Preliminary Engineering Evaluation Report

West Contra Costa Sanitary Landfill, P#1840
1 Parr Blvd, Richmond
Application #25019

Background

The West Contra Costa Sanitary Landfill (WCCSL) operated as a municipal solid waste disposal site between 1953 and September 2006. There have been many operational changes over the years as new permits and recycling operations commenced. Currently the site consists of a number of distinct operations and facilities that function as a cohesive whole. These operations/facilities include:

- Waste Recycling Center (Golden Bear Waste Recycling Center)
- Bulk Materials Processing Center (organic material processing, composting, concrete)
- Municipal Solid Waste Landfill (closed) and Flare
- Hazardous Waste Management Facility (Post-closure Term began in 2003)
- Hazardous Waste Management Facility Leachate Treatment Plant
- Landfill Gas Power Plant

Project Description

The facility is requesting a throughput increase and other modifications for the S-117 Composting Operation (part of the Bulk Materials Processing Center). The facility is also requesting issuance of an authority to construct for new equipment and operations: a portable screener and portable engine (S-185 and S-186) that will remain on the site but will be moved to various locations on-site as necessary, and a wood waste stockpile operation (S-189). In addition, the facility will shut down an existing permitted tub grinder (S-115) and screener (S-116).

This project will generate particulate emissions from vehicle traffic traveling to and from the site (delivering feed stock and picking up product), composting operations, screening and grinding operations, stockpiles, and diesel engine powering equipment. The diesel engines will also emit combustion products including nitrogen oxides, carbon monoxide, organic compounds, sulfur dioxide, and diesel PM (a toxic air contaminant). The composting operation will emit precursor and non-precursor organic compounds and toxic air contaminants (such as methanol and ammonia).

Current Composting Process

The current permitted composting operation (S-117) uses uncontrolled windrow composting methods and is permitted to use up to 19,000 tons/year of feedstock. Currently, S-117 is only permitted to compost green waste.

Proposed Composting Process Using CASP Method

Under this application, the facility has requested to increase the permitted feedstock limit up to 130,000 tons/year for S-117. Initially, the Applicant requested to continue using the uncontrolled windrow composting method; however, the Applicant modified this request and is now proposing to compost using the covered aerated static pile (CASP) composting method.

As opposed to the current windrow process, which requires mechanical turning of the pile to promote aeration, the proposed aerated static pile (ASP) composting method provides aeration using perforated pipes and a blower system for the active composting phase. During active composting using the ASP method, the feedstock is placed on top of perforated pipes attached to a blower system that either pushes air (positive aeration) or pulls air (vacuum aeration) through the active composting pile. For positive aeration systems, the active pile is covered with a layer of finished compost to provide a semipermeable barrier that controls VOC and ammonia emissions during the active composting phase. Negative aeration systems are typically vented to biofilters for VOC and ammonia control. The Applicant is proposing to use the more typical positive aeration system and compost covers for this CASP process; however, the Applicant has requested that permit conditions allow either method.

Curing Piles

For both standard windrow composting processes and the CASP method, the active compost pile will be relocated to another area and allowed to cure without turning for about 30 days to complete the composting process. The Applicant is not proposing to use any controls on the curing piles.

CASP Impacts on Particulate Emissions

The ASP method results in much lower particulate emissions than traditional windrow compost methods, because it eliminates the frequent turning of the compost pile during the active compost phase and the associated fugitive road dust emissions generated by the windrow turning equipment traveling on unpaved areas during these pile turning events. Using compost covers or biofilters on the aerated static pile reduces emissions of organic compounds and ammonia. Per article titled "Compost Emissions Estimate for a Conditional use Permit Modification" dated June 29, 2011, it has been shown that aerated static pile composting with negative aeration and biofiltration can provide a VOC reduction by 85% (Tim O'Neill, 2010 Biocycle West Coast conference; Card 7 Schmidt, 2011 Biocycle West Coast Conference).

Potential Future Additions and Changes

As indicated earlier, the facility is proposing to greatly increase the greenwaste throughput at S-117 and to convert from standard windrow composting to a CASP method for the active composting phase. The facility has stated that no windrow tilling will occur once the CASP system is in place. The facility has mentioned that they may want to incorporate other materials (biosolids and food waste) in the future.

Change of Condition for S-117

S-117 Commercial Green Waste and Food Waste Composting Operation, Covered Aerated Static Pile (CASP) Method, abated by Biofilter (A-117).

Screening/Grinding Operations, Associated Engines and Wood Waste Stockpiles

In addition to the composting process changes above, the facility has requested to permit a portable prime diesel engine (S-186). This proposed engine has a rated capacity of 125 BHP, and the facility has requested to operate it for 1083 hours per year. This engine would power a portable screening operation that would remain on-site but would be moved to various on-site locations as needed. The facility is also planning to operate a portable grinding operation. Since particulate emissions for these screening and grinding operations are low, the District has combined the portable screening and grinding operations under a single source (S-185).

As indicated above, the facility plans to use a portable tub grinder powered by a portable diesel engine. Both units have previously been registered through CARB's State Portable Equipment Registration Program (PERP). PERP registered equipment is typically exempt from District permits if the PERP registration is valid. However, the District has determined that these units will require District permits when operating at WCCSL in support of the compost operation, because the engine and tub grinder are necessary and integral to the operation of a permitted stationary source. In this case, the portable engine is powering a portable tub grinder that is supplying feed stock to the S-117 Green Waste Compost Operation. The District has determined that PERP registrations for equipment operating in support of stationary sources are not valid at the stationary source location per Health and Safety Code Section 2451(c)(3):

§ 2451 Applicability
(c) The following are not eligible for registration under this program:
(3) engines, equipment units, and associated engines determined by the Executive Officer to qualify as part of a stationary source permitted by a district.

The District's permit requirement determination above is consistent with CAPCOA guidance regarding PERP registered equipment operating at stationary sources. The District has notified the Applicant that a permit is required for the diesel engine and tub grinder.

WCCSL has requested to permit wood waste stockpiles separately as opposed to having the stockpiles included in the composting operation source. WCCSL currently accepts various types of woody waste that is not suitable for composting but rather is ground and transported off site within a matter of days. This material would be processed by the grinder unit in addition to the greenwaste supplied to the compost operation. The facility is requesting a limit of 30,000 tons/year for the wood waste stockpiles (S-189).

In summary, the Applicant is requesting an Authority to Construct for the following equipment:

S-185 Portable Trommel Screen (130,000 tons/year throughput) and Portable Grinder Operations (130,000 tons/year composting material + 30,000 tons/year wood waste = 160,000 tons/year throughput).
S-186 Portable Diesel Engine for S-185 Trommel Screen John Deere 4045 HF 275, 125 BHP, operating 1083 hours/year.
S-189 Wood Waste Stockpiles (30,000 tons/year)

Shut-Down of Permitted Sources:

The facility currently has a permitted tub grinder and screener and has requested that the District archive these sources, once the District issues the permit to operate for this application. Neither sources has been operating for some time now.

The facility would like the following equipment removed from the permits for this site:

S-115 Wood/Yard Waste Shredder; Tub Grinder; Morbark 5600, 60 tons/hr abated by A-115 Water Spray System
S-116 Wood Waste Screener, Morbark 721, 60 tons/hr abated by A-116 Water Spray System

Emission Calculation

The proposed emission changes for the Compost Operations, emissions from new equipment, and emission reductions from equipment shut downs, and net emission changes for this project are summarized in Tables 1-4. Calculation assumptions are explained below. Detailed spreadsheets showing all calculations are attached.

Table 1. Proposed Emission Changes for the Compost Operations (S-117)

	Proposed Emissions at 130,000 tons/year of Compost Throughput			
	POC TPY	NH3 TPY	PM10 TPY	PM2.5 TPY
Composting	103.922	12.09		
Batch Drops			0.536	0.081
Paved Roads			3.604	0.885
Unpaved Roads			6.180	0.618
Stockpiled greenwaste	6.565			
Total	110.487	12.09	10.321	1.584
	Baseline Emissions * for Existing Compost Throughput			
	POC TPY	NH3 TPY	PM10 TPY	PM2.5 TPY
Composting/windrow	46.028	6.852	0.091	0.045
Batch Drops			0.133	0.020
Paved Roads			1.520	0.760
Unpaved Roads			0.562	0.281
Stockpile greenwaste	0.814			
Total	46.842	6.852	2.306	1.106
	Net Emission Increases for S-117 Compost Operations			
	POC TPY	NH3 TPY	PM10 TPY	PM2.5 TPY
Total	63.645	5.238	8.015	0.477

* Baseline emissions were determined using the 3-year average baseline throughput to S-117 of 16,122 tons/year.

Table 2. Proposed Emissions from New Equipment

		POC TPY	PM10 TPY	PM2.5 TPY	NOx TPY	CO TPY	SO2 TPY
S-185	Portable Screen		1.642	0.613			
S-186	Portable Engine	0.034	0.030	0.030	0.645	0.111	0.0007
S-189	Wood Waste Stockpile	0.0	0.062	0.009			
Total		0.034	1.734	0.652	0.645	0.111	0.0007

Table 3. Emission Reductions from Equipment Shut Downs- None

S-115 Tub Grinder-none as facility used PERP unit
S-116 Screener-none- as facility used PERP screener

Table 4. Net Project Emission Changes

		POC TPY	PM10 TPY	PM2.5 TPY	NOx TPY	CO TPY	SO2 TPY
S-117	Compost Operations	63.645	8.015	0.477	0.0	0.0	0.0
S-185	Portable Screen	0.0	1.642	0.613	0.0	0.0	0.0
S-186	Portable Engine	0.034	0.030	0.030	0.645	0.111	0.0007
S-189	Wood Waste Stockpile	0.0	0.062	0.009	0.0	0.0	0.00
S-115	Shredder-Tub Grinder	0.0	0.0	0.0	0.0	0.0	0.0
S-116	Screener	0.0	0.0	0.0	0.0	0.0	0.0
Net Project Increases		63.679	9.750	1.129	0.645	0.111	0.0007

Emission Calculation Basis and Assumptions

Particulate emissions are expected from vehicle traffic, composting operations and diesel engine powering equipment, and screening, grinding, and stockpile operations. The composting operations will also have organic and ammonia emissions. The District assumes that all VOC emissions discussed below are precursor organic compounds (POC).

A. Historical emissions for the S-117 Windrow Composting Operations include particulate matter due to stockpile formation, particulate matter due to windrow turning, particulate matter due to vehicle traffic (delivering feedstock, removing product, during stockpile formation and relocation, and during windrow turning), plus volatile organic compound and ammonia emissions due to the physical aeration and biological composting processes. Organic emission factors were based on San Joaquin Valley Air Pollution Control District - Compost VOC Emission Factors dated Sept 15, 2010 and Emission Reductions from Composting and Related Operations dated March 2002. The BAAQMD currently bases uncontrolled windrow emission factors on results from the San Joaquin Valley Air Pollution Control District (SJVAPCD) report "Compost VOC Emission Factors", September 15, 2010. A factor of 5.71 pounds of VOC/wet ton is used for uncontrolled windrow composting (90% from composting, 10% from curing).

   Studies conducted in the South Coast and San Joaquin Valley air Districts indicate that a CASP system and biofiltration, reduce VOC emissions by up to 90% as compared to

uncontrolled windrow operations. For the sake of this application it is assumed that VOC emissions from composting will be reduced by at least 80%; curing emissions are not affected. Therefore, the abated VOC emission factor for CASP composting and curing is estimated to be:
(5.71 lb/wet ton)*(90%)*(1.00 - 0.80) + (5.71 lb/wet ton)*(10%) = 1.60 lb VOC/wet ton.

Stockpiled Material: VOC emissions were provided from source test results from SCAQMD inland testing dated 2001 for stockpiled greenwaste material for composting operation (SCAQMD- inland EF 0.101 lb-VOC/wet ton/day)

NH_3: In conjunction with South Coast Rule 1133 "Composting and Related Operations", South Coast Air Quality Management District (SCAQMD) has developed an NH_3 emission factor of 0.85 lb/wet ton (0.83 lb/wet ton from composting, 0.02 lb/wet ton from curing) for greenwaste. Technology Assessment for Proposed Rule 1133 dated March 2002.

PM10: The windrow PM10 emission factor is derived using methodology described in "Emission Inventory Methodology-Biosolids Management and Imported Livestock Waste," Nov. 18, 2003, Sonoma Technology Inc., prepared for San Joaquin Valley Unified APCD and an average CARB emission factor for agricultural land preparation from area source categories emission estimates Section 7.4 Agricultural Land Preparation, Emission Inventory Source Category: Miscellaneous Processes/ Farming Operations, Jan. 2003. Assume 50% abatement efficiency for use of water spray.

B. Proposed emissions for the S-117 CASP Composting Operations include particulate matter, volatile organic compound and ammonia emission factors for the composting process plus particulate matter emission factors for vehicle traffic on paved and unpaved on-site roads.

C. The particulate emission factors for the operation of S-185 Wood Waste Screener and Grinding Operations are from AP42 4th Edition Section 10.3 Plywood Veneer and Layout Operations, Table 10.3-1 for log debarking, assuming 60% of emission is PM10 (February 1980). Abatement efficiencies are per permit handbook guidance for Tub Grinders (Chapter 11.13).

D. The emission factor for stockpiles is from AP42 5th Edition Section 13.2.4 Aggregate Handling and Storage Piles, Table 13.2.4-1 (November 2006).

E. The fugitive emission factors due to vehicle traffic are calculated separately for paved and unpaved roads

1. The emission factor for vehicle traffic on paved roads to and from the concrete/asphalt storage piles is calculated based on 31,431.33 miles/yr of paved road estimated by the applicant and using the following equation found in EPA's AP42 5th Edition Chapter 13.2.1 Paved Roads, January 2011.

E_{ext} = $[k (sL)^{0.91} (W)^{1.02}] (1 – P / 4N)$
Where
E_{ext} = Emission factor, pounds per vehicle miles traveled (lbs/VMT)
k = particle size multiplier (lbs/VMT) = 0.016, for PM_{10} from Table 13.2.1-1
sL = road surface silt loading (g/m^2)
= 7.4, mean value for municipal solid waste landfills from Table 13.2.1-4
W = average weight of vehicles (tons) = 16.63, estimate provided by applicant
P = number of days with at least 0.01 in. of precipitation in the averaging period
= 60 days, estimated from Graph of Probability of 0.01" Precipitation for Richmond obtained from the Western Regional Climate Center Website (www.wrcc.dri.edu)
N = number of days in the averaging period = 365 for annual
$E_{paved} = [.0022 (7.4)^{0.91} (16.63)^{1.02} – 0.00047] (1 – 60 / 4(365))$ = 0.2294 lbs/VMT

Emission Factor (paved), lbs/vehicles = E_{paved} * VMT = (0.2294) *(31431.33 VMT/yr) = 7208.94 lbs/yr for PM-10 = 3.60 tons/yr PM-10

2. The emission factor for vehicle traffic on unpaved roads to and from the composting and stockpile storage piles is calculated based on consultant providing information on unpaved road estimated by the applicant and using the following equations found in EPA's AP42 5th Edition Chapter 13.2.2 Unpaved Roads, November 2006. Assume 50% abatement efficiency for use of dust suppressant. VMT/YR is 16,068.73

$E = k (s/12)^a (W/3)^b$ and $E_{ext} = E [(365 – P) / 365]$

$E_{ext} = [k (s/12)^a (W/3)^b] [(365 – P) / 365]$
Where
E_{ext} = Annual Emission factor (lbs/VMT)
k = empirical constant (lbs/VMT)
= 1.5, for PM_{10} and industrial roads in Table 13.2.2-2
a = empirical constant = 0.9, for PM_{10}, industrial roads from Table 13.2.2-2
b = empirical constant = 0.45, for PM_{10}, industrial roads from Table 13.2.2-2
s = surface material silt content (%)
= 6.4, mean value for municipal solid waste landfills from Table 13.2.2-1
W = mean vehicle weight (tons) = 16.63, estimate provided by applicant
P = number of days with at least 0.01 in. of precipitation in the averaging period
= 60 days, estimated from Graph of Probability of 0.01" Precipitation for Richmond obtained from the Western Regional Climate Center Website (www.wrcc.dri.edu)
$E_{unpaved} = [1.5 (6.4/12)^{0.9} (16.63/3)^{0.45}] [(365 – 60) / 365]$ = 1.538 lbs/VMT

Emission Factor (unpaved), lbs/vehicles = $E_{unpaved}$ * VMT = (1.538) *(16068.73 VMT/yr)*(1-.5)
= 12,360.77 lbs/yr for PM-10

F. Diesel engines will emit combustion products. Emissions are based on operating times, bhp capacity, and certified emission factors, as indicated below.

G. Abatement efficiencies are per permit handbook guidance for Crushing and Grinding (11.7).

Cumulative Increase

The cumulative increases for all facilities in the District were reset in 1991, so the post 4/5/1991 increases are shown below as the current cumulative increase for this facility. The cumulative emission increases for this proposed project are included below.

Table #5 Cumulative Emission Increases

Pollutant	Current, tpy	Application Increases, tpy	Contemporaneous Reductions, tpy	Post-Project, tpy
PM10	18.925	9.750	0	28.675
POC *	20.028	63.679	0	83.707
NOx *	42.787	0.645	0	43.432
SO2	54.565	0.001	0	54.566
CO	159.339	0.111	0	159.450

* This facility provided offsets for the current 20.028 tons/year of POC and 42.787 tons/year of NOx emission increases in earlier permit applications. Therefore, this site is only required to provide offsets for the POC and NO_x emission increases resulting from this permit application.

Table #6 - Potential to Emit for the Facility

Description	NMOC / POCs tons/yr	NO_X, tons/yr	CO, tons/yr	PM_{10}, tons/yr	SO_2, tons/yr	Estimated Under A/N
Class II Landfill, S-15	12.44					A/N 11375
[5]Flare for S-15, A8	0	0	0	0	0	A/N 11375
IC Engine, S-5	2.61	11.93	43.33	2.3	4.65	A/N 11375
IC Engine, S-6	2.61	11.93	43.33	2.3	4.65	A/N 11375
IC Engine, S-37	2.3	10.52	31.4	2.25	4.10	A/N 11375
HWMF Landfill, S-46	1.43-1.43 =0					A/N 2789 & 8514- to be archived
Flare for S-46, A-11	0.34 -.34 =0	1.37-1.37 = 0	6.86-6.86=0	0.39-.39 =0	1.14-1.14 = 0	A/N 2789 & 8514 Abatement to be archived
Transfer Station, S-50				142.39(1)		A/N 13247
Inlet Storage Tanks S-69 and S-70	.017					A/N 14848
Air Stripper S-48	(0.59 - .59)=0					A/N 14622 – archive with this application

Table #6 - Potential to Emit for the Facility						
Description	NMOC / POCs tons/yr	NO_X, tons/yr	CO, tons/yr	PM_{10}, tons/yr	SO_2, tons/yr	Estimated Under A/N
Leachate System S-71,S-72, S-73, S-74 S-75 and S-76 (including exempt oil tanks = 0.142)	(0.17 - .0237)= 0.142					A/N 14966 (some permitted sources will be archived other sources modified in A/N 20621) need to verify if S-21 also needs to be archived
Leachate System S-24, S-26, S-27, S-28, S-29, S-33, S-40, S-42, S-43 and S-45	(.04 -.04) = 0					A/N 14769 (all sources archived)
Concrete/Asphalt Recycling (S111, S112, S113, S114, S118) and Composting (S115, S116, S117) formerly permitted under facility number A0198 (2)	16.9-16.9=0			8.37(3) – 8.37=0		A/N 14621 (S-117 windrow 16.9 tons/yr) (these emissions were removed as S-117 was modified)
Modified Leachate System including sources S120,123,130,140,141,142,145,146,151,153,155,156,157)and exempt sources (144,150,152,154,158,159,160)	0.7577					A/N 20621
Flare A-120	5.457	19.503	78.013	6.672	39.002	A/N 21826
S-47 CAMU				0.064(6)		A/N14771
S-117 Composting S-185 Portable Trommel Screen and Grinder S-186 Portable Diesel Engine for Screen S-189 Wood Waste Stockpiles	110.521	0.645	0.111	9.750 (4)	0.001	A/N 25019
PTE Totals	**136.86**	**54.5**	**196.2**	**165.7**	**52.4**	

(1) Value includes 142.2 typ of fugitive vehicle traffic emissions.

(2) The permit for the S110 Diesel Engine Powering Wood Waste Screener was subsequently cancelled. Since the existing engine would not meet the standards of the state air toxic control measure that now apply, WCCSL agreed to cancel the S110 permit and to accept the following permit condition on S116 Wood Waste Screener: Prior to the operation of S116 using a power source that requires a District permit, the owner/operator must hold a valid District permit for the power source. Emissions estimates for this cancelled source are not included in the above table for application # 14621.

(3) Value includes 5.59 tpy of fugitive vehicle traffic PM10 emissions.

(4) Values include 7.702 tpy of fugitive vehicle traffic PM10 emissions.

(5) Flare emissions from A-8 were removed as a condition limits PTE to abatement A-120 flare as this is the maximum PTE

(6) All emissions are from Vehicle traffic from CAMU operation.

Statement of Compliance

Regulation 1, "General Provisions and Definitions"

The facility is subject to Regulation 1, Section 301, which prohibits discharge of air contaminants resulting in public nuisance. Although compost operations can be sources of odors, the District is proposing permit conditions that are intended to prevent or abate odors before off-site issues arise. For the proposed project operating in compliance with the proposed permit conditions, the District does not expect this project to be a source of public nuisance.

Public Notice Requirements, Regulation 2, Rule 1

This site is a major facility, because emissions (POCs and CO) have the potential to exceed 100 tons/year but this application is not for a new major facility. This application is for an increase in composting operation along with the issuance of a diesel engine and a screener and grinder. As shown in Table 5, the cumulative emission increases for this application for POCs are greater than the Regulation 2-2-221 major modification level (40 tons/year of POC). Therefore, this application will be subject to the Regulation 2-2-405 publication and public comment requirements.

This facility is not subject to Regulation 2-1-412 as no school is located within 1000 feet.

California Environmental Quality Act (CEQA) Requirements, Regulation 2, Rule 1

This project involves the modification of a composting operation. Standard calculations have been made pursuant to use of Permit Handbook Chapters, AP-42 and other Regulatory Agency guidance manual for calculations. However, this project has undergone CEQA review and a Final EIR was certified by Contra Costa County on December 17, 2008. This facility is complying with Regulation 2-1-310 CEQA Requirements.

Best Available Control Technology (BACT) Requirements, Regulation 2, Rule 2

This project is subject to BACT pursuant to Regulation 2, Rule 2, Section 301 for the S-117 Composting Operation, because POC, NPOC, and PM_{10} emissions will each exceed 10 pounds per highest day. For S-117, emissions of all other criteria pollutants will be less than 10 pounds per highest day. For composting operations, the District does not have a standard BACT determination in the District's BACT/TBACT Workbook. Therefore, staff conducted a case-by-case BACT review using information from other air districts and other literature reviews. This BACT review is discussed below.

The S-186 Portable Diesel Engine will be restricted to operating no more than 8 hours per day by permit conditions. With this limit, S-186 will not emit more than 10 pounds per day of any pollutants and will not trigger BACT requirements. In addition, sources S-189 and S-185 are not subject to BACT, because emissions will not exceed 10 pounds per day of PM_{10}.

Compost Processes and Controls

Composting is a biological decomposition process that converts biodegradable solid waste (such as lawn and garden waste, food waste, and other organic matter) into a stable material that is

typically used as a soil amendment or fertilizer. Traditional composting uses aerobic (oxygen based) decomposition processes to breakdown the biodegradable material. Oxygen level, temperature, moisture, carbon to nitrogen ratio, material porosity, and other factors affect the rate of decomposition, quality of the product, and the emissions to the atmosphere.

The most common type of composting operation uses the open windrow compost method. The compost feedstock is prepared by shredding, grinding, and mixing the available materials to achieve a desired mix ratio. This shredded and mixed feedstock is placed in long stockpiles, called windrows, to start the active composting phase. Decomposition accelerates as the temperature increases. The desired oxygen levels are maintained in the windrow by frequently turning over the windrow using mechanical means. Once the active composting phase is complete, the windows are allowed to rest and finish the composting process during a curing phase. This compost method requires a large work area, a large buffer zone between the facility and residents or industry, and a long time period to complete the compost process. This composting method typically has substantial fugitive particulate and organic emissions. Water sprays are commonly used to control particulate emissions, but organic emission controls are not typically employed.

Another type of composting process is the aerated static pile (ASP) process. Rather than placing the mixed feedstock in long windrows, the feedstock is placed in an area equipped with perforated pipes. Aeration is accomplished by blowing air into the pipes and through the feedstock (positive aeration), or the reverse, negative aeration, by pulling air through the feedstock and into the pipes. This aeration method typically requires less space and less total processing time than the traditional windrow method, but may still require large buffer zones and improves the oxygen control in the pile. It can also allow for greater flexibility in the type of feedstock processed. The ASP process eliminates the need for windrow turning, which is the largest source of particulate emissions for the windrow process. In addition, ASP process can easily be fitted with biofilters to control organic and ammonia emissions. Finished compost placed on top of the active compost curing piles acts as a biofilter for positive ASP. This type of ASP is often called a covered aerated static pile (CASP) process. Curing piles are typically handled similarly to the windrow process.

Another type of composting is the “in vessel” approach. This process may be used for sites that require a small footprint or that are in a more confined area. This type of system may be less adaptable with regards to types and amount of feedstock received. In-vessel composting equipment can be equipped with piping and biofilters to control organic and ammonia emissions. For in-vessel systems, the capture rates for organic and ammonia emissions are likely higher than the capture rates that can be achieved by the CASP process or a biofilter controlled negative ASP process. However, actual reported capture and control efficiencies for in-vessel systems vary widely and this range overlaps the ranges of capture and control efficiencies reported for CASP systems and biofilter controlled negative ASP systems. In addition, in-vessel system and control costs are considerably higher than for the CASP method.

BACT Analysis for S-117 Compost Operations

The District has two BACT levels: BACT1 and BACT2. A project must use BACT1 (the most stringent level of control) if it is found to be technologically feasible and cost effective. In accordance with the District's BACT/TBACT Workbook, the District's cost effectiveness thresholds are: $17,500/ton for POC, NPOC, and NO_x; $18,300/ton for SO_2; and $5,300/ton for PM_{10}. The District's BACT/TBACT Workbook also identifies the procedures to be used for conducting a cost effectiveness analysis. If emission controls do not meet the BACT1 criteria, the applicant must use BACT2, which is an achieved in practice level of control. BACT2 controls cannot be any less stringent than controls or emission limits that are required by any Air District, state, or federal rules or regulations.

For the proposed composting operation, the largest type of emission is precursor organic compounds with a proposed emission rate of 110.5 tons/year of POC for the CASP process at 130,000 tons/year of feedstock processed. As discussed above, in-vessel composting with biofilter abatement is a technologically feasible process that is expected to result in the highest potential control efficiency for organic emissions. However, for this type of composting process to be deemed BACT1 for this project, it must also be cost-effective.

The District conducted a cost-effectiveness analysis for a bio-filter controlled in-vessel composting system. Based on equipment cost data provided by the Applicant's consultant and District procedures in the BACT/TBACT Workbook, the District calculated an annualized cost of $6,543,000/year for the in-vessel equipment and controls that would be required to handle 130,000 tons/year of feedstock. As an initial emission control estimate, the District assumed that this system would achieve up to 95% capture and control of the project's uncontrolled emission rate (352.59 tons/year of POC). For this initial assumption, the cost effectiveness of an in-vessel system was determined to be $18,557/ton. For more realistic overall capture and control assumptions (80%-85%), the cost-effectiveness would be more than $20,000/ton. Since the cost of a biofilter controlled in-vessel compost system will exceed the District's cost-effectiveness threshold for POCs ($17,500/ton), this type of system is not considered to be cost-effective.

The next most stringent type of compost process and emission control is an aerated static pile system that is controlled by biofilters. The District did not identify any green waste compost projects where these types of controls had been required as a BACT control measure. South Coast Air Quality Management District Rule 1133.2 requires that new co-composting operations (composting with biosolids) be equipped with aeration systems and VOC controls, with new systems required to meet 80% VOC control and existing systems required to meet 70% VOC control. San Joaquin Valley Air Pollution Control District (SJVAPCD) Rule 4566 requires use of compost covers on windrows or other control measures achieving at least 60% control of VOC for certain types of non-agricultural commercial compost operations, if the compost operation has a throughput of $\geq$ 200,000 tons/year of throughput but < 750,000 tons/year. For compost operations with throughput rates $\geq$ 750,000 tons/year, SJVAPCD Rule 4566 requires 80% VOC Control. For green waste composting operations, the SJVAPCD Rule 4566 control rates are the most stringent achieved in practice or BACT2 level of control that the District has identified to date.

The applicant has proposed to use aerated static piles for the active compost phase and has requested to have the flexibility to try both CASP and negative ASP vented to a biofilter processes for this project. Reported emission factors for ASP composting operations are highly variable. Biofilters have been demonstrated to achieve at least 85% control of POC emissions. Considering these factors, the District has determined that an 80% overall capture and control efficiency for the active composting phase is achievable for either a compost covered positive ASP or a negative ASP vented to a biofilter and that no controls for the curing phase is a reasonable criteria. The District is proposing to limit the total emission rate for this controlled compost project to 1.6 pounds of POC per ton of feedstock. Compared to a total uncontrolled emission rate of 5.71 pounds of POC/ton for uncontrolled windrow composting, the proposed project will achieve an overall capture and control rate of 72% for POC emissions.

The proposed project will have a lower throughput rate and a higher overall capture and control efficiency than would be required by the SJVAPCD Rule 4566 (60% control at 200,000 tons/year of throughput) for a green waste compost operation. Therefore, the proposed controls for this compost project are at least as stringent as BACT2 controls for green waste compost operations. Since more stringent emission control measures such as biofilter controlled in-vessel composting is not cost effective and the proposed project will have more stringent controls than BACT2, the District finds that the S-117 compost project - with the POC emission limits and control measures specified in the proposed permit conditions – satisfies BACT for POC control.

The stockpiles of green waste feedstock also trigger BACT for POC emissions, because emissions from this step will exceed 10 pounds of POC per highest day. A literature review found that the only type of control employed for feedstock piles is a limit on the duration of time that material resides in the stockpile before being incorporated into the active compost step. Under the SJVAPCD Rule 4566, stockpile storage time is limited to 10 days for operations processing less than 100,00 tons/year of material and to 3 days for operations processing 100,000 tons/year or more. Since the proposed project will process more than 100,000 tons/year of green waste, it must meet a 3 day (72 hour) stockpile storage limit as a BACT2 control measure. The facility has agreed to incorporate greenwaste and foodwaste stockpiles into the composting operation within 48-72 hours. Therefore, the feedstock stockpiles will satisfy BACT for POC control.

BACT is also required for control of PM_{10} emissions from S-117. The facility is substantially reducing PM_{10} emissions (compared to windrow compost methods) by using aerated static piles. In addition, the facility is proposing to use dust suppressants and water sprays to control vehicle traffic particulate emissions from unpaved roads, good housekeeping measures to control particulate emissions from paved roads, and water sprays on all material handling operations to control particulate emissions from these operations. These types of control measures constitute BACT for control of fugitive PM_{10} emissions.

Emission Offsets and Prevention of Significant Deterioration (PSD), Regulation 2, Rule 2

Regulation 2-2-302 currently requires offsets for NO_x and POC emission increases if facility-wide emissions of that pollutant are greater than 10 tons/year. Sites may potentially qualify to use the District's small facility bank for the required offsets if facility-wide emissions are less

than 35 tons/year of NO_x or POC. If facility-wide emissions are greater than 35 tons/year of NO_x or POC, the facility must usually provide their own offsets.

As shown in Table 6, facility wide emissions are greater than 35 tons/year each for NO_x and POC. Therefore, the facility will need to provide emission offsets for both NO_x and POCs at a ratio of 1.15 to 1.0: 73.23 tons/yr of POC (63.679*1.15) and 0.742 tons/yr of NO_x (0.645*1.15). Regulation 2, Rule 2 allows the facility to supply POC emission reduction credits to offset NO_x emission increases. Thus, a total of 73.973 tons/year of POC credits is required. The applicant is proposing to use Banking Certificate # 1379 (78.00 tons/year of POC credits) to supply the necessary emission reduction credits for this project.

Regulation 2-2-303 requires offsets for SO_2 and PM_{10} emission increases if the site is a major facility for one of these pollutants and (b) facility-wide emissions of SO_2 or PM_{10} are greater than 100 tons/year. Since site-wide SO_2 emissions are less than 100 tons/year, this site is not major for SO_2 emissions, and SO_2 offsets are not required. Although PM_{10} emissions are greater than 100 tons/year, most of these emissions are due to fugitive road dust emissions associated with the transfer station. Since this landfill and composting facility does not belong to one of the 28 PSD categories for which fugitive emissions must be included, the major facility determination for PM_{10} excludes fugitive PM_{10} emissions. This site has less than 100 tons/year of non-fugitive PM_{10} emissions. Therefore, this site is not a major facility for PM_{10} emissions, and PM_{10} offsets are not required.

Regulations 2-2-304 through 309 and 2-2-315 apply to PSD facilities. Sites belonging to one of the 28 PSD source categories listed in section 169(l) of the federal Clean Air Act have a PSD threshold of 100 tons/year for each regulated air pollutant and must include fugitive emissions when making a PSD major facility determination. However, sites that fall within unlisted categories (such as this landfill and composting facility) have a PSD major facility threshold of 250 tons/year for each regulated air pollutant and may exclude fugitive emissions when making this major facility determination. As shown in Table 6, the maximum permitted/potential site-wide emissions will be less than 250 tons/year for each regulated air pollutant (POC, NO_x, CO, PM_{10}, and SO_2). Therefore, this site is not a PSD major facility and is not subject to the PSD requirements in Sections 304-309 or 315.

The facility is not subject to Regulation 2-2-317 (Maximum Achievable Control Technology) because site-wide HAP emissions will not exceed 10 tons/year for any single HAP nor 25 tons/year for all HAPs combined. The HAP with the largest projected emission rate is methanol. The facility has agreed to accept a permit condition limiting total methanol emissions for this entire site to no more than 9 tons/year. The facility will be required to verify emission rates for all potential methanol sources, to monitor throughput rates and other relevant information, and to calculate annual methanol emissions to ensure that methanol emission rates do not exceed this site-wide limit. Compounds that are on the HAP list include: methanol, naphthalene and acetaldehyde. The District calculation of cumulative emissions of all HAPs is 13.96 tons/year, which does not exceed the 25 tons per year threshold. Since HAPs will not exceed 9 tons/year of any single HAP nor 25 tons/year of all HAPs, this project is exempt from MACT requirements per 2-2-114.

Health Risk Assessment Requirements, Regulation 2, Rule 5

The District's regulation concerning toxic air contaminant emissions is codified in Regulation 2, Rule 5, New Source Review of Toxic Air Contaminants. All TAC emissions from new and modified sources are subject to risk assessment review, if emissions of any individual TAC exceed either the acute or chronic emission thresholds defined in Table 2-5-1.

TAC emissions from the diesel engine for screener and CASP are presented in Tables 7-8 below.

EMISSIONS: Diesel particulate matter (PM) was used as a surrogate for all emitted TACs. The particulate emission rate was calculated based on the following:

Table 7. Diesel PM Emissions from S-186

Source	PM Emission Factor (g/bhp-hr)	Horsepower	Annual Usage (hours/year)	Diesel PM Emissions (lb/year)
S-186	0.201	125	1083	60.006

Table 8. TAC Emissions from Composting and Stockpile Operation S-117

			Trigger Levels		
Compounds	lbm/hr	lbm/yr	Acute lbm/hr	Chronic lbm/yr	
IPA	10.67	9.35E+04	7.1	2.70E+05	
Methanol	3.23	2.83E+04	62	1.50E+05	
Napthalene	0.13	1.10E+03	NA	3.20E+00	
Acetaldehyde		0.04	3.09E+02	1	3.80E+01
Ammonia	3.62	3.17E+04	7.1	7.70E+03	

The ISCST3 air dispersion computer model was used to estimate annual average ambient air concentrations. The model was run with Chevron Refinery (2001-2005 exclude 2004) meteorological data, Elevated terrain was considered using 10m DEM input from the USGS Richmond, San Quentin, Mare Island and Petaluma Point areas. Model run was made with rural dispersion coefficient as Urban/Rural classification was determined based on the typing scheme proposed by Auer. Stack and building parameters for the analysis were based on information provided by the applicant

Estimates of residential risk assume potential exposure to annual average TAC concentrations occur 24 hours per day, 350 days per year, for a 70-year lifetime. Risk estimates for offsite workers assume potential exposure occurs 8 hours per day, 245 day per year, for 40 years. Cancer risk adjustment factors (CRAFs) were used to calculate all cancer risk estimates. The CRAFs are age-specific weighting factors used in calculating cancer risks from exposures of infants, children and adolescents, to reflect their anticipated special sensitivity to carcinogens. The estimated health risks for this permit application are presented in the Tables 9-11 below.

Table 9. Source Risk Due to S-186 Diesel Engine

Receptor	Cancer Risk	Chronic Non-cancer Hazard Index
Resident	0.29 chances in a million	0.0001
Worker	0.46 chances in a million	0.0003

Table 10. Source Risk for S-117 CASP Composting System Utilizing BACT2

Receptor	Cancer Risk	Hazard Index	
		Chronic	Acute
Resident	0.38 chances in a million	0.0016	0.035
Worker	0.09 chances in a million	0.0008	0.050

Table 11. Total Project Health Impacts

Receptor	Cancer Risk	Hazard Index	
		Chronic	Acute
Resident	0.67 chances in a million	0.0017	0.035
Worker	0.55 chances in a million	0.0011	0.050

TBACT is not required for either source (S-186 or S-117) as cancer risk is less than 1 in a million for each source and the chronic index is less than 0.2 for each source. Project health risks are less than the Regulation 2-5-302 limits of 10 in a million cancer risk, 1.0 chronic HI, and 1.0 acute HI. Therefore, this project will satisfy all toxic NSR requirements.

Major Facility Review, Regulation 2, Rule 6

This facility is subject to MFR Permit requirements pursuant to Regulation 2-6-301, because it has the potential to emit more than 100 tons per year of any regulated air pollutant (POC, CO and PM10). It is also subject to MFR Permit requirements pursuant to Regulation 2-6-304, because it is a designated facility that is subject to the requirements of 40 CFR, Part 60, Subpart WWW. As a designated facility, this facility was required to obtain a Title V Federal Operating Permit. The requirements of this program have been codified in District Regulation 2, Rule 6.

The facility was issued the initial Title V permit on May 29, 2002. The permit has undergone five revisions since issuance. The most recent renewal for this facility was December 20, 2010. This project will trigger a significant revision of the Title V permit. It will be processed in a separate application.

Regulation 6, "Particulate Matter and Visible Emissions"

S-186 diesel-fired engine is subject to Regulation 6, Rule 1 ("Particulate and Visible Emissions"). Regulation 6-1-301 limits the visible emissions from each of these sources to Ringelmann 1.0. No visible particulate emissions are expected from a properly operating diesel engine equipped with particulate filter. This engine is not expected to produce visible emissions

or fallout in violation of this regulation and they will be assumed to be in compliance with Regulation 6 pending a regular inspection.

Regulation 6-1-310 limits the exhaust point emission rate to 0.15 grains/dscf at 0% O_2. This engine complies with Regulation 6-1-310 by a margin of at least 2.9:1. Since the particulate emission rate has been certified by CARB, it is not necessary to conduct any additional compliance demonstration monitoring for this limit.

Grains/dscf = (7000 grains/453.6 grams) * (125 bhp) * (.20142 grams/bhp-hr) /
[(6.06 gallons/hour * 0.137 MM BTU/gallon * 9190 dscf/MMBTU] = 0.051 grains/dscf

HP	125	
PM G/BHP-hr	0.20142	
Fuel gal/hr	6.06	
dscf/MMBTU	9190	
MM BTU/gal	1.37E-01	
grain loading grains/dscf		0.051

The facility will be in compliance with Regulation 6-1-311 General Operations. The process rate of the composting operation for source S-117 will not exceed 17,950 kg/hr (based on the facility not operating more than 18 hours a day on processing materials). This equates to an emission rate not to exceed 14.17 kg/hour or 31.23 lbs/hr per the formula E in kg/hr = 0.02 P^0.67 in kg/hr. Facility will comply with Table 1 of Regulation 6-1-311 for other sources which include S-185 Portable Trommel Screening and Portable Grinding Operations along with source S-189 Wood Waste Stockpiles.

Where P is the processing rate and E is the emissions.

P = 39,573.82 lbs/hr or 17,950.4 kg/hr
E = 31.28 lbm/hr or 14.17 kg/hr

E = .026*P^.67 = lbm/hr
E = .02* P^.67 = kg/hr

Regulation 7, Rule 1 "Odorous Substances"

This composting operation is not subject to this regulation per exemption 7-110.5 Agricultural operations as described in the California Health and Safety Code Section 41705. Section 41705(2) excludes composting operations per the Public Resources Code, as compost is defined per section 40116 of the Public Resources Code: If facility accepts any other waste that is not defined per 40116, then the facility shall be subject to Regulation 7 Rule 1. Compost definition includes "vegetable, yard and wood waste which are not hazardous waste".

Regulation 8 Rule 2 "Miscellaneous Operations:

This rule applies to diesel oil fired IC engines. Regulation 8-2-301 limits total carbon emissions to either 15 pounds/day or to an exhaust stack concentration of 300 ppmv. From the calculations above, maximum emissions are 0.501 pounds/day of POC from S-186 (Facility will have condition limit not to exceed 8 hours per day along with a cumulative hours not to exceed 1083 hours per year). Therefore, this engine will comply with Regulation 8-2-301 by emitting less than 15 pounds/day of total carbon. Additional monitoring to verify compliance with this certified emission rate is not necessary.

However, for the composting operation source S-117 will exceed the 15 pound/day total carbon limit. The alternative limit is 300 ppmv of total carbon, but this requires a stack test method to verify compliance. The facility will submit a permit shield for source S-117 Green Waste Composting Operation (CASP) Covered Aerated Static Pile to allow the use of an alternative monitoring method to demonstrate compliance with the 300 ppmv for total carbon limit. Instead the facility will comply with the 300 ppm total carbon on fugitive testing of the static piles and curing piles to demonstrate that no off gassing is occurring. The permit shield will be incorporated in the facilities existing Title V application.

Regulation 9, Rule 1, "Inorganic Gaseous Pollutants – Sulfur Dioxide"

The portable diesel engine S-186 is subject to Regulation 9, Rule 1. Regulation 9-1-302 limits the sulfur dioxide concentration in an exhaust point to 300 ppmv. At the CARB diesel fuel sulfur content limit of 0.0015% sulfur by weight and the theoretical F-factor of 9190 dscf of flue gas (0% O_2) per MM BTU of diesel oil, the maximum possible concentration in the exhaust gas is less than 2 ppmv of SO_2. Since this maximum possible concentration is far less than the 300 ppmv SO_2 concentration limit, additional compliance demonstration monitoring is not necessary.

PPM of SO_2 = (0.005504 grams/bhp-hr) * (125 bhp) / (453.6 grams/lb) / (64.07 lbs/lbmol) * (385 ft^3/lbmol) / (0.83 MM BTU/hour) / (9190 ft^3/MM BTU) * 1E6
= 1.2 ppmv SO_2 in the exhaust at 0% O_2

g/bhp-hr SO2	0.005504
MW SO2	64.07
f Factor	9190
HP	125
Heat Value MM Btu/hr	8.30E-01
PPM = of SO2	1.195

Regulation 9-1-304 limits the sulfur content of liquid fuels to 0.5% by weight. Since the engines will use only CARB diesel oil containing less than 0.0015% sulfur by weight, these engine will comply with this limit. Records of the source of fuel used in these engines will verify compliance with this limit. Compliance with Regulation 9-1-304 is expected since diesel fuel with a 0.0015% by weight sulfur is mandated for use in California.

Sources complying with Regulation 9-1-302 and 9-1-304 are expected to comply with the ground level limits in Regulation 9, Rule 1, Section 301 (Limitations on Ground Level Concentrations).

In addition, S-186 will comply with monitoring and reporting requirements of 9-1-501 and 502. Source S-186 is subject to monitoring requirements of 1-520 and 522.

Regulation 9, Rule 2, "Inorganic Gaseous Pollutants – Hydrogen Sulfide"

The ground level concentration limit on hydrogen sulfide (H_2S) in Section 9-2-301 is 0.06 ppm averaged over 3 minutes or 0.03 ppm averaged over 60 minutes. Hydrogen sulfide is generally identified by its characteristic rotten egg small and can be detected by its odor at concentrations as low as 0.0005 ppmv. Therefore, H_2S emissions are usually detected by smell well before the concentrations approach the limits in Section 9-2-301. Hydrogen sulfide complaints have not been an issue for this facility in the past; therefore, area monitoring to demonstrate compliance with this rule has not been required for this facility.

Regulation 9, Rule 8, "Inorganic Gaseous Pollutants – Nitrogen Oxides and Carbon Monoxide from Stationary ICE's"

This regulation is not applicable to portable engines pursuant to Section 209(e)(1) of the Clean Air Act, which preempts air Districts from adopting or attempting to enforce any standard or other requirement relating to the control of emissions for new nonroad engines or vehicles. States are also preempted from adopting and enforcing standards and other requirements related to the control of emissions from new nonroad engines or vehicles, except for CARB, which has been specifically allowed to control diesel PM from portable engines.

State Requirements: <u>CARB PORTABLE DIESEL ENGINE ATCM</u>

CARB's Airborne Toxic Control Measure (ATCM) for Diesel PM from Portable Engines (CCR Title 17, Section 93116) applies to portable diesel fueled engines that are rated at 50 bhp or more. The operator of the engine S-186 will comply with §93116.3(a) by using only CARB certified diesel fuel in the engine. New engines are subject to the requirements of §93116.3(b)(2) and may only be permitted now if: a) the engines comply with the most stringent federal or California emission standards that are currently in effect for non-road engines (§93116.3(b)(2)(A)), or if they meet one of the following exceptions. Section 93116.3(b)(2)(E) states: Until January 1, 2017 a district may issue a permit or registration for an engine not meeting the most stringent of the Federal or California emission standards for nonroad engines if: items 1 and 2 are satisfied. The facility has provided proof that the engine operated in California during the time period of January 1, 2008 to December 31, 2010. Consequently, the S-186 portable engine may be permitted pursuant to Section 93116.3(b)(2)(E).

Federal Requirements:

The engine in this application is not considered to be a "stationary" engine by federal definitions, because it meets the requirements of a nonroad engine, as defined in 40 CFR 1068.30:

Nonroad engine means:

(1) Except as discussed in paragraph (2) of this definition, a nonroad engine is an internal combustion engine that meets any of the following criteria:
  (i) It is (or will be) used in or on a piece of equipment that is self-propelled or serves a dual purpose by both propelling itself and performing another function (such as garden tractors, off-highway mobile cranes and bulldozers).
  (ii) It is (or will be) used in or on a piece of equipment that is intended to be propelled while performing its function (such as lawnmowers and string trimmers).
  (iii) By itself or in or on a piece of equipment, it is portable or transportable, meaning designed to be and capable of being carried or moved from one location to another. Indicia of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform.

(2) An internal combustion engine is not a nonroad engine if it meets any of the following criteria:
  (i) The engine is used to propel a motor vehicle, an aircraft, or equipment used solely for competition.
  (ii) The engine is regulated under 40 CFR part 60, (or otherwise regulated by a federal New Source Performance Standard promulgated under section 111 of the Clean Air Act (42 U.S.C. 7411)).
  (iii) The engine otherwise included in paragraph (1)(iii) of this definition remains or will remain at a location for more than 12 consecutive months or a shorter period of time for an engine located at a seasonal source. A location is any single site at a building, structure, facility, or installation. Any engine (or engines) that replaces an engine at a location and that is intended to perform the same or similar function as the engine replaced will be included in calculating the consecutive time period. An engine located at a seasonal source is an engine that remains at a seasonal source during the full annual operating period of the seasonal source. A seasonal source is a stationary source that remains in a single location on a permanent basis (i.e., at least two years) and that operates at that single location approximately three months (or more) each year. See §1068.31 for provisions that apply if the engine is removed from the location.

Although the screener engine resides at this facility for more than 12 months, it does not reside at a single on-site location (as defined above) for more than 12 consecutive months.

Since the portable diesel engine in this application is a nonroad engine and not a stationary engine, the NSPS requirements for stationary compression ignition engines (40 CFR, Part 60, Subpart IIII) and the NESHAP requirements for stationary reciprocating internal combustion engines (40 CFR,
Part 63, Subpart ZZZZ) do not apply to these engines.

The engine is subject to 40 CFR Part 89 Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines pursuant to Section 89.102 (75-130 kW and manufactured after January 1, 1997). Per Table 1 of Section 89.112, the S-186 (Model Years 2003-2006, 125 bhp) is subject to Tier 2 emission standards, which limit emissions to: NOx+NMHC = 6.6 g/kW-hr (4.9 g/bhp-hr), CO = 5.0 g/kw-hr (3.7 g/bhp-hr), and PM = 0.3 g/kW-hr (0.22 g/bhp-hr).

Section 89.113 limits opacity to: 20% during acceleration mode, 15% during lugging mode, and 50% during the peaks of either of the above modes.

The engine family for S-186 (6JDXL06.8039) has been certified to comply with these emission and opacity standards (Executive Order U-R-004-0244).

West Contra Costa Sanitary Landfill is subject to the federal NSPS and NESHAPs for MSW Landfills (40 CFR Part 60, Subpart WWW and 40 CFR Part 63 Subpart AAAA). However, the landfills and associated control equipment will not be modified by any aspect of this application.

40 CFR Part 70, State Operating Permit Programs (Title V):

This facility is a major and designated facility pursuant to 40 CFR Part 70 and Regulation 2, Rule 6. It is currently subject to Title V Operating Permit Requirements. The requirements of this program have been codified in District Regulation 2, Rule 6. See discussion of Rule 2-6 above.

Permit Conditions

The proposed permit conditions for the new and modified sources associated with this project are presented below.

P# 1840; West Contra Costa Sanitary Landfill

Permit Condition # 26086
Conditions for S-186 Portable Diesel Engine and for S-185 Trommel Screen John Deere 4045 HF 275, 125 BHP, maximum operating hours 1083 hours/yr.

1. The owner/operator of the portable diesel-fueled engine driver for the trommel screen (S-185) has been issued permits for portable source (also known as nonroad engines by federal definitions) that are subject to Regulation 2-1-220 and the CARB ATCM for diesel PM from portable engines. Based on this portable source and nonroad engine determinations, the engine is not subject to the CARB ATCM for stationary compression ignition engines, the federal NSPS requirements for stationary compression ignition engines (40 CFR Part 60, Subpart IIII), or the federal NESHAP requirements for stationary reciprocating internal combustion engines (40 CFR, Part 63, Subpart ZZZZ). To retain the portable source and nonroad engine determination, the owner/operator shall not operate the engine in one on-site location for more than 12 consecutive months. Any backup or standby engine that replaces this engine at the same on-site location and is intended to perform the same function will be counted toward this time limitation. The owner/operator shall not move equipment and then return it to the same location in an attempt to circumvent the portable equipment time requirement. (Basis: Regulations 2-1-220.1-3, 2-1-220.10, CCR §93116.2(a)(28), and 40 CFR 1068.30)

2. The owner/operator shall use CARB diesel fuel exclusively to fire this engine. Only ultra low sulfur fuel (<0.0015% sulfur by weight) shall be combusted at the S-186 Diesel Engine. (Basis: Cumulative Increase, Offsets, BACT, TBACT, Regulation 2-5-301, 302, and CCR §93116.3(a))

3. The total combined operating time for S-186 shall not exceed 1083 hours during any consecutive 12-month period. The total hours operating S-186 shall not exceed 8 hours during any 24 hour period. The total amount of fuel combusted at the Diesel Engine (S-

186) shall not exceed 6563 gallons per year. (Basis: Regulation 2-5-302, Cumulative Increase, and Offsets,)

4. Effective January 1, 2012, the owner/operator shall equip engine (S-186) with a non-resettable totalizing meter that measures hours of operation for S-186. (Basis: Cumulative Increase, Offsets, CCR §93116.4(c)(2)(A))

5. To demonstrate compliance with Parts 1-3, the owner/operator shall maintain the following records in a District approved log and shall make these records available to District staff upon request. All records shall be retained for at least five years from the date of entry. These record-keeping requirements shall not replace the record-keeping requirements contained in any applicable District or state regulations. (Basis: Cumulative Increase, Offsets, Regulations 2-1-220 and 2-5-302, and CCR §93116.2(a)(28) and §93116.3(b)(2)(E), and 40 CFR 1068.30)
   a. Each time an engine is moved to a new on-site location, the owner/operator shall record the initial operation date for that engine in the new location and the total consecutive operating time (in months) for that engine in its previous on-site location. The owner/operator shall describe each on-site operating location in supporting records using maps, descriptions, coordinates of the location boundaries, or other unique identifiers.
   b. For S-186, the owner/operator shall record the hours of operation for each operating day.
   c. For S-186, the owner/operator shall record the hours of operation per calendar month.
   d. For S-186, the owner/operator shall record the total operating time per calendar year.
   e. The owner/operator shall maintain records of purchase orders, vendor certifications, or other relevant documentation to demonstrate that the fuel used in this engine complies with Part 2.
   f. The owner/operator shall maintain records demonstrating that S-186 has either been replaced or modified as of January 1, 2017, which is necessary to achieve compliance with the diesel PM emission limitations specified in CCR §93116.3(b and c). If the owner/operator plans to modify S-186 to meet these requirements, the owner/operator shall obtain all required permits from the District prior to modifying or altering this engine.

Permit Condition # 26087
Conditions for Sources S-189 Wood Waste Collection Stockpiles and S-185 Portable Trommel Screen; throughput limit of 130,000 tons/yr and Grinder operation throughput limit 160,000 tons/yr

1. Total throughput of greenwaste feed stock being processed at source S-185 shall not exceed 130,000 tons during any consecutive 12-month period for the trommel screener and 160,000 tons during any consecutive 12-month period for the tub grinder. Source S-189 Wood Waste Stockpile will not be processed through the trommel screener known as source S-185 at any time without a change of permit condition being requested. Source S-189 shall be processed through the portable grinder operation that is identified as comprising source S-185. (Basis: Cumulative Increase, Regulation 6-1-301, 6-1-310, 6-1-311)

2. Total throughput of S-189 wood waste stockpile being process through the tub grinder shall not exceed 30,000 tons of woodwaste feedstock during any consecutive 12-month period. "Woodwaste " means solid wastse consisting of wood pieces or particles which are generated from the manufacturing or production of wood products, harvesting, processing or storage of raw wood materials, or construction and demolition activities. Woodwaste processing stockpiles need to be identified as part of source S-189 and shall not be part of the composting operation known as source S-117. Greenwaste stockpiles that are processed through source S-185 need to be identified as being separate from the woodwaste stockpile to ensure that the limits for each stockpile are not exceeded. (Basis: Cumulative Increase, Regulation 6-1-301, 6-1-310, 6-1-311, Title 14 CCR Division 7 Chapter 3.1)

3. Greenwaste piles received on site shall be incorporated into the composting operation S-117 within 48 hours after grinding, except for material received on the day prior to a holiday or weekend; in such cases, the material would be processed on the next working day. Woodwaste piles shall be removed from the property (or permanently placed if used on the property) within 7 days of receipt if they are not part of the composting operation, unless the local enforcement agency (EA) deems that a shorter time limit is required in order to minimize the potential for violations of this chapter Title 14 Natural Resources; Division 7 Chapter 3.1 section 17852(10). (Basis: Regulation 2-1-317; CCR Title 14)

4. The material handling operations associated with S-185 and S-189 such as loading, unloading, stockpiling, mixing (grinding operation), turning, and screening - shall be abated by water sprays (A-115), as necessary to comply with Part 6. Dry, dusty material shall be wetted down before unloading from truck beds, as necessary to comply with Part 7. (Basis: Cumulative Increase, Regulations 1-301 and 6-1-305)

5. Source S-189 Wood stock piles shall not exceed a temperature reading of 100 degrees Fahrenheit during the day. Temperature readings shall be recorded during the time period (11 to 3 pm). Temperature readings shall be taken once per week and recorded in a log book. (Regulation 7-1, BACT)

6. All roadways associated with this facility shall be maintained in a clean or wetted condition, as necessary to comply with Part 7. (Basis: Regulations 1-301 and 6-1-305)

7. Visible dust emissions from any operation of this facility shall not exceed Ringelmann 1.0 or result in fallout on adjacent property in such quantities as to cause a public nuisance per Regulation 1-301. To ensure compliance with this part, the Permit Holder shall visually observe all material handling operations and roadways associated with these sources and shall immediately initiate corrective actions, if any visible dust emissions are detected that persist for longer than 3 minutes in an hour. (Basis: Regulations 1-301, 6-1-301 and 6-1-305)

8. If the facility receives more than 2 violation notices for "public nuisance" from the District in any consecutive 12 month period, for source S-185 the owner/operator of the facility shall implement any control measures that the District, after discussion with the operator, deems necessary and appropriate within the time period specified by the District. If requested by the District, the Permit Holder shall submit to the District an application to modify the permit to operate and/or these permit conditions within 30 days, of notification. (Basis: Regulations 1-301)

9. The owner/operator shall maintain records, summarized on a monthly and annual basis, of green waste and wood waste throughput at S-185 and S-189. These records shall be kept in a District-approved log, shall be retained on-site for a minimum of five years from the date of entry, and shall be made available to District representatives upon request. (basis: Cumulative increase, Regulation 2 Rule 6)

~~**Condition # 23356**~~
~~**FOR: S-117 COMPOSTING OPERATION AND A-117 WATER SPRAY TRUCK**~~

~~1. The owner/operator shall not exceed 19,000 tons of compost material throughput at S117 in any consecutive twelve month period.~~

~~2. The owner/operator shall abate S117 with A117 Water Spray whenever composting material is being processed. The unloading and loading of compost material associated with S117 shall be abated as necessary by water spray to prevent visible particulate emissions. Dry, dusty material shall be wetted down before unloading from truck beds as necessary to prevent visible emissions. (basis: Cumulative increase)~~

~~3. The owner/operator shall not operate S118 in such a way that visible emissions, which are as dark or darker than a Ringelmann 1.0, occur for a period or periods aggregating more that 3 minutes in any hour; or results in fallout on adjacent property which causes a public nuisance. (basis: Regulation 6-1-301 and Regulation 1-301)~~

~~4. The owner/operator shall apply a waterborne petroleum resin dust suppressant or other equivalent chemical dust suppressant to all unpaved on-site truck routes, to and from the composting operation, on a regular basis according to manufacturer's recommendations to achieve and maintain a minimum particulate matter (TSP) control efficiency of 75% by weight.~~

~~5. The owner/operator shall maintain records, summarized on a monthly and annual basis, of compost material throughput at S117. The owner/operator shall maintain records of chemical dust suppressant applied to vehicle routes and other unpaved areas. These records shall be kept in a District approved log, shall be retained on-site for a minimum of five years from the date of entry, and shall be made available to District representatives upon request. (basis: Regulation 2-6-501)~~

Permit Condition # 26088
Conditions for S-117

S-117 Commercial Green Waste and Food Waste Composting Operation, Covered Aerated Static Pile (CASP) Method, abated by Biofilter (A-117).

1. The total amount of feedstock material delivered to the composting facility shall not exceed 130,000 tons during any consecutive rolling 12-month period. Feedstock material shall include green waste (such as yard trimmings, untreated wood wastes, natural fiber products, and construction and demolition wood waste) and may include food waste (such as food scraps, food waste, and compostable food packaging or serving materials). The food waste shall not include any pomace or liquid wastes from commercial food or beverage processing operations. The feedstock shall not include any biosolids, animal

wastes, or poultry litter. For the purposes of the feedstock throughput limit in this part, feedstock does not include any finished compost that is added to either aerated static piles or curing piles and that is acting as a biofilter for odor or organic emissions control. (Basis: BACT, Offsets, and Cumulative Increase)

2. Active composting at this facility shall be performed only by the covered aerated static pile (CASP) method using perforated pipes and a blower system to provide positive or negative aeration of the active composting piles. Negative aeration operations (drawing air through the pile) shall include a condensate trap upstream and an active biofilter (A-117) downstream of the blower. For positive aeration operations, active piles shall be covered with at least a 6-inch layer of finished compost to act as a biofilter (A-117). The CASP composting operation shall be designed and operated to maintain a target 80% reduction of precursor organic compounds (POC) and ammonia (NH3) as compared to uncontrolled windrow style composting. The owner/operator shall demonstrate compliance with this control efficiency limitation by meeting Part 3 emission limits. (Basis: BACT, Offsets, and Cumulative Increase)

3. The owner/operator may use additional food waste material other than the percentage allowed in Part 1, provided that the owner/operator demonstrates that all of the following are satisfied:
   a. Total Precursor Organic Compound (POC) emissions from S-117 (for composting plus curing piles) shall not exceed 1.60 pounds of POC per wet ton of feedstock.
   b. Total ammonia (NH3) emissions from S-117 (for composting plus curing piles) shall not exceed 0.19 pounds of ammonia per wet ton of feedstock.
   c. Total POC emissions from S- 117 shall not exceed 103.92 tons in any consecutive twelve month period;
   d. The use of any feedstock materials shall not increase toxic emissions above the permitted levels for S-117 or result in new toxic air contaminant emissions above any District risk screening trigger level.

   Note, emission limits above do not include any emissions originating from the greenwaste feedstock pile. (Basis: BACT, Offsets, Cumulative Increase; Regulation 2-5-302, and Regulation 2-6-423)

4. In order to avoid being deemed a major source of HAP emissions, the owner/operator of this facility shall demonstrate that methanol emissions do not exceed 9.0 tons per year on a facility-wide basis. (Basis: Regulation 2-6-423)

5. To demonstrate compliance with Regulation 8, Rule 2, Section 301, the owner/operator shall ensure that the concentration of total carbon does not exceed the limits identified below for the following locations.
   a. If the active compost pile is equipped with negative aeration, the emissions from the A-117 Biofilter shall not exceed 300 ppmv of total carbon on a dry basis.
   b. If the active compost pile is equipped with positive aeration and the A-117 Biofilter is a compost cover on top of the active aeration pile, the average emissions from any covered aerated static pile shall not exceed 300 ppmv of total carbon.

c. The average emissions from any curing pile shall not exceed 300 ppmv of total carbon.

(Basis: Regulation 8-2-301)

6. The vehicle fleet used for delivery, pick-up, processing, composting, on-site transport, or other handling of feed stock, biofilter material, compost, and related materials or any related operations shall comply with the following limitations:
   a. The mean vehicle fleet weight shall not exceed 16.63 tons.
   b. The distance traveled by the vehicle fleet on paved roads shall not exceed 31,430 miles during any consecutive 12-month period.
   c. The distance traveled by the vehicle fleet on unpaved roads shall not exceed 16,070 miles during any consecutive 12-month period.

   (Basis: Cumulative Increase)

7. The material handling operations associated with S-117, such as loading, unloading, stockpiling, mixing, turning, and screening - shall be abated by water sprays (A-18), as necessary to comply with Part 9. Dry, dusty material shall be wetted down before unloading from truck beds, as necessary to comply with Part 8. (Basis: Regulations 1-301 and 6-1-305, BACT)

8. All roadways associated with this facility shall be maintained in a clean or wetted condition, as necessary to comply with Part 9. (Basis: Regulations 1-301 and 6-1-305, BACT)

9. Visible dust emissions from any operation of this facility shall not exceed Ringelmann 1.0 or result in fallout on adjacent property in such quantities as to cause a public nuisance per Regulation 1-301. To ensure compliance with this part, the Permit Holder shall visually observe all material handling operations and roadways associated with these sources and shall immediately initiate corrective actions, if any visible dust emissions are detected that persist for longer than 3 minutes in an hour. (Basis: Regulations 1-301, 6-1-301 and 6-1-305)

10. The owner/operator shall use Best Management Practices (BMP) for aerated static pile composting operations to ensure that the CASP composting systems are operating as designed and to prevent negative impacts on air quality. Examples of BMP include, but are not limited to, Parts 11-16 and the following practices:
    a. rapid incorporation of feedstocks into active compost piles;
    b. proper application and use of biofilters and cover materials;
    c. minimal disturbance of active composting piles;
    d. regular monitoring of temperature, moisture content, and oxygen levels within the active and curing piles;
    e. on-going monitoring and maintenance of piping, blowers, traps, biofilters, and cover materials; and
    f. implementation of good housekeeping practices.

    (Basis: BACT)

11. During normal operations, green waste shall be processed and incorporated into an active compost pile within 72 hours of receipt and food waste shall be incorporated into an active compost pile within 48 hours of receipt (except when food waste is delivered on-site on Friday or the day before a holiday; in which instances, the material will be incorporated into the composting operation on the next working day), so that these feedstocks do not decompose in the storage piles and generate odors on-site. Any stockpile that is deemed to be odorous by a District inspector shall be removed within 24 hours. (Basis: BACT, Regulation 1-301, Regulation 7-1)

12. Once an aerated static pile has been established, the active composting piles shall only be disturbed when necessary: (a) to ensure that the active compost process is achieving the desired temperature, moisture, oxygen, and pH levels, (b) to prevent or control odorous, POC, or TAC emissions, or (c) to transfer material to a curing pile. (Basis: BACT)

13. The owner/operator shall ensure that the S-117 Composting Operations are maintained within the temperature, moisture, oxygen, and pH content levels dictated by BMP for CASP method composting and curing operations. (Basis: BACT)

14. The owner/operator shall ensure that the A-117 Biofilter is maintained within the temperature, moisture, oxygen, and pH content levels dictated by BMP for compost operation biofilters. The owner/operator shall also ensure that A-117 is free of cracks, channeling, rodent burrows, and excessive weeds. (Basis: BACT)

15. The owner/operator shall handle and dispose of liquids that have come in contact with S-117 or A-117 in a manner that ensures that these liquids do not become a source of odors. (Basis: BACT)

16. The owner/operator shall sweep or clear debris and waste materials from the feedstock stockpile areas, active composting areas, biofilter areas, and curing pile areas as needed to ensure that these materials do not become a source of odors or excessive dust. (Basis: BACT)

*17. If the plant receives two or more Violation Notices from the District for "Public Nuisance" in any consecutive 12 month period, the Permit Holder for these sources shall implement the following control measures, as applicable, or any other measures that the District deems necessary and appropriate within the time period specified by the District. If requested by the District, the Permit Holder shall submit to the District an application to modify the Permit to Operate and/or these permit conditions within 30 days of notification. (Basis: Regulation 1-301)
    a. Reduce the total feedstock throughput rate allowed by Part 1.
    b. Reduce the food waste
    c. Reduce the green waste and food waste stockpile times allowed by Part 11.
    d. Apply odor inhibitor solutions to odorous operations.
    e. Install an odor abatement system to prevent odors from traveling off-site.
    f. Enclose odor nuisance operations in a building that is kept under negative pressure with emissions vented to a biofilter.

g. Use chemical suppressants to control fugitive dust emissions from roadways associated with the dust nuisance operation.
h. Pave roadways associated with the dust nuisance operation.
i. Enclose dust nuisance operations in a warehouse-like building.

18. In order to demonstrate compliance with Part 1, the owner/operator shall keep a dated record of the amount of feedstock received for composting at S-117. The owner/operator shall calculate and record the total amount of compost feedstock throughput on a monthly basis and the total amount of compost feedstock throughput for each consecutive rolling 12-month period. All records shall be kept in a District approved logbook, and records shall be made available for inspection by District staff upon request. (Basis: BACT, Offsets, and Cumulative Increase)

19. In order to demonstrate compliance with Parts 2-4, the owner/operator shall conduct an initial compliance demonstration test on both the active composting operation and the curing piles for S-117. The initial compliance demonstration test shall be initiated within 60 days of start-up of the CASP process at S-117 and shall be conducted over the full composting cycle for a typical compost feedstock mix. Prior to initial operation of the CASP process at S-117, the owner/operator shall submit a source test protocol to the District's Engineering Division and to the Source Test Section that describes how, where, and when the testing will be conducted and that identifies all test methods that will be used for this test. The source test protocol shall include analyses for toxic air contaminants (TAC) of gases collected from the active compost piles after control by the biofilter and from the curing piles. In addition to total POC and ammonia (NH3) emission rates, the owner/operator shall use the data determined by this test to calculate the total methanol emissions from S-117 in units of pounds of methanol per wet ton of feedstock. The owner/operator shall obtain District approval for the source test protocol and all analysis and reporting procedures prior to initiating any testing. (Basis: BACT, Offsets, and Cumulative Increase)

20. In order to demonstrate compliance with Part 4, the owner/operator shall identify all potential sources of methanol for this facility and shall prepare a potential to emit assessment for each source of methanol. The owner/operator shall use this data combined with the methanol emissions data determined pursuant to Part 19 to calculate the total facility wide maximum potential methanol emissions. If necessary, the owner/operator shall limit the throughput of the S-117 Compost Operations in order to assure compliance with the Part 4 limit. (Basis: Regulation 2-6-423)

21. In order to demonstrate compliance with Part 5, the owner/operator shall conduct an initial compliance demonstration test on S-117. The initial compliance demonstration test shall be initiated within 60 days of start-up of the CASP process at S-117 and shall be conducted over the full composting cycle for a typical compost feedstock mix. Prior to initial operation of the CASP process at S-117, the owner/operator shall submit a source test protocol to the District's Engineering Division and to the Source Test Section that describes how, where, and when the testing will be conducted and that identifies all test methods that will be used for this test. For negatively aerated static piles vented to a

biofilter, testing shall be conducted in accordance with Section 8-2-601. For positively aerated static piles equipped with a biofilter cover and for curing piles, the source test protocol shall include use of a portable hydrocarbon analyzer with test locations and compost cycle dates identified in the source test protocol. The owner/operator shall obtain District approval for the source test protocol and all analysis and reporting procedures prior to initiating any testing. Based on the results of this initial test, the District will establish an on-going monitoring schedule to verify compliance with the limit in Part 5. (Basis: Regulation 8-2-301)

22. In order to demonstrate compliance with Part 6, the owner/operator shall identify all vehicles that will make up the vehicle fleet associated with S-117 and shall calculate the mean vehicle fleet weight based on vehicle weight and load weight data. The owner/operator shall maintain maps of all vehicle fleet travel routes on paved and unpaved roads. The owner/operator shall maintain daily records of the type and number of vehicles delivering feed stock and picking up compost product and shall maintain records of daily on-site vehicle fleet trips. The owner/operator shall use this data and the map information to calculate and record the vehicle miles traveled (VMT) on both paved and unpaved roads by the vehicle fleet. The VMT data shall be summed for each consecutive rolling 12-month period. (Basis: Cumulative Increase)

23. In order to demonstrate compliance with Parts 7-9, the owner/operator shall maintain a dust mitigation plan that identifies all watering and dust suppressant application locations and schedules and any other dust mitigation measures that will be employed on a routine basis. The owner/operator shall implement this dust mitigation plan during all hours of operation and shall identify and record any instances when the plan was not followed or when additional measures were necessary to control dust. (BACT and Regulations 1-301 and 6-1-305)

24. In order to demonstrate compliance with Part 10-16, the owner/operator shall maintain the following records:
    a. Maintain a list of all Best Management Practices that will be employed at this source and identify the desired ranges for temperature, moisture, oxygen, and pH for the active aerated compost piles, curing piles, and biofilters.
    b. Maintain records of feed stock receipt dates and compost pile initiation dates. Identify and record any instances when the stockpile storage times in Part 11 were exceeded.
    c. Identify and record any instances when an aerated static pile is disturbed for reasons other than those allowed by Part 12.
    d. Maintain records of compost pile, curing pile, and biofilter monitoring events and data (temperature, moisture, oxygen, and pH levels). Identify and record any instances when the active compost piles, curing piles, or biofilters were outside of the desired BMP range. Identify and records the action taken to rectify this situation.
    e. Maintain records of all maintenance activities conducted on S-117, A-117, or any of the associate piping or control systems.

All records shall be kept on site and shall be made available for inspection by District staff upon request. Records shall be retained for at least five years from the date of entry. These record-keeping requirements shall not replace the record-keeping requirements contained in any applicable District Regulations. (Basis: BACT)

Recommendations

The District has reviewed the material contained in the permit application for the proposed project and has made a preliminary determination that the project is expected to comply with all applicable requirements of District, state, and federal air quality-related regulations. The preliminary recommendation is to issue an Authority to Construct for the equipment listed below. However, the proposed source is a major modification to an existing major source which triggers the public notification requirements of District Regulation 2-2-405 and public inspection of application material for this project per District Regulation 2-2-406. After the comments are received and reviewed, the District will make a final determination on the permit.

I recommend that the District initiate a public notice and consider any comments received prior to taking any final action on issuance of an Authority to Construct for the following sources:

S-189 Wood Waste collection, stock piles and grinding operation maximum limit 30,000 tons/yr
S-185 Portable Trommel Screen throughput (130,000 tons/yr) and Grinder operation throughput limit 160,000 tons/yr (130,000 composting material and 30,000 wood waste).
S-186 Portable Diesel Engine for Trommel Screen John Deere 4045 HF 275, 125 BHP, maximum operating hours 1083 hours/yr.

And a change of Condition for S-117

S-117 Commercial Green Waste and Food Waste Composting Operation, Covered Aerated Static Pile (CASP) Method, abated by Biofilter (A-117).

The facility would like the following equipment taken out of service

S-115 Tub Grinder;
S-116 Wood Waste Screener

Irma Salinas Date
Senior Air Quality Engineer

Appendix A Emission Calculations

Source S-186 Diesel Engine 125 BHP

Emission factors provided by Deere Power for IC Engine. Thus, NOx, CO, PM-10 emissions are based on Manufacturer factors.

	Manufacturer	Tier 3 Engine
NOx & NMHC	4.55 g/bhp-hr	4.9 g/bhp-hr
NOx	4.323 g/bhp-hr	
CO	0.746 g/bhp-hr	3.7 g/bhp-hr
POC	0.228 g/bhp-hr	
*PM10-diesel	0.20 g/bhp-hr	0.22 g/bhp-hr
**SO_2	0.006 g/hp-hr	

**The emission factor for SO2 is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors. (October 1996) Fifth Edition Volume I.

SO_2 8.09E-3 (% S in fuel oil) lb/hp-hr = 8.09E-3 (0.0015% S) (454 g/lb) = 0.0055 g/hp-hr

S-186 Portable Diesel Engine for Trommel Screen S-185

Compound	Max. Daily *Lbm/day	Lbm/yr	Tons/yr
NOx	9.52	1289.07	0.645
CO	1.64	222.44	0.111
POC	0.50	67.85	0.034
PM-10	0.44	60.06	0.030
SOx	0.01	1.36	0.00068

*limit of 8 hours per day maximum operation of engine so that BACT is not triggered.

AP-42 Table 10.3-1 Uncontrolled Fugitive Particulate Emission Factors for Plywood Veneer & Layout Operations

The particulate emission factors for the operation of S-189 Wood/Yard Waste shredder (Tub Grinder) and Screener are from the AP-42 4th Edison Section 10.3 Plywood Veneer and Layout Operations, Table 10.3-1 for log debarking, assuming 60% of emission is PM-10: and 50% of that is from PM-2.5
0.024 lb/ton X .6 = .0144 tons/yr for uncontrolled fugitive particulate emission factors

S-185 Portable Trommel Screen and Grinder Operation
The particulate emission factors for the operation of S-185 are from AP-42 4th Edition Section 10.3 Plywood Veneer and Layout Operations, Table 10.3-1 for log debarking, assuming 60% of emission is PM-10. The abatement efficiency of 50% is fc when using water.

PM-2.5 tons/yr	PM-10 tons/yr
0.522	1.044

Screening and Grinding AP-42 Fourth Edition Chapter 10.3-1										
						PM-10		PM-2.5		
Screening			0.024	lbs/ton		0.0144		0.0072		
Grinding			0.024	lbs/ton		0.0144		0.0072		
Grinding	160,000									
Screening	130,000									
		tons/yr	PM-10 after abatement					PM-2.5 after abatement		
	lbs/yr	Abate %	lbs/yr	tons/yr		lbs/yr	Abate %	lbm/yr	tons/yr	
Screening	1872	50.00%	936	0.468		936	50.00%	468	0.234	
Grinding	2304	50.00%	1152	0.576		1152	50.00%	576	0.288	
Total				1.044		Total			0.522	
			PM-10	PM-2.5						
portable screener		S-185	1.642373	0.612611						

Throughput Composting				
S-117		tons/yr		limit
YR 2013				
YR 2012		51715		19,000.00
YR 2011		51900		19,000.00
YR 2010		10365		10,365.00
Total				16,121.67

A/N 25019										
			tons/yr		POC lb/ton		POCs lb/yr		tons/yr	abated	tons/yr
Historical Throughput			16122		5.71		92056.62		46.02831	0	46.02831
Throughput Condition Request			130000				742300		371.15	0.8	103.922
Change			113878		5.71		650243.38		325.1217	0.8	57.89369

	tons/yr	lbm/yr					
	130000	260,000,000.00			lbm/yr	tons/yr	Abated tons/yr
Ammonia	0.83	lb/wet ton	composting		1.079E+05	5.395E+01	10.79
	0.02	lb/wet ton	curring		2.600E+03	1.300E+00	1.300E+00
Total Unabated						55.250	12.090

S-117 Composting Operation- Baseline Emissions									
Source	Throughput	Throughput Units	Pollutant	Emission Factor	Emission Factor Units	Abatement Efficiency %	Emissions lbm/yr	Emissions PM-10 tons/yr	Emissions PM-2.5 tons/yr
Windrows turning piles	16122	tons/yr	PM10	0.045	lbs/ton	75.00%	181.4	0.091	0.045343
paved roads	25550	vehicles/yr	PM10	0.119	lbs/vehicle	0	3040.5	1.520	0.760113
unpaved roads	25550	vehicles/yr	PM10	0.176	lbs/vehicle	0.00%	4496.8	2.248	1.1242

Green Waste Stockpiles prior to being used in ASPs

Composition	tons/yr	lb-VOC/wet ton	lbm/yr	tons/yr	lbm/day
stockpile	130000	0.101	13130	6.565	35.9726

Historical Stockpile

Composition	tons/yr	lb-VOC/wet ton	lbm/yr	tons/yr	lbm/day
stockpile	16122	0.101	1628.322	0.814161	4.461156

	lbm/day	lbm/yr	tons/yr
Difference	31.51145	11501.68	5.750839

Unpaved Roads AP-42 Chapter 13.2.2.1

Table 13.2.2-1 Typical Silt content Values of Surface Material on Industrial Unpaved Roads

	Silt % mean
Material Storage area	7.1
Municipal SW landfills	6.4

Vehicles traveling on unpaved surfaces at industiral sites, emissions are estimated from the following equation

$E = K(s/12)^a*(W/3)^b$

E =	size-specific emission factor (lb/VMT)
s=	surface maqterial silt content (%)
W=	mean vehicle weight (tons)
M =	surface material moisture content (%)
s=	MEAN VEHICLE SPEED (mph)
C=	emission factor for 1980's vehicle fleet exhaust, break wear and tire wear

Table 13.2.2-2 Constants for Equations 1A and 1B

Constant	Industrial Roads (Equation 1a)	
	PM-2.5	PM-10
K(lb/VMT)	0.15	1.5
a	0.9	0.9
b	0.45	0.45
s%	6.4	6.4
W	16.63	
VMT	16068.73162	
E- lbs/VMT	1.84E-01	1.84E+00
E= tons/VMT	9.21E-05	9.21E-04
	PM-2.5	PM-10
E lbs/yr	2958.4801	29584.80

Table 13.2.2-1 Typical Silt Content Values of Surface Material on Industrial Unpaved Roads

Control Efficiency water
0.5

Table 3. Maximum Vehicle Miles Traveled by Fleets 1 & 2 on Gravel Roads

	Length Controlled by			Total	Units	
	Rain	Watered	Salts	Length		
Unpaved Length	0	1980	0	1980	feet (one way)	<--- One-way length
# of Round Trips	0	484	0	484	trips/day	
Avg. Op.Time	0	311	0	311	days/year	
Annual Trips	0	21424.98	0	21424.98	trips/year	
VMT/Day	0	363	0	363	miles/day	
VMT/Year	0	16068.73	0	16068.73	miles/year	

E ext= annual size specific emission factor extrapolated for natural mitigation lbm/VMT
E- equation factor from equation 1a
P = number of days in a year with at least 0.01 in of precipitation

E ext = E[(365-P)/365]

http://www.wrcc.dri.edu/summary/oak.ca.html
http://www.wrcc.dri.edu/cgi-bin/cliGCStP.pl?ca7414 Richmond

	City of Richmond		60	days	
	Wind Speed		8.3	MPH	Oakland
		PM-2.5		PM-10	

E ext=	annual size specific emission factor extrapolated for natural mitigation lbm/VMT							
E- equation factor from equation 1a								
P =	number of days in a year with at least 0.01 in of precipitation							
	E ext = E[(365-P)/365]							
http://www.wrcc.dri.edu/summary/oak.ca.html								
http://www.wrcc.dri.edu/cgi-bin/cliGCStP.pl?ca7414					Richmond			
	City of Richmond		60	days				
	Wind Speed		8.3	MPH	Oakland			
		PM-2.5		PM-10				
	E =	0.153849		1.538488				
	E = lbm/yr	2472.155		24721.55		12360.77		
	E = tons/yr	1.236077		12.36077				
E= tons/yr Abated		0.618039		6.180387				
STATION: Richmond, CA								
CLIMATOLOGICAL SUMMARY. Period of Record: Jan 2000 to Dec 2008								
Summaries based on unedited daily ASOS data. Errors may be present.								

AP-42 Chapter 13.2.1.3 Predictive Emission Factor Equations:						For Paved Roads			
E = k(sL)^.91 x (W)^1.02				E ext =	E *(1-P/4N)				
E =	particulate emision facgtor								
k=	particule size multiplier for particle size range and unit of interest								
sL=	road surface silt loading (g/m2)								
W =	average weight (tons)of the vehicles traveling the road								
VMT	vehicle miles traveled								
P=	numer of wet days with at least 0.01 in of precipitation during the averaging period								
zN =	number of days in the averaging epriod (365 days for annual)								
Per applicant W =		16.63							
Table 13.2.1.-1 Particulate Size multipliers for paved road equation							k		
	lb/VMT								
PM-2.5	0.00054								
PM-10	0.0022								
sL - Table 13.2.1-3 Silt Loading g/m2)				Mean		City of Richmond		60	days
Municipal solid waste landfills				7.4					
		PM-10		PM-2.5					
Emissions lbs/VMT = E		0.239185		0.058709					
E ext lbs/VMT		0.229355		0.056296					
Miles traveled is		31431.33	VMTper year						
			PM-10			PM-2.5			
Paved Road emissions:			7517.899	lbm/yr		1845.302			
			3.758949	tons/yr		0.922651			
E =			7208.944	LBM/YR		1769.468	LBM/YR		
			3.604472	TONS/YR		0.884734	TONS/YR		
			PM-10	PM-2.5					
Total Paved And Unpaved Roads			10.32133	1.58401					
Paved Road Difference			8.015258	0.477355					
This table was taken from the consultant									
Table 3. Maximum Vehicle Miles Traveled by Fleet on Paved Roads									
Paved Length		3300	feet		<--- One-way length				
Max Daily Round Trips		484	trips/day						
Avg Operating Time		365	days/year						
Max Annual Round Trips		25145.07	trips/year						
VMT/Day		605	miles/day						
VMT/Year		**31431.33**	**miles/year**						

Source S-117 Composting Operation Throughput increase to 130,000 tons/yr

Composting Operating Calculations of POCs										
Composting Operation										
New Throughput Limit										
	tons/yr	lbs/ton	lbs/yr	tons/yr	abatement efficiency	POCs abated tons/yr				
New Limit	130,000	5.71	742300	371.15	72.00%	103.922		207844	103.922	
Historical	16122	5.71	92056.62	46.02831	0.00%	46.02831				
Change	113,878		650243.4	325.12169		57.89369		115787.4	317.2257	
Ammonia Calculations										
	tons/yr	lbs/yr								
	130,000	260,000,000.00			lbm/yr	tons/yr	Abated tons/yr		lbs/yr	lbm/day
Ammonia	0.83	lb/wet ton	composting		1.079E+05	5.395E+01	10.79		2.418E+04	66.247
	0.02	lb/wet ton	curring		2.600E+03	1.300E+00	1.300E+00			
Total						5.525E+01	12.090		24180	66.24658
Ammonia Calculations										
	tons/yr	lbs/yr								
	16,122	32,244,000.00			lbm/yr	tons/yr				
Ammonia	0.83	lb/wet ton	composting		1.338E+04	6.691				
	0.02	lb/wet ton	curring		3.224E+02	0.161				
Ammonia Difference tons/yr						6.852	5.238			

Green Waste Stockpiles prior to being used in ASPs

Composition	tons/yr	lb-VOC/wet ton	lbm/yr	tons/yr	lbm/day
stockpile	130000	0.101	13130	6.565	35.9726

Historical Stockpile

Composition	tons/yr	lb-VOC/wet ton	lbm/yr	tons/yr	lbm/day
stockpile	16122	0.101	1628.322	0.814161	4.461156

	lbm/day	lbm/yr	tons/yr
Difference	31.51145	11501.68	5.750839

Calculations of Toxic Air Contaminants

S-117 Composting and Greenwaste Stockpile Emissions

	tons/yr	lbm/yr
POCs	110.487	220974

Compounds				Trigger Levels		
POCS	% VOC	lbm/hr	lbm/yr	Acute Lbm/hr	Chronic lbm/yr	tons/yr
IPA	42.31	10.6728424	9.35E+04	7.1	2.70E+05	46.7470497
methanol	12.79	3.226321301	2.83E+04	62.00	1.50E+05	14.1312873
naphthalene	0.5	0.126126712	1104.87	NA	3.2	0.552435
acetaldehyde	0.14	0.035315479	309.3636	1.00	38.00	0.1546818
Total	55.74					
ammonia		2.760273973	2.42E+04	7.1	7.70E+03	

	tons/yr	lbm/yr				
	130000	2.60E+08		lbm/yr	tons/yr	Abated tons/yr
Ammonia	0.83	lb/wet ton	composting	1.079E+05	5.395E+01	10.79
	0.02	lb/wet ton	curing	2.600E+03	1.300E+00	1.3E+00
Total Unabated					5.525E+01	12.090

	lbm/ton of Greenwaste	lbm/yr
Ammonia from Stockpiles prior to being used in ASP	5.813E-02	7,556.721

Compounds	lbm/yr	grams/sec	lbm/hr	grams/sec
Ammonia	31,736.72	4.56E-01	3.622913391	4.56E-01
IPA	93494.0994	1.34E+00	10.6728424	1.34E+00
methanol	28262.5746	4.07E-01	3.226321301	4.07E-01
naphthalene	1104.87	1.59E-02	0.126126712	1.59E-02
acetaldehyde	309.3636	4.45E-03	0.035315479	4.45E-03

			Trigger Levels	
Compounds	lbm/yr	grams/sec	Acute Lbm/hr	Chronic lbm/yr
IPA	9.35E+04	1.344757389	7.1	2.70E+05
methanol	2.83E+04	0.406510211	62.00	1.50E+05
naphthalene	1.10E+03	0.015891721	NA	3.20E+00
acetaldehyde	3.09E+02	0.004449682	1.00	3.80E+01
Ammonia	3.17E+04	0.456480043	7.1	7.70E+03

Source	PM Emission Factor (g/bhp-hr)	Horsepower	Annual Usage (hours/year)	Diesel PM Emissions (lb/year)
S-186	0.201	125	1083	60.006

BACT Determination

Cost Effectiveness Determination

Interest rate is 5% based on

CRF 0.129505 5 % interest based on 10 year Treasury Note averaged over 6 months plus 2 %.

total cost $29,808,000.00 taken from Consultant and provided

Capital Recovery Factor (CRF)	0.129504575
Tax	0.01
Insurance	0.01
G&A	0.02
O&M	0.05
Annualized cost	$6,542,992.37

Reduction in Annual Pollutant Emissions (tons/yr) 352.5925

Cost Effectiveness = Annulized cost of Abatement System ($/yr)/ Reduction in Annual Pollutant Emissions (tons/yr)

Cost Effectiveness is $18,556.81 greater than $17,500- not cost effective.

	tons/yr	lbs/ton	lbs/yr	tons/yr	abatement efficiency	POCs abated tons/yr			
New Limit	130,000	5.71	742300	371.15	95.00%	18.5575			352.5925
Historical	0	5.71	0	0	0.00%	0			
Change	130,000		742300	371.15		18.5575			

Per the BACT handbook, the interest rate for cost effectiveness calculations is based on a 6 month rolling average of the daily treasury note interest rate for the project term, rounded up to the nearest integer, plus an additional 2%.

Permitting	$700.000
Design/commissioning	$2.400.000
Mechanical pre-treatment and post-treatment	$1.700.000
Composting equipment	$2.300.000
Odor control equipment	$1.200.000
Mobile equipment	$1.220.000
Site preparation / utilities connection	$1.000.000
Foundations	$5.000.000
Access roads, weigh station, paved yards, green areas	$1.500.000
Reinforced concrete works	$5.660.000
Buildings	$3.240.000
SUB-TOTAL	$25.520.000
CONTINGENCIES (15%)	$3.828.000
GRAND TOTAL	$29.808.000

Andy Benedetti
Sales Engineer

BioMRF Technologies Inc.