	8.37E-02	52.2	No
Ethylene glycol		107-21-1	5.30E+01	4.14E+00	7.8	Yes
Fluoranthene	1	206-44-0	3.62E-02	2.75E-03	1.92	No
Fluorene	1	86-73-7	3.27E-02	2.23E-03	1.92	No
Formaldehyde		50-00-0	5.51E-02	5.74E-04	0.18	No
Formaldehyde		50-00-0	5.51E-02	5.74E-04	0.18	No
gamma-BHC (Lindane)		58-89-9	2.37E-05	1.69E-06	0.03	No
Heptachlor		76-44-8	8.71E-02	6.05E-03	0.03	Yes
Hexachlorobenzene		118-74-1	3.20E-02	2.39E-03	+	No
Hexachlorobutadiene		87-68-3	3.00E-03	1.73E-04	0.014	No
Hexachlorocyclopentadiene		77-47-4	1.02E-01	5.65E-03	0.006	Yes
Hexachloroethane		67-72-1	2.46E-04	1.35E-05	0.582	No
Hexane		110-54-3	3.35E+01	1.88E+00	10.8	Yes
Hydrazine		302-01-2	1.06E-01	8.26E-03	0.006	Yes
Indeno(1,2,3-cd)pyrene	1	193-39-5	2.78E-04	2.05E-05	1.92	No
Iodomethane		74-88-4	1.73E-04	1.34E-05	0.696	No
Isophorone		78-59-1	9.89E-02	7.64E-03	3	No
Isopropylbenzene		98-82-8	1.60E-02	1.14E-03	0.108	No
Kepone	2	143-50-0	1.87E-04	1.35E-05	0	No
Lead	3	7439-92-1	4.85E-02	3.79E-03	-	No
m,p-Cresols		65794-96-9	1.41E+00	1.10E-01	1.326	Yes
m,p-Xylenes		--	3.97E-01	2.32E-02	52.2	No
m-Dinitrobenzene	2	99-65-0	2.01E-04	1.35E-05	0.12	No
Mercury		7439-97-6	4.05E-05	3.16E-06	0.003	No
Methanol		67-56-1	6.53E+01	5.10E+00	15.72	Yes
Methoxychlor		72-43-5	9.44E-05	6.61E-06	0.6	No
Methyl methacrylate		80-62-6	8.68E-04	1.30E-04	123	No
Methylene chloride		75-09-2	6.45E+01	4.96E+00	105	No
Mirex	2	2385-85-5	7.46E-05	4.16E-06	54	No
Naphthalene	1	91-20-3	1.67E-01	1.36E-02	1.92	No
Nickel		7440-02-0	7.73E-01	6.04E-02	0.006	Yes
Nitrobenzene		98-95-3	2.97E-04	2.03E-05	0.3	No
Nitroglycerin	2	55-63-0	2.61E-03	2.03E-04	0.06	No
N-Methyl-N-nitrosomethylamine		62-75-9	1.76E-04	1.35E-05	0	No
N-Nitrosomorpholine		59-89-2	2.04E-04	1.35E-05	60	No
o-Cresol		95-48-7	5.15E-01	4.01E-02	1.326	No
o-Toluidine		95-53-4	1.75E-02	1.35E-03	0.526	No
o-Xylene		95-47-6	1.47E-01	8.64E-03	52.2	No
p-(Dimethylamino)azobenzene		60-11-7	1.73E-04	1.35E-05	1.5	No
Parathion		56-38-2	2.61E-04	2.03E-05	0.006	No
p-Benzoquinone		106-51-4	1.61E-02	1.25E-03	0.024	No
Pentachloronitrobenzene		82-68-8	1.86E-04	1.35E-05	+	No
Pentachlorophenol		87-86-5	1.76E-01	1.38E-02	0.06	Yes
Phenanthrene	1	85-01-8	9.01E-02	6.65E-03	1.92	No
Phenol		108-95-2	2.86E+00	2.23E-01	2.28	Yes
Phosphorus		7723-14-0	5.93E-01	4.63E-02	0.006	Yes
p-Nitroaniline	2	100-01-6	2.60E-04	2.03E-05	0.18	No
p-Nitrotoluene	2	99-99-0	6.86E-04	5.08E-05	0.066	No
p-Phenylenediamine		106-50-3	1.73E-04	1.35E-05	0.012	No
Pyrene	1	129-00-0	3.05E-02	2.34E-03	1.92	No
Selenium		7782-49-2	6.37E-02	4.98E-03	0.012	Yes
Styrene		100-42-5	6.88E-01	4.37E-02	63.9	No
tert-Butyl methyl ether		1634-04-4	1.29E-02	8.68E-04	+	No
Tetrachloroethylene		127-18-4	3.91E+00	4.19E-01	40.2	No
Toluene		108-88-3	4.30E+00	3.93E-01	24	No
Total polycyclic aromatic hydrocarbon (PAH)	1	--	7.85E-03	8.17E-05	1.92	No
Toxaphene		8001-35-2	3.21E-02	2.45E-03	0.03	Yes
Trichloroethylene		79-01-6	9.05E+00	7.19E-01	81	No
Triethylene glycol	5	112-27-6	7.51E+00	5.86E-01	+	No
Vinyl acetate		108-05-4	2.84E-03	1.76E-04	2.112	No
Vinyl chloride		75-01-4	7.18E-02	8.31E-03	0.6	No
Xylenes (total)		1330-20-7	1.02E+00	1.16E-01	52.2	No

1. Compounds are listed under Polycyclic Organic Matter (POM) on the EPA list of HAPs.
2. Compounds on the SC Standard 8 list of TAPs but not the EPA list of HAPs.
3. Compounds on the EPA list of HAPs but not the SC Standard 8 list of TAPs.
4. Compounds are listed under Polychlorinated Biphenyls (PCB) on the EPA list of HAPs.
5. Compounds are listed under Glycol Ethers on the EPA list of HAPs.
6. A de minimis value of 0 lb/day is assumed to be 0.005 lb/day, per SC DHEC's modeling guidance.

Table E-2. Modeled Emission Rates
Pinewood Site

Compound	Model ID	CAS #	LTSA/LTSC (g/s)	LTSB/LTSD (g/s)	CTF1 (g/s)	S1 (g/s-m^2)	S2 (g/s-m^2)	S3 (g/s-m^2)	AE1 (g/s-m^2)	AE2 (g/s-m^2)
1,2-Dibromo-3-chloropropane	DIBROCHLO	96-12-8	8.118E-05	1.127E-05	1.590E-05	6.919E-11	2.662E-14	4.362E-14	2.189E-10	1.565E-10
1,2-Dichloroethane	DICHLORETH	107-06-2	1.115E-02	1.548E-03	1.460E-03	3.510E-09	1.331E-09	1.270E-12	1.126E-10	8.051E-11
4,4'-Methylenebis(2-chloroaniline)	4,4,	101-14-4	1.052E-04	1.460E-05	3.230E-05	-	-	-	-	-
Arsenic	AS	7440-38-2	1.518E-02	2.109E-03	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate	BISPHT	117-81-7	6.898E-03	9.580E-04	4.080E-07	-	-	-	-	-
Cadmium	CD	7440-43-9	1.748E-03	2.427E-04	-	-	-	-	-	-
Carbon disulfide	CARBON	75-15-0	8.033E-03	1.116E-03	3.100E-03	6.987E-09	5.955E-11	3.518E-10	5.643E-10	4.034E-10
Chlordane (tech.)	CHLORD	57-74-9	1.211E-03	1.682E-04	7.480E-06	1.823E-12	1.421E-12	2.504E-13	-	-
Chloroform	CHLORO	67-66-3	1.838E-02	2.553E-03	4.380E-03	1.499E-08	5.606E-09	1.468E-13	1.172E-10	8.381E-11
Chromium	CR	7440-47-3	9.800E-04	1.361E-04	-	-	-	-	-	-
Cobalt	CO	7440-48-4	1.470E-03	2.042E-04	-	-	-	-	-	-
Ethylene glycol	EG	107-21-1	2.784E-01	3.867E-02	1.670E-05	-	-	6.029E-14	-	-
Heptachlor	HEPT	76-44-8	3.941E-04	5.474E-05	5.810E-05	2.177E-11	1.681E-11	1.908E-13	-	-
Hexachlorocyclopentadiene	HEXACYCL	77-47-4	3.798E-04	5.275E-05	1.560E-04	-	-	-	-	-
Hexane	HEXANE	110-54-3	1.262E-01	1.753E-02	4.960E-02	-	-	-	-	-
Hydrazine	HYDR	302-01-2	5.552E-04	7.711E-05	-	-	-	-	-	-
m,p-Cresols	CRESOL	108-39-4	7.403E-03	1.028E-03	1.010E-05	-	-	-	-	-
Methanol	METH	67-56-1	3.424E-01	4.755E-02	4.370E-04	6.902E-10	4.151E-10	3.192E-11	-	-
Nickel	NI	7440-02-0	4.059E-03	5.637E-04	-	-	-	-	-	-
Pentachlorophenol	PENTACHL	87-86-5	9.253E-04	1.285E-04	7.970E-09	-	-	-	-	-
Phenol	PHENOL	108-95-2	1.502E-02	2.085E-03	1.390E-05	-	-	-	-	-
Phosphorus	P	7723-14-0	3.112E-03	4.323E-04	-	-	-	-	-	-
Selenium	SE	7782-49-2	3.344E-04	4.644E-05	-	-	-	-	-	-
Toxaphene	TOXAP	8001-35-2	1.640E-04	2.278E-05	4.140E-06	1.326E-12	1.714E-14	6.710E-14	-	-

Table E-3. Summary of Modeling Results
Pinewood Site

Pollutant	CAS No.	Maximum 24-hr Modeled Impact LTSA Scenario (µg/m^3)	LTSB Scenario (µg/m^3)	LTSC Scenario (µg/m^3)	LTSD Scenario (µg/m^3)	Std. 8 MAAC (µg/m3)	Above the MAAC? (Yes/No)	Percent of MAAC (%)
1,2-Dibromo-3-chloropropane	96-12-8	0.004	0.003	0.004	0.002	0.05	No	7.86%
1,2-Dichloroethane	107-06-2	0.447	0.308	0.431	0.208	200	No	0.22%
4,4'-Methylenebis(2-chloroaniline)	101-14-4	0.006	0.005	0.006	0.004	1.1	No	0.57%
Arsenic	7440-38-2	0.389	0.196	0.420	0.060	1.0	No	42.02%
bis(2-Ethylhexyl)phthalate	117-81-7	0.177	0.089	0.191	0.027	25	No	0.76%
Cadmium	7440-43-9	0.045	0.023	0.048	0.007	0.25	No	19.35%
Carbon disulfide	75-15-0	0.555	0.455	0.543	0.383	150	No	0.37%
Chlordane (tech.)	57-74-9	0.032	0.016	0.034	0.006	2.5	No	1.35%
Chloroform	67-66-3	0.962	0.732	0.935	0.624	250	No	0.38%
Chromium	7440-47-3	0.025	0.013	0.027	0.004	2.5	No	1.09%
Cobalt	7440-48-4	0.038	0.019	0.041	0.006	0.25	No	16.28%
Ethylene glycol	107-21-1	7.130	3.602	7.707	1.108	650	No	1.19%
Heptachlor	76-44-8	0.016	0.012	0.016	0.008	2.5	No	0.66%
Hexachlorocyclopentadiene	77-47-4	0.027	0.022	0.026	0.019	0.5	No	5.37%
Hexane	110-54-3	8.679	7.102	8.498	5.971	900	No	0.96%
Hydrazine	302-01-2	0.014	0.007	0.015	0.002	0.5	No	3.07%
m,p-Cresols	65794-96-9	0.190	0.097	0.205	0.031	110.5	No	0.19%
Methanol	67-56-1	8.792	4.476	9.499	1.410	1310	No	0.73%
Nickel	7440-02-0	0.104	0.052	0.112	0.016	0.5	No	22.47%
Pentachlorophenol	87-86-5	0.024	0.012	0.026	0.004	5	No	0.51%
Phenol	108-95-2	0.385	0.196	0.416	0.061	190	No	0.22%
Phosphorus	7723-14-0	0.080	0.040	0.086	0.012	0.5	No	17.23%
Selenium	7782-49-2	0.009	0.004	0.009	0.001	1	No	0.93%
Toxaphene	8001-35-2	0.005	0.003	0.005	0.001	2.5	No	0.19%

APPENDIX F

DHEC PERMIT APPLICATION FORMS
MODELING QUESTIONNAIRE FORMS

DHEC

South Carolina Department of Health and Environmental Control

PROMOTE PROTECT PROSPER

Bureau of Air Quality
Construction Permit Application
Part I

Please Refer To Instructions Before Completing This Form

FACILITY INFORMATION			
1. Facility Name: Pinewood Site		**2. Existing Air Permit Number** (if applicable): -	
Federal Identification No. :	Are you a small business? ☐ Y ☒ N	Primary SIC or NAICS Code: 562211	
3. Physical Address: 8430 Camp Mac Boykin Road			
City: Pinewood	County: SC	Zip Code: 29125	
4. Mailing Address (if different): 84 Villa Rd., Suite 300			
City: Greenville	State: SC	Zip Code: 29615	
5. Facility/Operator Contact: William A. Stephens		Are you the primary permit contact? ☒ Yes ☐ No	
Mailing Address (if different):			
City:	State:	Zip Code:	
Phone No. (864) 288-6353	Fax No. (864) 288-6354	E-mail Address: bstephens@kestrelhorizons.com	
COMPANY INFORMATION			
6. Company Name: Pinewood Site Custodial Trust (PSCT)			
Mailing Address (if different):			
City:	State:	Zip Code:	
7. Owner/Agent Contact: William A. Stephens		Are you the primary permit contact? ☒ Yes ☐ No	
Mailing Address (if different):			
City:	State:	Zip Code:	
Phone No. ( ) -	Fax No. ( ) -	E-mail Address: wstephens@kestrelhorizons.com	
CORPORATE/CONSULTANT – ENVIRONMENTAL CONTACT INFORMATION			
8. Name: John Wilcox	Firm (if applicable): Trinity Consultants		
Mailing Address: 53 Perimeter Center East, Suite 230		Are you the primary permit contact? ☐ Yes ☒ No	
City: Atlanta	State: GA	Zip Code: 30346	
Phone No. (678) 441-9977	Fax No. (678) 441-9978	E-mail Address: jwilcox@trinityconsultants.com	
FACILITY OPERATING PERMIT STATUS			
9. Facility Air Operating Permit Status: ☐ State Minor ☐ General Conditional Major ☐ Conditional Major ☐ Title V			
Will this project result in a change in the Facility Air Operating Permit Status? ☒ Yes ☐ No If yes, status after project completion: permitted			
10. NSR Status Before Project: ☒ Minor Source ☐ PSD Major Source ☐ NSR Major Source (Non-Attainment Area)			
Will this project result in a change in the Facility NSR Status? ☐ Yes ☒ No If yes, status after project completion:			
PURPOSE OF APPLICATION			
11. Brief Narrative of Project: Addition of evaporative leachate treatment system to process leachate produced by the landfill See project description in application			
12. Permit Application Type:	☐ New Facility	☒ New Source at Existing Facility	☐ Unpermitted Existing Source
	☐ Modify Existing Source ☐ Permit Revision	Permit No. (i.e.,CA,CB):	Date Issued:
Does this application contain confidential data? ☐ Yes ☒ No If yes, mark all confidential material appropriately.			
Are you requesting this application be eligible for expedited review pilot program? ☐ Yes ☒ No			

SIGNATURES

I certify, to the best of my knowledge and belief, that no applicable standards and/or regulations will be contravened or violated. I certify that any application form, report, or compliance certification submitted in this permit application is true, accurate, and complete based on information and belief formed after reasonable inquiry. I understand that any statements and/or descriptions, which are found to be incorrect, may result in the immediate revocation of any permit issued for this application.

13. Owner or Operator Signature	Title/Position	Date
William A. Stephens	Principal, Kestrel Horizons, LLC as Trustee for the PSCT	January 9, 2012

I have placed my signature and seal on the engineering documents submitted, signifying that I have reviewed this application as it pertains to DHEC Air Pollution Regulation 61-62.

14. Professional Engineer Signature	SC License/Registration No.	Date
Judith Beach Collora	21180	January 6, 2012

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 21180 JUDITH BEACH COLLORA

Bureau of Air Quality
Construction Permit Application
Part I

Please Refer To Instructions Before Completing This Form

EMISSIONS SUMMARY AT MAXIMUM DESIGN CAPACITY				
	15. Prior to Construction/Modification		16. After Construction/Modification	
Pollutant	Uncontrolled (tons/year)	Controlled (tons/year)	Uncontrolled (tons/year)	Controlled (tons/year)
Particulate Matter (PM)			0.30	0.30
Particulate Matter < 10 Micron (PM_{10})			0.30	0.30
Particulate Matter < 2.5 Micron ($PM_{2.5}$)			0.30	0.30
Sulfur Dioxide (SO_2)			0.14	0.14
Carbon Monoxide (CO)			2.08	2.08
Nitrogen Oxides (NO_X)			4.90	4.90
Volatile Organic Compounds (VOCs)	4.48	4.48	20.03	20.03
Greenhouse Gases (Mass)			2,680	2,680
Greenhouse Gases (CO_2e)			2,767	2,767
Hazardous Air Pollutant – Single Greatest	1.72	1.72	5.10	5.10
Hazardous Air Pollutants – Total	5.04	5.04	23.00	23.00

PROJECT REGULATORY APPLICABILITY REVIEW				
Regulation	Applicable: Yes	Applicable: No	General Reason Indicator(s)	Comments
17. South Carolina Regulation 61-62 - Air Pollution Control Regulations and Standards (PROJECT ONLY)				
Standard 1: Fuel Burning Operations	☒	☐	L	
Standard 2: Ambient Air Quality Standards	☐	☒	H	
Standard 3: Waste Combustion/Reduction	☐	☒	K	
Standard 3.1: HMI Waste Incinerators	☐	☒	K	
Standard 4: Emissions from Process Industries	☐	☒	B	
Standard 5: Volatile Organic Compounds	☐	☒	H	
Standard 5.1: BACT/LAER For VOCs	☐	☒	H	
Standard 5.2: Control of Oxides of Nitrogen	☐	☒	H	
Standard 7: Prevention of Significant Deterioration	☐	☒	H	
Standard 7(II): Minor Source Increment Analysis	☐	☒	H	
Standard 7.1: Standards for Non Attainment Areas	☐	☒	H	
Standard 8: Toxic Air Pollutants	☒	☐	L	
Regulation 61-62.6: Control of Fugitive Particulate Matter	☐	☒	B	
Regulation 61-62.63: National Emission Standards For Hazardous Air Pollutants (NESHAP) For Source Categories	☒	☐	L	
Regulation 61-62.68: Chemical Accident Prevention	☐	☒	H	
Regulation 61-62.72: Acid Rain	☐	☒	H	
Regulation 61-62.96: Nitrogen Oxides (NO_X) Budget Trading Program	☐	☒	H	
Regulation 61-62.99: Nitrogen Oxides (NO_X) Budget Program Requirements for Stationary Sources Not In the Trading Program	☐	☒	H	
Other	☐	☐		
18. Federal Regulations (PROJECT ONLY)				
NSPS (Part 60) Subpart(s) IIII	☒	☐	L	
NESHAP (Part 61) Subpart(s)	☐	☒	H	
MACT (Part 63) Subpart(s) ZZZZ	☒	☐	L	
Compliance Assurance Monitoring (CAM) (Part 64)	☐	☒	H	
Other	☐	☐		

Bureau of Air Quality
Construction Permit Application
Part I

Please Refer To Instructions Before Completing This Form

19. PART II FORMS – Indicate the number of applicable Part II Form(s) attached	
Fuel Burning Source Construction Permit Applications (Part IIA)	1
Process Source Construction Permit Applications (Part IIB)	1
Incinerator Applications (Part IIC)	
Asphalt Plant Applications (Part IID)	
Dry Cleaner Applications (Part IIE)	
Concrete Batch Plant Permit Applications (Part IIF)	
Storage Vessel Permit Applications (Part IIG/Part IIGa)	11

20. APPLICATION CHECKLIST

The following items must be submitted in accordance with S.C. Regulation 61-62.1, Section II(C)(3) to be considered complete. Be sure to check all items included in the application.

Included	N/A	Item Description	Last Submitted	BAQ Verify (Office Use Only)
☒	☐	A. A description of the facility's proposed new or altered processes, including the physical and chemical properties and feed rate of the materials used and produced (in pounds per hour), from which the facility determined potential emissions		☐
☒	☐	B. Scaled plot plan of the facility clearly showing property boundaries, stack and building locations, and indicating true north		☐
☒	☐	C. Detailed narrative description of the project including the full scope of the project (each source installed or altered, associated control equipment, how the project affects other sources and their emissions, flow diagram/schematic of the process including all input and output streams)		☐
☒	☐	D. Project Total Emissions (Uncontrolled potential and Controlled). Attach all calculations including equations, emission factors, assumptions, and references used to estimate emissions		☐
☒	☐	E. Regulatory applicability determination (including all emission limitations, monitoring, record keeping, reporting) associated with the new or altered source(s)		☐
☒	☐	F. Air Dispersion Modeling Questionnaire(s) for each new or altered emission point		☐
☒	☐	G. Facility-Wide Air Dispersion Modeling Analysis (see Air Dispersion Modeling Guidelines for further information)		☐
☐	☒	H. Description and estimate of fugitive emissions for the project		☐
☐	☒	I. A description of all air pollution control devices or systems on the new or altered source(s), whether inherent or add-on		☐
☐	☒	J. Confidential information must be properly marked and claimed under a separate cover and copies of the application suitable for public inspection must also be submitted		☐

The following items should be submitted, if applicable, in accordance with other S.C. and Federal regulations. Be sure to check all items included in the application.

Included	N/A	Item Description	Last Submitted	BAQ Verify (Office Use Only)
☒	☐	K. Any reasonably anticipated operating scenarios for the project		☐
☒	☐	L. Provide all emission data (actual emissions, baseline actual emissions, netting, etc.) needed to make applicability determinations for BACT/LAER (SC Regulation 61-62.5, Standard 5.1)		☐
☐	☒	M. If BACT/LAER is applicable above, attach an appropriate BACT/LAER analysis		☐
☒	☐	N. All emission data (actual emissions, baseline actual emissions, netting, etc.) needed to make applicability determinations for PSD and non-attainment NSR (SC Regulation 61-62.5, Standards 7 & 7.1)		☐
☐	☒	O. If PSD or NSR is applicable above, attach an appropriate BACT/LAER analysis		☐
☐	☒	P. CAM plan, if applicable		☐

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Bureau of Air Quality
Construction Permit Application
Part IIA: Fuel Burning Source

Please Refer To Instructions Before Completing This Form

1. FUEL BURNING EQUIPMENT INFORMATION

Unit ID:	Equipment ID: LTS1	Permit Number:	File Name:

Check all that apply:
☒ New Unit
☐ Is this a Replacement Unit? If yes, specify Unit to be replaced:
☐ Is this a Fuel Addition/Change to an Existing Unit? If yes, specify addition or change:
☐ Is this a Physical Modification to an Existing Unit? If yes, describe:
☐ Other:

Type of Unit (e.g., Fire-tube boiler, hot water heater): Propane fired evaporative leachate treatment system

Purpose (please describe all uses, including use as a control device): E-800 is a component of LTS1. It is a propane-fired evaporator designed to reduce volume of leachate that must be sent offsite for treatment. E-800 is the only fuel-burning part of the treatment system. The emission rates listed in section 3 below are for fuel combustion in E-800 only. See the application report for additional details.

Date of Manufacture: 2012	Installation Date: 2012	Reconstruction/Modification Date (if applicable):
Make: Encon	Model: N66V2-400	Not available at this time ☐

Rated Input Capacity: 4.54 x 10^6 BTU/hr

Does the unit combust a waste as defined in Section 61-62.1? ☐ Yes ☒ No
If yes, which waste streams?

Number of burners: 1 | Specify size of each burner (in 10^6 BTU/hr) 4.54

Is this unit equipped with Low NOx burner(s)? ☐ Yes ☒ No | If yes, indicate for which fuels:

Is this unit capable of soot blowing? ☐ Yes ☒ No | If yes, indicate for which fuels:

Burner Type (Solid fuels only): ☐ Pulverized ☐ Traveling Grate ☐ Underfeed Stoker ☐ Other (specify):

Is this unit equipped with a control device? ☐ Yes ☒ No (If yes, complete the information on page 3 of this form.)

2. FUEL DATA (Include All Fuels)

Fuel Type and Grade	BTU Content	% Sulfur by weight	% Ash by weight	Consumption @ Rated Capacity (units)
Propane	91.5 MMBtu/Mgal	0.0185	0	50 gph

3. EMISSION RATES BY FUEL TYPE (At Maximum Input Capacity)

Primary Fuel Type: Propane

Pollutant		Calculated Emissions				Calculation Method
		Uncontrolled		Controlled		
		(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	
Particulate Matter (PM)		0.03	0.15	0.03	0.15	AP-42
Particulate Matter < 10 Micron (PM_{10})		0.03	0.15	0.03	0.15	AP-42
Particulate Matter < 2.5 Micron ($PM_{2.5}$)		0.03	0.15	0.03	0.15	AP-42
Sulfur Dioxide (SO_2)		0.0009	0.0039	0.0009	0.0039	AP-42
Carbon Monoxide (CO)		0.37	1.63	0.37	1.63	AP-42
Nitrogen Oxides (NOx)		0.65	2.83	0.65	2.83	AP-42
Volatile Organic Compounds (VOC)		0.05	0.22	0.05	0.22	AP-42
Greenhouse Gases	(Mass)	612	2,680	612	2,680	40 CFR 98
	(CO_2e)	614	2,690	614	2,690	40 CFR 98
Hazardous Air Pollutant – Single Greatest		Negligible	Negligible	Negligible	Negligible	Neg. HAP from firing propane
Hazardous Air Pollutants – Total		Negligible	Negligible	Negligible	Negligible	Neg. HAP from firing propane

Please Refer To Instructions Before Completing This Form

Unit ID:	Equipment ID:	Permit Number:	File Name:

4. EMISSION RATES BY FUEL TYPE (At Maximum Input Capacity)						**Secondary Fuel Type:**
Pollutant		**Calculated Emissions**				**Calculation Method**
		Uncontrolled		**Controlled**		
		(lb/hr)	**(tons/yr)**	**(lb/hr)**	**(tons/yr)**	
Particulate Matter (PM)						
Particulate Matter < 10 Micron (PM_{10})						
Particulate Matter < 2.5 Micron ($PM_{2.5}$)						
Sulfur Dioxide (SO_2)						
Carbon Monoxide (CO)						
Nitrogen Oxides (NOx)						
Volatile Organic Compounds (VOC)						
Greenhouse Gases	(Mass)					
	(CO_2e)					
Hazardous Air Pollutant – Single Greatest						
Hazardous Air Pollutants – Total						

5. EMISSION RATES BY FUEL TYPE (At Maximum Input Capacity)						**Additional Fuel Type:**
Pollutant		**Calculated Emissions**				**Calculation Method**
		Uncontrolled		**Controlled**		
		(lb/hr)	**(tons/yr)**	**(lb/hr)**	**(tons/yr)**	
Particulate Matter (PM)						
Particulate Matter < 10 Micron (PM_{10})						
Particulate Matter < 2.5 Micron ($PM_{2.5}$)						
Sulfur Dioxide (SO_2)						
Carbon Monoxide (CO)						
Nitrogen Oxides (NOx)						
Volatile Organic Compounds (VOC)						
Greenhouse Gases	(Mass)					
	(CO_2e)					
Hazardous Air Pollutant – Single Greatest						
Hazardous Air Pollutants – Total						

6. SPECIATED HAP AND TAP EMISSION RATES AT MAXIMUM RATED CAPACITY

Process/ Equipment ID	**Pollutant**	**CAS Number**	**HAP, TAP, or Both**	**Uncontrolled (tons/year)**	**Controlled (tons/year)**	**Calculation Method**
See Appendix D						

7. OPERATING SCHEDULE INFORMATION

Hours/Day: 24	Days/Week: 4 typical, 7 max	Weeks/Year: 52	Max Hours/Year: 8,760
Seasonal Variation			
Dec. – Feb. (%): 25	Mar. – May (%): 25	June – Aug (%): 25	Sept. – Nov. (%): 25

Attach sheets as necessary to provide any additional information. Include any proposed fuel limits and limitation calculations.

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Bureau of Air Quality

Construction Permit Application

Part IIA: Fuel Burning Source

Please Refer To Instructions Before Completing This Form

8. CONTROL DEVICE INFORMATION

Primary Control Device		**Control Device ID:** **Stack/Exhaust ID:**	
Manufacturer Make and Model:		**Type of Device:**	
Inherent to Process: ☐ **Yes** ☐ **No**	**If inherent, please explain:**		
Pollutants Controlled:	☐ Particulate Matter (PM) ☐ Particulate Matter < 10 Micron (PM_{10}) ☐ Sulfur Dioxide (SO_2) ☐ HAP/TAP ☐ Carbon Monoxide (CO) ☐ Nitrogen Oxides (NOx) ☐ Volatile Organic Compounds (VOC) ☐Other, Please list any other pollutants controlled:		
Projected Capture Efficiency: **%**	**Destruction, Control, or Removal Efficiency:** **%**		
Engineering Design and Operating Characteristics:			
Manufacturer's Specifications and Ratings:			
Recommended Control Device Monitoring/Data Collection (include parameters):			
Recordkeeping:			

Secondary Control Device		**Control Device ID:** **Stack/Exhaust ID:**	
Manufacturer Make and Model:		**Type of Device:**	
Inherent to Process: ☐ **Yes** ☐ **No**	**If inherent, please explain:**		
Pollutants Controlled:	☐ Particulate Matter (PM) ☐ Particulate Matter < 10 Micron (PM_{10}) ☐ Sulfur Dioxide (SO_2) ☐ HAP/TAP ☐ Carbon Monoxide (CO) ☐ Nitrogen Oxides (NOx) ☐ Volatile Organic Compounds (VOC) ☐Other, Please list any other pollutants controlled:		
Projected Capture Efficiency: **%**	**Destruction, Control, or Removal Efficiency:** **%**		
Engineering Design and Operating Characteristics:			
Manufacturer's Specifications and Ratings:			
Recommended Control Device Monitoring/Data Collection (include parameters):			
Recordkeeping:			

Additional Control Device		**Control Device ID:** **Stack/Exhaust ID:**	
Manufacturer Make and Model:		**Type of Device:**	
Inherent to Process: ☐ **Yes** ☐ **No**	**If inherent, please explain:**		
Pollutants Controlled:	☐ Particulate Matter (PM) ☐ Particulate Matter < 10 Micron (PM_{10}) ☐ Sulfur Dioxide (SO_2) ☐ HAP/TAP ☐ Carbon Monoxide (CO) ☐ Nitrogen Oxides (NOx) ☐ Volatile Organic Compounds (VOC) ☐Other, Please list any other pollutants controlled:		
Projected Capture Efficiency: **%**	**Destruction, Control, or Removal Efficiency:** **%**		
Engineering Design and Operating Characteristics:			
Manufacturer's Specifications and Ratings:			
Recommended Control Device Monitoring/Data Collection (include parameters):			
Recordkeeping:			

South Carolina Department of Health and Environmental Control

Please Refer To Instructions Before Completing This Form

1. PROCESS SOURCE INFORMATION

Unit ID:	**Permit Number:**	**File Name:**	
Check all that apply:	☒ Construct a new process that will not be part of an existing source		
	☐ Alter an existing source	☐ Adding new equipment	
		☐ Replacing existing equipment Specify equipment to be replaced:	
		☐ Other:	

Description of New or Existing Process/Equipment (including description of alteration to existing source): LTS1 is an evaporative leachate treatment system comprisingf tanks T-200, T-300, T-400, T-500, T-600, T-700, and T-900, filter press FLT-600, dryers D-601 and D-901, evaporator E-800, pumps, pH adjustment system, etc. Only E-800 is fuel-fired. All emitting process equipment are vented through a single stack (LTSA/LTSB/LTSC/LTSD). Emission rates have been aggregated for all emitting equipment. See application report for additional detail.

Process description (define process boundary): See Section 2 and Figure B-1 of the application report

Does the unit combust a waste as defined in Section 61-62.1? ☐ Yes ☒ No
If yes, which waste streams?

Is this unit equipped with a control device? ☐ Yes ☒ No (If yes, complete the information on page 3 of this form.)

2. RAW MATERIAL DATA

What is the process weight rate (ton/hour) for the entire process as defined in SC Regulation 61-62.1? N/A

Material	Maximum Quantity Used (Units)
Landfill leachate	6,258.75 tpy

3. PRODUCT DATA

Products	Production at Maximum Rated Capacity (Units)

4. NEW OR ALTERED PROCESS SOURCE(S)

Process/ Equipment ID	Equipment Description (Include Make/Model of Each)	Design Capacity (Units)	Normal Operating Throughput Rate (Units)	Control Device ID	Stack/ Exhaust ID
LTS1	See Section 2 of application report	400 gal/hr	400 gal/hr	N/A	LTSA/LTSB/LTSC/LTSD

5. NEW OR ALTERED FUEL BURNING SOURCE(S)

Process/ Equipment ID	Indirect/Direct Heating	Total Rated Heat Input (10^6 BTU/hr)	Number of Burners	Size of Each Burner (10^6 BTU/hr)	Burner Type (Solid Fuels Only)	Equipped with a Low NOx Burner?	If Yes, For Which Fuels?
E-800	Indirect	4.54	1	4.54		☐	
						☐	
						☐	

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Bureau of Air Quality
Construction Permit Application
Part IIB: Process Source

Please Refer To Instructions Before Completing This Form

Unit ID:	Permit Number:	File Name:

6. FUEL DATA (Include All Fuels)

Process/ Equipment ID	Fuel Type and Grade	BTU Content	% Sulfur by Weight	% Ash by Weight	Consumption @ Rated Capacity (Units)
E-800	Propane	91.5 MMBtu/Mgal	0.0185	0	50 gph

7. EMISSION RATES AT MAXIMUM RATED CAPACITY

Process/ Equipment ID	Pollutant	CAS Number	HAP, TAP, or Both	Uncontrolled (tons/year)	Controlled (tons/year)	Calculation Method
LTS1	VOC			18.58	18.58	Mass balance, AP42 factor
E-800	PM, PM10, PM2.5			0.15	0.15	AP42 factor
E-800	NOx			2.83	2.83	AP42 factor
E-800	CO			1.63	1.63	AP42 factor
E-800	SO2			0.00391	0.00391	AP42 factor
LTS1	Total HAP			20.06	20.06	Mass balance
LTS1	Speciated HAP and TAP	See Appendix D of application report	See Appendix D of application report	See Appendix D of application report	See Appendix D of application report	Mass balance
E-800	CO2e			2,690	2,690	40 CFR 98 factors

8. OPERATING SCHEDULE INFORMATION

Hours/Day: 24	Days/Week: 4 typical, 7 max	Weeks/Year: 52	Max Hours/Year: 8,760
Seasonal Variation			
Dec. – Feb. (%): 25	Mar. – May (%): 25	June – Aug. (%): 25	Sept. – Nov. (%): 25

Attach sheets as necessary to provide any additional information.

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Bureau of Air Quality
Construction Permit Application
Part IIB: Process Source

Please Refer To Instructions Before Completing This Form

9. CONTROL DEVICE INFORMATION

Primary Control Device		Control Device ID: Stack/Exhaust ID:	
Manufacturer Make and Model:		Type of Device:	
Inherent to Process: ☐ Yes ☐ No	If inherent, please explain:		
Pollutants Controlled:	☐ Particulate Matter (PM) ☐ Particulate Matter < 10 Micron (PM_{10}) ☐ Sulfur Dioxide (SO_2) ☐ HAP/TAP ☐ Carbon Monoxide (CO) ☐ Nitrogen Oxides (NOx) ☐ Volatile Organic Compounds (VOC) ☐Other, Please list any other pollutants controlled:		
Projected Capture Efficiency: %	Destruction, Control, or Removal Efficiency: %		
Engineering Design and Operating Characteristics:			
Manufacturer's Specifications and Ratings:			
Recommended Control Device Monitoring/Data Collection (include parameters):			
Recordkeeping:			

Secondary Control Device		Control Device ID: Stack/Exhaust ID:	
Manufacturer Make and Model:		Type of Device:	
Inherent to Process: ☐ Yes ☐ No	If inherent, please explain:		
Pollutants Controlled:	☐ Particulate Matter (PM) ☐ Particulate Matter < 10 Micron (PM_{10}) ☐ Sulfur Dioxide (SO_2) ☐ HAP/TAP ☐ Carbon Monoxide (CO) ☐ Nitrogen Oxides (NOx) ☐ Volatile Organic Compounds (VOC) ☐Other, Please list any other pollutants controlled:		
Projected Capture Efficiency: %	Destruction, Control, or Removal Efficiency: %		
Engineering Design and Operating Characteristics:			
Manufacturer's Specifications and Ratings:			
Recommended Control Device Monitoring/Data Collection (include parameters):			
Recordkeeping:			

Additional Control Device		Control Device ID: Stack/Exhaust ID:	
Manufacturer Make and Model:		Type of Device:	
Inherent to Process: ☐ Yes ☐ No	If inherent, please explain:		
Pollutants Controlled:	☐ Particulate Matter (PM) ☐ Particulate Matter < 10 Micron (PM_{10}) ☐ Sulfur Dioxide (SO_2) ☐ HAP/TAP ☐ Carbon Monoxide (CO) ☐ Nitrogen Oxides (NOx) ☐ Volatile Organic Compounds (VOC) ☐Other, Please list any other pollutants controlled:		
Projected Capture Efficiency: %	Destruction, Control, or Removal Efficiency: %		
Engineering Design and Operating Characteristics:			
Manufacturer's Specifications and Ratings:			
Recommended Control Device Monitoring/Data Collection (include parameters):			
Recordkeeping:			

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Storage Vessel Permit Application
Bureau of Air Quality
Part IIG

1. Facility Name: Pinewood Site

Storage Vessel Designation: AL01 – AL02 (Auxiliary Leachate Tank Farm Primary Leachate Storage Tanks, 2 each)

2. Physical Data:
   a. Vessel Dimensions:
      Shell Height: (ft) Diameter: 12(ft)
      Shell Length48.17 (ft) Max. Volume: 40,000 (gal)
   b. Material of Construction: ☒ Steel ☐ Fiberglass ☐ Other (Specify):
   c. Paint Color: ☐ Aluminum ☒ Gray ☐Red ☐ White ☐Other (Specify):
   d. Paint Shade: ☐ Specular ☐ Diffuse ☐ Light ☒ Medium ☐ Primer ☐ Other
   e. Vessel condition: ☒ Good ☐ Fair ☐ Poor
   f. Vessel location: ☒ Aboveground ☐ Underground
   g. Vent Data:
      Valve Type: ☐ Combination ☒ Open ☐ Pressure Vacuum
      No. of Vents: 1 Pressure Setting: Vacuum Setting:
      Discharge Vented to: Atmosphere Vent Location (UTM, Lat/Long): Zone 17, 544170, 3727709
   h. Roof Type: ☒ Fixed Roof (Dome/Cone) ☐ External Floating Roof ☐ Internal Floating Roof

3. Operating Data:
   a. Material Stored: ☐ Pure ☒ Mixture

Component Name	CAS RN	MW	Density/Temperature	Weight Percent
Aqueous leachate - see Appendix C of application report for leachate composition				

   b. Storage Conditions:
      True Vapor Pressure: Unknown kPa Maximum True Vapor Pressure: Unknown kPa
      Method Used to Determine Vapor Pressure:
      Temperature: Min Ambient (°F) Max Ambient (°F)
      Annual Throughput: 750,000 (gal) Turnovers per year: 19
      Vapor Loss Control Device Description: None
   c. Emission Rate at maximum annual throughput (lb/hr):

Pollutant	Before Control Device	After Control Device	Method of Estimating Emissions
VOC (all tanks)	0.67	0.67	WATER9
Total HAP (all tanks)	1.04	1.04	WATER9
See Appendix D of application report for speciated HAPs			

   d. Normal Operating Schedule: 24 hours/day 7 days/week 52 weeks/yr
      Seasonal Variation: Dec-Feb 25 % Mar.-May 25 % June-Aug. 25 % Sept-Nov. 25 %
   e. How will waste material from vessel cleanouts be disposed of? On-site stabilization, then send to RCRA TSDF

Storage Vessel Permit Application
Bureau of Air Quality
Part IIG

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1. Facility Name: Pinewood Site

   Storage Vessel Designation: CL01 – CL10 (Central Leachate Tank Farm Primary Leachate Storage Tanks, 10 each)

2. Physical Data:
   a. Vessel Dimensions:
      Shell Height:32 (ft) Diameter: 14.33(ft)
      Shell Length (ft) Max. Volume: 40,000 (gal)
   b. Material of Construction: ☒ Steel ☐ Fiberglass ☐ Other (Specify):
   c. Paint Color: ☐ Aluminum ☒ Gray ☐ Red ☐ White ☐ Other (Specify):
   d. Paint Shade: ☐ Specular ☐ Diffuse ☐ Light ☒ Medium ☐ Primer ☐ Other
   e. Vessel condition: ☒ Good ☐ Fair ☐ Poor
   f. Vessel location: ☒ Aboveground ☐ Underground
   g. Vent Data:
      Valve Type: ☐ Combination ☒ Open ☐ Pressure Vacuum
      No. of Vents: 1 Pressure Setting: Vacuum Setting:
      Discharge Vented to: Atmosphere Vent Location (UTM, Lat/Long): Zone 17, 544295, 3728117
   h. Roof Type: ☒ Fixed Roof (Dome/Cone) ☐ External Floating Roof ☐ Internal Floating Roof

3. Operating Data:
   a. Material Stored: ☐ Pure ☒ Mixture

Component Name	CAS RN	MW	Density/Temperature	Weight Percent
Aqueous leachate - see Appendix C of application report for leachate composition				

   b. Storage Conditions:
      True Vapor Pressure: Unknown kPa Maximum True Vapor Pressure: Unknown kPa
      Method Used to Determine Vapor Pressure:
      Temperature: Min Ambient (°F) Max Ambient (°F)
      Annual Throughput: 150,000/tank (gal) Turnovers per year: 4
      Vapor Loss Control Device Description: None
   c. Emission Rate at maximum annual throughput (lb/hr):

Pollutant	Before Control Device	After Control Device	Method of Estimating Emissions
VOC (all tanks)	0.69	0.69	WATER9
Total HAP (all tanks)	1.05	1.05	WATER9
See Appendix D of application report for speciated HAPs			

   d. Normal Operating Schedule: 24 hours/day 7 days/week 52 weeks/yr
      Seasonal Variation: Dec-Feb 25 % Mar.-May 25 % June-Aug. 25 % Sept-Nov. 25 %
   e. How will waste material from vessel cleanouts be disposed of? Stabilized on-site and sent to RCRA TSDF

South Carolina Department of Health and Environmental Control

Storage Vessel Permit Application
Bureau of Air Quality
Part IIG

1. Facility Name: Pinewood Site

   Storage Vessel Designation: T-200 (LTS1 Mix Tank) – Although the mix tank is not a storage tank, the storage tank form most closely matches its description.

2. Physical Data:
   a. Vessel Dimensions:
      Shell Height: 16.25 (ft) Diameter: 10 (ft)
      Shell Length (ft) Max. Volume: 6,500 (gal)
   b. Material of Construction: ☒ Steel ☐ Fiberglass ☐ Other (Specify):
   c. Paint Color: ☐ Aluminum ☒ Gray ☐ Red ☐ White ☐ Other (Specify):
   d. Paint Shade: ☐ Specular ☐ Diffuse ☐ Light ☒ Medium ☐ Primer ☐ Other
   e. Vessel condition: ☒ Good ☐ Fair ☐ Poor
   f. Vessel location: ☒ Aboveground ☐ Underground
   g. Vent Data:
      Valve Type: ☐ Combination ☒ Open ☐ Pressure Vacuum
      No. of Vents: 1 Pressure Setting: Vacuum Setting:
      Discharge Vented to: Stack LTSA/LTSB/LSTC/LSTD Vent Location (UTM, Lat/Long): Zone 17, 544295, 3728117
   h. Roof Type: ☒ Fixed Roof (Dome/Cone) ☐ External Floating Roof ☐ Internal Floating Roof

3. Operating Data:
   a. Material Stored: ☐ Pure ☒ Mixture

Component Name	CAS RN	MW	Density/Temperature	Weight Percent
Aqueous leachate - see Appendix C of application report for leachate composition				

   b. Storage Conditions:
      True Vapor Pressure: Unknown kPa Maximum True Vapor Pressure: Unknown kPa
      Method Used to Determine Vapor Pressure:
      Temperature: Min Ambient (°F) Max Ambient (°F)
      Annual Throughput: 1.5 million (gal) Turnovers per year: 231
      Vapor Loss Control Device Description: None
   c. Emission Rate at maximum annual throughput (lb/hr):

Pollutant	Before Control Device	After Control Device	Method of Estimating Emissions
VOC	Included in total emissions from LTS1. See Appendix D of application report.		Historical leachate concentrations
Total HAP	Included in total emissions from LTS1. See Appendix D of application report.		Historical leachate concentrations
	Included in total emissions from LTS1. See Appendix D of application report.		Historical leachate concentrations

   d. Normal Operating Schedule: 24 hours/day 7 days/week 52 weeks/yr
      Seasonal Variation: Dec-Feb 25 % Mar.-May 25 % June-Aug. 25 % Sept-Nov. 25 %
   e. How will waste material from vessel cleanouts be disposed of? Stabilization on-site, then send to RCRA TSDF

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Storage Vessel Permit Application
Bureau of Air Quality
Part IIG

1. Facility Name: Pinewood Site

   Storage Vessel Designation: T-300 (LTS1 Caustic Storage Tank)

2. Physical Data:
   a. Vessel Dimensions:
      Shell Height: 8.6 (ft) Diameter: 8.5 (ft)
      Shell Length (ft) Max. Volume: 2,000 (gal)
   b. Material of Construction: ☐ Steel ☐ Fiberglass ☒ Other (Specify): HDPE
   c. Paint Color: ☐ Aluminum ☒ Gray ☐ Red ☐ White ☐ Other (Specify):
   d. Paint Shade: ☐ Specular ☐ Diffuse ☐ Light ☒ Medium ☐ Primer ☐ Other
   e. Vessel condition: ☒ Good ☐ Fair ☐ Poor
   f. Vessel location: ☒ Aboveground ☐ Underground
   g. Vent Data:
      Valve Type: ☐ Combination ☒ Open ☐ Pressure Vacuum
      No. of Vents: 1 Pressure Setting: Vacuum Setting:
      Discharge Vented to: Atmosphere Vent Location (UTM, Lat/Long): Zone 17, 544295, 3728117
   h. Roof Type: ☒ Fixed Roof (Dome/Cone) ☐ External Floating Roof ☐ Internal Floating Roof

3. Operating Data:
   a. Material Stored: ☒ Pure ☐ Mixture

Component Name	CAS RN	MW	Density/Temperature	Weight Percent
Caustic Soda Solution	1310-73-2	40	2.13 g/mL / Ambient	TBD

   b. Storage Conditions:
      True Vapor Pressure: 0.2 kPa Maximum True Vapor Pressure: 0.2 kPa
      Method Used to Determine Vapor Pressure: MSDS
      Temperature: Min Ambient (°F) Max Ambient (°F)
      Annual Throughput: TBD (gal) Turnovers per year: TBD
      Vapor Loss Control Device Description: None
   c. Emission Rate at maximum annual throughput (lb/hr):

Pollutant	Before Control Device	After Control Device	Method of Estimating Emissions
Negligible emissions			

   d. Normal Operating Schedule: 24 hours/day 7 days/week 52 weeks/yr
      Seasonal Variation: Dec-Feb 25 % Mar.-May 25 % June-Aug. 25 % Sept-Nov. 25 %
   e. How will waste material from vessel cleanouts be disposed of? N/A

DHEC 1942D (07/1977)

Storage Vessel Permit Application
Bureau of Air Quality
Part IIG

DHEC — PROMOTE PROTECT PROSPER — South Carolina Department of Health and Environmental Control

1. Facility Name: Pinewood Landfill

   Storage Vessel Designation: LTS1 Sulfuric Acid Tank (T-400)

2. Physical Data:
   a. Vessel Dimensions:
      Shell Height: 8.7 (ft) Diameter: 6.3 (ft)
      Shell Length (ft) Max. Volume: 1,100 (gal)
   b. Material of Construction: ☐ Steel ☐ Fiberglass ☒ Other (Specify): HDPE
   c. Paint Color: ☐ Aluminum ☒ Gray ☐ Red ☐ White ☐ Other (Specify):
   d. Paint Shade: ☐ Specular ☐ Diffuse ☐ Light ☒ Medium ☐ Primer ☐ Other
   e. Vessel condition: ☒ Good ☐ Fair ☐ Poor
   f. Vessel location: ☒ Aboveground ☐ Underground
   g. Vent Data:
      Valve Type: ☐ Combination ☒ Open ☐ Pressure Vacuum
      No. of Vents: 1 Pressure Setting: Vacuum Setting:
      Discharge Vented to: Atmosphere Vent Location (UTM, Lat/Long): Zone 17, 544295, 3728117
   h. Roof Type: ☒ Fixed Roof (Dome/Cone) ☐ External Floating Roof ☐ Internal Floating Roof

3. Operating Data:
   a. Material Stored: ☒ Pure ☐ Mixture

Component Name	CAS RN	MW	Density/Temperature	Weight Percent
Sulfuric Acid	7664-93-9	98.1	1.84 g/mL / Ambient	100

   b. Storage Conditions:
      True Vapor Pressure: <0.01 kPa Maximum True Vapor Pressure: <0.01 kPa
      Method Used to Determine Vapor Pressure: MSDS
      Temperature: Min Ambient (℉) Max Ambient (℉)
      Annual Throughput: TBD (gal) Turnovers per year: TBD
      Vapor Loss Control Device Description: None
   c. Emission Rate at maximum annual throughput (lb/hr):

Pollutant	Before Control Device	After Control Device	Method of Estimating Emissions
Negligible emissions			

   d. Normal Operating Schedule: 24 hours/day 7 days/week 52 weeks/yr
      Seasonal Variation: Dec-Feb 25 % Mar.-May 25 % June-Aug. 25 % Sept-Nov. 25 %
   e. How will waste material from vessel cleanouts be disposed of? N/A

DHEC 1942D (07/1977)

South Carolina Department of Health and Environmental Control

Storage Vessel Permit Application
Bureau of Air Quality
Part IIG

1. Facility Name: Pinewood Landfill

   Storage Vessel Designation: LTS1 Perlite Tank (T-500)

2. Physical Data:
   a. Vessel Dimensions:
      Shell Height: 6.3 (ft) Diameter: 4.4 (ft)
      Shell Length (ft) Max. Volume: 500 (gal)
   b. Material of Construction: ☐ Steel ☐ Fiberglass ☒ Other (Specify): HDPE
   c. Paint Color: ☐ Aluminum ☒ Gray ☐ Red ☐ White ☐ Other (Specify):
   d. Paint Shade: ☐ Specular ☐ Diffuse ☐ Light ☒ Medium ☐ Primer ☐ Other
   e. Vessel condition: ☒ Good ☐ Fair ☐ Poor
   f. Vessel location: ☒ Aboveground ☐ Underground
   g. Vent Data:
      Valve Type: ☐ Combination ☒ Open ☐ Pressure Vacuum
      No. of Vents: 1 Pressure Setting: Vacuum Setting:
      Discharge Vented to: Atmosphere Vent Location (UTM, Lat/Long): Zone 17, 544295, 3728117
   h. Roof Type: ☒ Fixed Roof (Dome/Cone) ☐ External Floating Roof ☐ Internal Floating Roof

3. Operating Data:
   a. Material Stored: ☒ Pure ☐ Mixture

Component Name	CAS RN	MW	Density/Temperature	Weight Percent
Aqueous solution of perlite	93763-70-3	varies	2.3 g/mL / Ambient	TBD

   b. Storage Conditions:
      True Vapor Pressure: <0.01 kPa Maximum True Vapor Pressure: <0.01 kPa
      Method Used to Determine Vapor Pressure: MSDS
      Temperature: Min Ambient (°F) Max Ambient (°F)
      Annual Throughput: TBD (gal) Turnovers per year: TBD
      Vapor Loss Control Device Description: None
   c. Emission Rate at maximum annual throughput (lb/hr):

Pollutant	Before Control Device	After Control Device	Method of Estimating Emissions
Negligible emissions			

   d. Normal Operating Schedule: 24 hours/day 7 days/week 52 weeks/yr
      Seasonal Variation: Dec-Feb 25 % Mar.-May 25 % June-Aug. 25 % Sept-Nov. 25 %
   e. How will waste material from vessel cleanouts be disposed of? N/A

DHEC 1942D (07/1977)

DHEC
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

Storage Vessel Permit Application
Bureau of Air Quality
Part IIG

1. Facility Name: Pinewood Site

   Storage Vessel Designation: T-600 (LTS1 Filtrate Tank)

2. Physical Data:
   a. Vessel Dimensions:
      Shell Height: 8 (ft) Diameter: 6.7 (ft)
      Shell Length (ft) Max. Volume: 1,600 (gal)
   b. Material of Construction: ☒ Steel ☐ Fiberglass ☐ Other (Specify):
   c. Paint Color: ☐ Aluminum ☒ Gray ☐ Red ☐ White ☐ Other (Specify):
   d. Paint Shade: ☐ Specular ☐ Diffuse ☐ Light ☒ Medium ☐ Primer ☐ Other
   e. Vessel condition: ☒ Good ☐ Fair ☐ Poor
   f. Vessel location: ☒ Aboveground ☐ Underground
   g. Vent Data:
      Valve Type: ☐ Combination ☒ Open ☐ Pressure Vacuum
      No. of Vents: 1 Pressure Setting: Vacuum Setting:
      Discharge Vented to: Stack LTSA/LTSB/LTSC/LTSD Vent Location (UTM, Lat/Long): Zone 17, 544295, 3728117
   h. Roof Type: ☒ Fixed Roof (Dome/Cone) ☐ External Floating Roof ☐ Internal Floating Roof

3. Operating Data:
   a. Material Stored: ☐ Pure ☒ Mixture

Component Name	CAS RN	MW	Density/Temperature	Weight Percent
Aqueous leachate - see Appendix C of application report for leachate composition				

   b. Storage Conditions:
      True Vapor Pressure: Unknown kPa Maximum True Vapor Pressure: Unknown kPa
      Method Used to Determine Vapor Pressure:
      Temperature: Min Ambient (°F) Max Ambient (°F)
      Annual Throughput: 1.5 million (gal) Turnovers per year: 938
      Vapor Loss Control Device Description: None
   c. Emission Rate at maximum annual throughput (lb/hr):

Pollutant	Before Control Device	After Control Device	Method of Estimating Emissions
VOC	Included in total emissions from LTS1. See Appendix D of application report		Historical leachate concentrations
Total HAP	Included in total emissions from LTS1. See Appendix D of application report		Historical leachate concentrations
Speciated HAP	Included in total emissions from LTS1. See Appendix D of application report		Historical leachate concentrations

   d. Normal Operating Schedule: 24 hours/day 7 days/week 52 weeks/yr
      Seasonal Variation: Dec-Feb 25 % Mar.-May 25 % June-Aug. 25 % Sept-Nov. 25 %
   e. How will waste material from vessel cleanouts be disposed of? Stabilized on-site then sent to RCRA TSDF

DHEC 1942D (07/1977)

PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

Storage Vessel Permit Application
Bureau of Air Quality
Part IIG

1. Facility Name: Pinewood Site

   Storage Vessel Designation: T-700 (LTS1 Holding Tank)

2. Physical Data:
   a. Vessel Dimensions:
      Shell Height: 16 (ft) Diameter: 13 (ft)
      Shell Length (ft) Max. Volume: 15,000 (gal)
   b. Material of Construction: ☒ Steel ☐ Fiberglass ☐ Other (Specify):
   c. Paint Color: ☐ Aluminum ☒ Gray ☐ Red ☐ White ☐ Other (Specify):
   d. Paint Shade: ☐ Specular ☐ Diffuse ☐ Light ☒ Medium ☐ Primer ☐ Other
   e. Vessel condition: ☒ Good ☐ Fair ☐ Poor
   f. Vessel location: ☒ Aboveground ☐ Underground
   g. Vent Data:
      Valve Type: ☐ Combination ☒ Open ☐ Pressure Vacuum
      No. of Vents: 1 Pressure Setting: Vacuum Setting:
      Discharge Vented to: Stack LTSA/LTSB/LTSC/LTSD Vent Location (UTM, Lat/Long): Zone 17, 544295, 3728117
   h. Roof Type: ☒ Fixed Roof (Dome/Cone) ☐ External Floating Roof ☐ Internal Floating Roof

3. Operating Data:
   a. Material Stored: ☐ Pure ☒ Mixture

Component Name	CAS RN	MW	Density/Temperature	Weight Percent
Aqueous leachate - see Appendix C of application report for leachate composition				

   b. Storage Conditions:
      True Vapor Pressure: Unknown kPa Maximum True Vapor Pressure: Unknown kPa
      Method Used to Determine Vapor Pressure:
      Temperature: Min Ambient (°F) Max Ambient (°F)
      Annual Throughput: 1.5 million (gal) Turnovers per year: 100
      Vapor Loss Control Device Description: None
   c. Emission Rate at maximum annual throughput (lb/hr):

Pollutant	Before Control Device	After Control Device	Method of Estimating Emissions
VOC	Included in total emissions from LTS1. See Appendix D of application report.		Historical leachate concentrations
Total HAP	Included in total emissions from LTS1. See Appendix D of application report.		Historical leachate concentrations
Speciated HAP	Included in total emissions from LTS1. See Appendix D of application report.		Historical leachate concentrations

   d. Normal Operating Schedule: 24 hours/day 7 days/week 52 weeks/yr
      Seasonal Variation: Dec-Feb 25 % Mar.-May 25 % June-Aug. 25 % Sept-Nov. 25 %
   e. How will waste material from vessel cleanouts be disposed of? Stabilization on-site, then send to RCRA TSDF

DHEC 1942D (07/1977)

Storage Vessel Permit Application
Bureau of Air Quality
Part IIG

DHEC
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

1. Facility Name: Pinewood Landfill

   Storage Vessel Designation: T-900 (LTS1 Slurry Holding Tank)

2. Physical Data:
   a. Vessel Dimensions:
      Shell Height: 13.1 (ft) Diameter: 6 (ft)
      Shell Length (ft) Max. Volume: 1,600 (gal)
   b. Material of Construction: ☒ Steel ☐ Fiberglass ☐ Other (Specify):
   c. Paint Color: ☐ Aluminum ☒ Gray ☐ Red ☐ White ☐ Other (Specify):
   d. Paint Shade: ☐ Specular ☐ Diffuse ☐ Light ☒ Medium ☐ Primer ☐ Other
   e. Vessel condition: ☒ Good ☐ Fair ☐ Poor
   f. Vessel location: ☒ Aboveground ☐ Underground
   g. Vent Data:
      Valve Type: ☐ Combination ☒ Open ☐ Pressure Vacuum
      No. of Vents: 1 Pressure Setting: Vacuum Setting:
      Discharge Vented to: Stack LTSA/LTSB/LSTC/LTSD Vent Location (UTM, Lat/Long): Zone 17, 544295, 3728117
   h. Roof Type: ☒ Fixed Roof (Dome/Cone) ☐ External Floating Roof ☐ Internal Floating Roof

3. Operating Data:
   a. Material Stored: ☐ Pure ☒ Mixture

Component Name	CAS RN	MW	Density/Temperature	Weight Percent
Aqueous leachate - see Appendix C of application report for leachate composition				

   b. Storage Conditions:
      True Vapor Pressure: Unknown kPa Maximum True Vapor Pressure: Unknown kPa
      Method Used to Determine Vapor Pressure:
      Temperature: Min Ambient (°F) Max 212 (°F)
      Annual Throughput: 90,000 (gal) Turnovers per year: 56
      Vapor Loss Control Device Description: None
   c. Emission Rate at maximum annual throughput (lb/hr):

Pollutant	Before Control Device	After Control Device	Method of Estimating Emissions
VOC	Included in total emissions from LTS1. See Appendix D of application report		Historical leachate concentrations
Total HAP	Included in total emissions from LTS1. See Appendix D of application report		Historical leachate concentrations
Speciated HAP and TAP	Included in total emissions from LTS1. See Appendix D of application report		Historical leachate concentrations

   d. Normal Operating Schedule: 24 hours/day 7 days/week 52 weeks/yr
      Seasonal Variation: Dec-Feb 25 % Mar.-May 25 % June-Aug. 25 % Sept-Nov. 25 %
   e. How will waste material from vessel cleanouts be disposed of? Stabilization on-site, then to a RCRA TSDF

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

AIR DISPERSION MODELING QUESTIONNAIRE
Bureau of Air Quality

COMPANY NAME Pinewood Site Custodial Trust

PERMIT NUMBER

STACK DESIGNATION (NAME) LTSA

POLLUTANT/AIR TOXIC EMITTED See Appendix D of the application report

CAS NO. (FOR AIR TOXICS ONLY) See Appendix D of the application report

EMISSION RATE (lb/hr) See Appendix D of the application report

PROCESS NAME (if applicable) LTS1

DATE INSTALLED/MODIFIED 2012

HEAT INPUT (10^6 BTU/hr) (if applicable) 4.54

FUEL(S) USED,INCLUDE BACKUPS (if applicable) Propane

STACK HEIGHT ABOVE GROUND (ft) 50

DOES STACK HAVE A RAIN CAP OR IS DISCHARGE HORIZONTAL No

STACK DIAMETER (i.d.) (ft) 4

UTM's OR LATITUDE/LONGITUDE OF STACK 544360, 3728141

STACK TEMPERATURE (deg. F) 212

STACK VELOCITY (ft/sec) 8.5

DISTANCE FROM STACK TO NEAREST PLANT BOUNDARY (ft) 1,138

BUILDING LENGTH[1] (ft) 139

BUILDING WIDTH[1] (ft) 72.5

BUILDING HEIGHT[1] (ft) 25

[1] If there are several buildings near the stack, include a plot plan showing stack location as well as length, width and height of nearby buildings. See back of form for additional information.

See instructions on the reverse side of this form.

DHEC
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

AIR DISPERSION MODELING QUESTIONNAIRE
Bureau of Air Quality

COMPANY NAME Pinewood Site Custodial Trust

PERMIT NUMBER

STACK DESIGNATION (NAME) LTSB

POLLUTANT/AIR TOXIC EMITTED See Appendix D of the application report

CAS NO. (FOR AIR TOXICS ONLY) See Appendix D of the application report

EMISSION RATE (lb/hr) See Appendix D of the application report

PROCESS NAME (if applicable) LTS1

DATE INSTALLED/MODIFIED 2012

HEAT INPUT (10^6 BTU/hr) (if applicable) 4.54

FUEL(S) USED,INCLUDE BACKUPS (if applicable) Propane

STACK HEIGHT ABOVE GROUND (ft) 50

DOES STACK HAVE A RAIN CAP OR IS DISCHARGE HORIZONTAL No

STACK DIAMETER (i.d.) (ft) 4

UTM's OR LATITUDE/LONGITUDE OF STACK 544360, 3728141

STACK TEMPERATURE (deg. F) 212

STACK VELOCITY (ft/sec) 0.2

DISTANCE FROM STACK TO NEAREST PLANT BOUNDARY (ft) 1,138

BUILDING LENGTH[1] (ft) 139

BUILDING WIDTH[1] (ft) 72.5

BUILDING HEIGHT[1] (ft) 25

[1] If there are several buildings near the stack, include a plot plan showing stack location as well as length, width and height of nearby buildings. See back of form for additional information.

See instructions on the reverse side of this form.

DHEC 3555 (12/97)

DHEC
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

AIR DISPERSION MODELING QUESTIONNAIRE
Bureau of Air Quality

COMPANY NAME Pinewood Site Custodial Trust

PERMIT NUMBER

STACK DESIGNATION (NAME) LTSC

POLLUTANT/AIR TOXIC EMITTED See Appendix D of the application report

CAS NO. (FOR AIR TOXICS ONLY) See Appendix D of the application report

EMISSION RATE (lb/hr) See Appendix D of the application report

PROCESS NAME (if applicable) LTS1

DATE INSTALLED/MODIFIED 2012

HEAT INPUT (10^6 BTU/hr) (if applicable) 4.54

FUEL(S) USED,INCLUDE BACKUPS (if applicable) Propane

STACK HEIGHT ABOVE GROUND (ft) 50

DOES STACK HAVE A RAIN CAP OR IS DISCHARGE HORIZONTAL No

STACK DIAMETER (i.d.) (ft) 4

UTM's OR LATITUDE/LONGITUDE OF STACK 544360, 3728141

STACK TEMPERATURE (deg. F) Ambient

STACK VELOCITY (ft/sec) 48.9

DISTANCE FROM STACK TO NEAREST PLANT BOUNDARY (ft) 1,138

BUILDING LENGTH[1] (ft) 139

BUILDING WIDTH[1] (ft) 72.5

BUILDING HEIGHT[1] (ft) 25

[1] If there are several buildings near the stack, include a plot plan showing stack location as well as length, width and height of nearby buildings. See back of form for additional information.

See instructions on the reverse side of this form.

DHEC
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

AIR DISPERSION MODELING QUESTIONNAIRE
Bureau of Air Quality

COMPANY NAME Pinewood Site Custodial Trust

PERMIT NUMBER

STACK DESIGNATION (NAME) LTSD

POLLUTANT/AIR TOXIC EMITTED See Appendix D of the application report

CAS NO. (FOR AIR TOXICS ONLY) See Appendix D of the application report

EMISSION RATE (lb/hr) See Appendix D of the application report

PROCESS NAME (if applicable) LTS1

DATE INSTALLED/MODIFIED 2012

HEAT INPUT (10^6 BTU/hr) (if applicable) 4.54

FUEL(S) USED,INCLUDE BACKUPS (if applicable) Propane

STACK HEIGHT ABOVE GROUND (ft) 50

DOES STACK HAVE A RAIN CAP OR IS DISCHARGE HORIZONTAL No

STACK DIAMETER (i.d.) (ft) 4

UTM's OR LATITUDE/LONGITUDE OF STACK 544360, 3728141

STACK TEMPERATURE (deg. F) Ambient

STACK VELOCITY (ft/sec) 40.7

DISTANCE FROM STACK TO NEAREST PLANT BOUNDARY (ft) 1,138

BUILDING LENGTH[1] (ft) 139

BUILDING WIDTH[1] (ft) 72.5

BUILDING HEIGHT[1] (ft) 25

[1] If there are several buildings near the stack, include a plot plan showing stack location as well as length, width and height of nearby buildings. See back of form for additional information.

See instructions on the reverse side of this form.