

**AUTHORITY TO CONSTRUCT
ENGINEERING EVALUATION**

Application No.:	<u>A/C 21893</u>
Date:	<u>April 09, 2009</u>
Engineer:	<u>Bruce Nixon</u>

A. FACILITY NAME:

Kiefer Landfill
Department of Waste Management and Recycling
Municipal Services Agency
County of Sacramento

B. LOCATION OF EQUIPMENT:

12701 Kiefer Boulevard, Sloughhouse

C. PROPOSAL:

Kiefer Landfill is proposing to operate an auxiliary IC engine that is mounted on a street sweeper. The auxiliary IC engine provides power for the vacuum system and sweeping brushes. The street sweeper has a primary IC engine that provides the power to move the street sweeper.

This is the second street sweeper with an auxiliary IC engine to be permitted at Kiefer Landfill (the other is P/O 19363). In this engineering evaluation the proposed IC engine will be referred to as IC engine (SS2) indicating that it is associated with the second street sweeper.

D. INTRODUCTION:

The County of Sacramento, Department of Waste Management and Recycling (DWMR), operates the Kiefer Landfill, a municipal solid waste landfill. They use a street sweeper to clean paved surfaces to comply with stormwater and fugitive dust control requirements. The street sweeper has an auxiliary IC engine mounted on it to operate the vacuum system and sweeping brushes. DWMR has submitted a permit application to operate the auxiliary IC engine on the street sweeper at the Kiefer Landfill.

An Authority to Construct and Permit to Operate is required for the auxiliary IC engine (SS2) on the street sweeper because it does not qualify for the SMAQMD Rule 201 Section 111.1 permit exemption for vehicle IC engines. The auxiliary IC engine (SS2) is not used to move the street sweeper on the roadway. The street sweeper has a primary IC engine to move it on the roadway and that IC engine is exempt from the requirement to obtain a permit by SMAQMD Rule 201 Section 111.1.

The IC engine will be evaluated as a "non-road" IC engine because it meets the U.S. EPA definition of "non-road" IC engine. The U.S. EPA definition is the same as the definition of "non-road" IC engine in SMAQMD Rule 412 Section 212. The IC engine meets the requirements specified in the definition as follows:

212.1 "is not a motor vehicle engine; and"

The auxiliary IC engine is not used as a motor vehicle engine. The auxiliary IC engine powers the vacuum system and sweeper brushes.

212.2 "is not regulated by a federal New Source Performance Standard promulgated under Section 111 of the Federal Clean Air Act; and"

There is no NSPS applicable to the operation of the auxiliary IC engine.

212.3 "by itself or in or on a piece of equipment, 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; and"

The auxiliary IC engine is mounted on the street sweeper and is therefore transportable.

212.4 "does not remain at a location for more than 12 consecutive months. Any engine, such as a back-up or stand-by engine, that replaces an engine at a location and is intended to perform the same function as the engine being replaced will be included in calculating the consecutive time period. In that case, the cumulative time of both engines, including the time between the removal of the original engine and installation of the replacement engine, would be counted toward the consecutive residence time period. In addition, an engine that is moved from its location but does not need to be moved from its location to perform its function shall be deemed to have remained at a single location."

The IC engine moves with the street sweeper from location to location at and near the landfill to clean the paved roadways.

E. EQUIPMENT DESCRIPTION:

IC Engine (SS2) [auxiliary IC engine for Street Sweeper No. 2]

A/C No.	21893
Make:	John Deere Power Systems Group
Model:	4045HF280B
Serial No.:	PE4045L074663
EPA Family No.:	8JDXL04.5111
EPA Emission Category:	Tier 3
Date of Manufacture:	2008
Engine Type:	4-cycle
Aspiration:	Turbocharged
Engine BHP:	99 hp at 2400 rpm
Displacement:	4.5 liter
Fuel:	CARB diesel
Equipment Driven:	Vacuum system and sweeper brushes on a street sweeper

F. PROCESS RATE:

The IC engine (SS2) will operate up to 520 hours/calendar quarter and combusts diesel fuel at a

rate of approximately 5.5 gallons/hour.

G. OPERATING SCHEDULE:

The IC engine (SS2) will be permitted to operate 24 hours/day and 520 hours/calendar quarter.

H. AIR POLLUTION CONTROL EQUIPMENT EVALUATION:

There is no specific air pollution control equipment, such as a diesel particulate filter, to control emissions from the IC engine (SS2) exhaust.

The IC engine (SS2) is designed and built with direct diesel injection, turbocharger and charge air cooler to reduce ROC, NOx, PM10 and CO emissions.

The IC engine (SS2) is a 2008 U.S. EPA Tier 3 certified non-road IC engine.

I. EMISSIONS CALCULATIONS:

1. HISTORIC POTENTIAL EMISSIONS:

The proposed IC engine (SS2) is considered to be new equipment, therefore:

Historic Potential Emissions = 0.

2. PROPOSED POTENTIAL TO EMIT:

The following Maximum Allowable Emissions from the proposed IC engine are calculated using 520 hours/calendar quarter as the requested maximum usage.

A/C 21893 IC Engine (SS2) [auxiliary on Street Sweeper No. 2]

Pollutant	Emission Factor (A) grams/hp-hr	Maximum Allowable Emissions (D)				
		Daily lb/day	Quarter 1 lb/quarter	Quarter 2 lb/quarter	Quarter 3 lb/quarter	Quarter 4 lb/quarter
ROC+NOx	3.0 (A)					
ROC	1.0 (C)	5.2	113	113	113	113
NOx	3.0 (C)	15.6	339	339	339	339
SO2	0.05 (B)	0.3	6	6	6	6
PM10	0.22 (A)	1.2	25	25	25	25
CO	0.67 (A)	3.5	76	76	76	76

(A) The emission factors for ROC+NOx, PM10 and CO are from the CARB Off Road Engine Certification for this engine model and family dated 12-14-2007.

(B) The emission factor for SO2 is based on 0.015% sulfur by weight in the diesel fuel.

(C) For the purpose of calculating NOx and ROC individually, ROC emissions are assessed at the worse case scenario of the uncontrolled U.S. EPA AP-42 emission factor of 1.0 gram/hp-hr and NOx emissions are assessed at the worse case limit of 3.0 gram/hp-hr.

(D) Maximum Allowable Emissions are based on 99 hp, 24 hours/day and 520 hours/calendar quarter.

3. CALCULATION OF BACT TRIGGER:

NEI (BACT) = Net Emissions Increase for BACT trigger purposes
 = Proposed Potential to Emit - Potential to Emit prior to modification
 (calculation uses values from the quarter that results in the largest NEI)

MPE = Maximum Potential Emissions for a 24-hour day operation

A/C 21893 IC Engine (SS2) [Auxiliary on Street Sweeper 2]

Pollutant	NEI (BACT) lb/quarter	Is NEI (BACT) >0 ?	MPE lb/day	BACT Trigger lb/day	Is BACT Required?
ROC	113	Yes	5.2	≥10	No
NOx	339	Yes	15.6	≥10	Yes
SO2	6	Yes	0.3	≥10	No
PM10	25	Yes	1.2	≥10	No
CO	76	Yes	3.5	≥550	No

4. CALCULATION OF OFFSET TRIGGER FOR ROC AND NOx:

 Indicates active permit

Permit No.	Emissions Unit	Stationary Source Potential to Emit lb/quarter	
		ROC	NOx
P/O 12320	Landfill and Landfill Gas Collection System	Modified to A/C 17821	
A/C 12321	Landfill Gas Flare	Modified to A/C 14669	
P/O 13574	IC Engine No. 1	Modified to A/C 16463	
P/O 13575	IC Engine No. 2	Modified to A/C 16519	
P/O 13576	IC Engine No. 3	Modified to A/C 16520	
A/C 14669	Landfill Gas Flare	Modified to A/C 15333	
A/C 15333	Landfill Gas Flare	Modified to A/C 16062	
 P/O 16026	Gasoline Dispensing Facility	46	0
A/C 16062	Landfill Gas Flare	Modified to A/C 17058	
P/O 16150	IC Engine No. 4	Modified to A/C 19705	
P/O 16151	IC Engine No. 5	Modified to A/C 20801	
P/O 16463	IC Engine No. 1	Modified to A/C 17331	

Permit No.	Emissions Unit	Stationary Source Potential to Emit lb/quarter	
		ROC	NOx
P/O 16519	IC Engine No. 2	Modified to A/C 17332	
P/O 16520	IC Engine No. 3	Modified to A/C 17333	
P/O 17058	Landfill Gas Flare	Modified to A/C 17359	
P/O 17331	IC Engine No. 1	Modified to A/C 20797	
P/O 17332	IC Engine No. 2	Modified to A/C 20798	
P/O 17333	IC Engine No. 3	Modified to A/C 20799	
P/O 17359	Landfill gas flare	Modified to A/C 19704	
P/O 17677	IC Engine No. 1	Modified to A/C 17822	
P/O 17678	IC Engine No. 2	Modified to A/C 17823	
P/O 17679	IC Engine No. 3	Modified to A/C 17824	
P/O 17728	Landfill Gas Flare	Modified to A/C 17359	
P/O 17821	Landfill and Landfill Gas Collection System	205,344	0
P/O 17822	IC Engine No. 1	Modified to A/C 17331	
P/O 17823	IC Engine No. 2	Modified to A/C 17332	
P/O 17824	IC Engine No. 3	Modified to A/C 17333	
P/O 17921	IC Engine (TS)	Modified to A/C 19189	
P/O 17976	Trommel Screen	Modified to A/C 19188	
P/O 18184	IC Engine (GG)	Modified to A/C 21792	
P/O 18185	Green Waste Grinder	0	0
P/O 19188	Trommel Screen	0	0
P/O 19189	IC Engine (TS)	Modified to A/C 19349	
P/O 19349	IC Engine (TS)	Modified to A/C 21262	
P/O 19363	IC Engine (SS1) [auxiliary on Street Sweeper No. 1]	39	452
P/O 19704	Landfill Gas Flare [The total emissions from the 5 IC Engines and Landfill Gas Flare No. 1 and No. 2 are shown here as the Landfill Gas Air Pollution Control System emissions]	31,511	44,110
P/O 19705	IC Engine No. 4	Modified to A/C 20800	

Permit No.	Emissions Unit	Stationary Source Potential to Emit lb/quarter	
		ROC	NOx
P/O 20797	IC Engine No. 1	See P/O 19704	
P/O 20798	IC Engine No. 2	See P/O 19704	
P/O 20799	IC Engine No. 3	See P/O 19704	
P/O 20800	IC Engine No. 4	See P/O 19704	
P/O 20801	IC Engine No. 5	See P/O 19704	
A/C 21097	LFG Flare No. 2	See P/O 19704	
P/O 21262	IC Engine (TS)	41	661
P/O 21792	IC Engine (GG)	37	4,377
A/C 21893	IC Engine (SS2) [auxiliary on Street Sweeper No. 2]	113	339
Total		237,131	49,939
Offset Trigger Level		≥ 5,000	≥ 5,000

5. CALCULATION OF OFFSET TRIGGER FOR SO2, PM10 AND CO:

Indicates active permit

Permit No.	Emissions Unit	Stationary Source Cumulative Emission Increase Since 01-01-77 lb/quarter		
		SO2	PM10	CO
P/O 12320	Landfill and Landfill Gas Collection System	Modified to A/C 17821		
A/C 12321	Landfill Gas Flare	Modified to A/C 14669		
P/O 13574	IC Engine No. 1	Modified to A/C 16463		
P/O 13575	IC Engine No. 2	Modified to A/C 16519		
P/O 13576	IC Engine No. 3	Modified to A/C 16520		
A/C 14669	Landfill Gas Flare	Modified to A/C 15333		
A/C 15333	Landfill Gas Flare	Modified to A/C 16062		
P/O 16026	Gasoline Dispensing Facility	0	0	0
A/C 16062	Landfill Gas Flare	Modified to A/C 17058		
P/O 16150	IC Engine No. 4	Modified to A/C 19705		

Permit No.	Emissions Unit	Stationary Source Cumulative Emission Increase Since 01-01-77 lb/quarter		
		SO2	PM10	CO
P/O 16151	IC Engine No. 5	Modified to A/C 20801		
P/O 16463	IC Engine No. 1	Modified to A/C 17331		
P/O 16519	IC Engine No. 2	Modified to A/C 17332		
P/O 16520	IC Engine No. 3	Modified to A/C 17333		
P/O 17058	Landfill Gas Flare	Modified to A/C 17359		
P/O 17331	IC Engine No. 1	Modified to A/C 20797		
P/O 17332	IC Engine No. 2	Modified to A/C 20798		
P/O 17333	IC Engine No. 3	Modified to A/C 20799		
P/O 17359	Landfill gas flare	Modified to A/C 19704		
P/O 17677	IC Engine No. 1	Modified to A/C 17822		
P/O 17678	IC Engine No. 2	Modified to A/C 17823		
P/O 17679	IC Engine No. 3	Modified to A/C 17824		
P/O 17728	Landfill Gas Flare	Modified to A/C 17359		
P/O 17821	Landfill and Landfill Gas Collection System	0	0	0
P/O 17822	IC Engine No. 1	Modified to A/C 17331		
P/O 17823	IC Engine No. 2	Modified to A/C 17332		
P/O 17824	IC Engine No. 3	Modified to A/C 17333		
P/O 17921	IC Engine (TS)	Modified to A/C 19189		
P/O 17976	Trommel Screen	Modified to A/C 19188		
P/O 18184	IC Engine (GG)	Modified to A/C 21792		
P/O 18185	Green Waste Grinder	0	20	0
P/O 19188	Trommel Screen	0	334	0
P/O 19189	IC Engine (TS)	Modified to A/C 19349		
P/O 19349	IC Engine (TS)	Modified to A/C 21262		
P/O 19363	IC Engine (SS1) [auxiliary on Street Sweeper No. 1]	19	20	118
P/O 19704	Landfill Gas Flare [The total emissions from the 5 IC Engines and Landfill Gas Flare No. 1 and No. 2 are	45,715	13,648	224,715

Permit No.	Emissions Unit	Stationary Source Cumulative Emission Increase Since 01-01-77 lb/quarter		
		SO2	PM10	CO
	shown here as the Landfill Gas Air Pollution Control System emissions]			
P/O 19705	IC Engine No. 4	Modified to A/C 20800		
P/O 20797	IC Engine No. 1	See P/O 19704		
P/O 20798	IC Engine No. 2	See P/O 19704		
P/O 20799	IC Engine No. 3	See P/O 19704		
P/O 20800	IC Engine No. 4	See P/O 19704		
P/O 20801	IC Engine No. 5	See P/O 19704		
A/C 21097	LFG Flare No. 2	See P/O 19704		
P/O 21262	IC Engine (TS)	8	24	137
P/O 21792	IC Engine (GG)	37	67	636
A/C 21893	IC Engine (SS2) [auxiliary on Street Sweeper No. 2]	6	25	76
Total		45,785	14,138	225,682
Trigger Level		≥ 13,650	≥ 7,500	≥ 49,500

6. CALCULATION OF EMISSION OFFSETS FOR ROC AND NOx:

ROC: Emission offsets are triggered for ROC. The proposed IC engine is U.S. EPA and CARB Tier 3 certified to emit ROC+NOx at 3.0 g/hp-hr. There is no specific ROC emission factor based on the U.S. EPA and CARB certification. Because the SMAQMD will require that NOx be offset for the full 3.0 g/hp-hr, requiring that ROC offsets also be provided would be double counting the required amount to be offset. In the Sacramento area the need to reduce NOx emissions for attainment of the ambient ozone air quality standard is a priority over reducing ROC emissions. The SMAQMD will, therefore, not require that ROC emissions be offset.

NOx: Emission offsets are triggered for NOx. The amount of NOx emissions that must be offset is 339 lb/quarter.

7. CALCULATION OF EMISSION OFFSETS FOR SO2, PM10 AND CO:

SO2: Emission offsets are triggered for SO2. The amount of SO2 emissions that must be offset is 6 lb/quarter.

PM10: Emission offsets are triggered for PM10. The amount of PM10 emissions that must

be offset is 25 lb/quarter.

CO: Emission offsets are triggered for CO. The amount of CO emissions that must be offset is 76 lb/quarter.

J. COMPLIANCE WITH RULES AND REGULATIONS:

1. CALIFORNIA HEALTH AND SAFETY CODE SECTION 42301.6 COMPLIANCE:

The proposed equipment is not located within 1000 feet of a K–12 school, therefore, California Health and Safety Code Section 42301.6 requirements for public noticing do not apply.

2. NSR COMPLIANCE:

Rule 202 - New Source Review

Section 112 - Exemption - Notification Requirements

The increase in Potential to Emit from this permit action **does not exceed** the level requiring U.S. EPA, CARB and public noticing.

Pollutant	Potential to Emit Level Requiring Public Noticing lb/quarter
ROC	≥ 5,000
NOx	≥ 5,000
SO2	≥ 13,650
PM10	≥ 7,500
CO	≥ 49,500

However, this permit action will be processed using SMAQMD Rule 202 Section 404 *Enhanced New Source Review* and therefore the notification exemption of Section 112 is not applicable.

In addition, because this permit action subjects the proposed IC engine to emission offsets, the notification exemption of Section 112 is also not applicable.

The procedural requirements in SMAQMD Rule 207 Sections 401 through 408 will be used.

Section 301 - BACT

ROC: NOx: SO2: PM10: CO:	}	This is a non-road IC engine with U.S. EPA and CARB certified Tier 3 emissions and is not subject to BACT that is more restrictive than U.S. EPA requirements. An emissions limit that is more restrictive than U.S. EPA standards cannot be required of a “non-road” IC engine because it is precluded by 40 CFR 85.1603(d). This section of federal law reserves the regulation of “non-road” IC engines to U.S. EPA (and in special circumstances, to CARB).
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Section 302 - Offsets

ROC: The amount of ROC offsets required for this source is 0 lb/quarter.

See discussion of the 0 lb/quarter in the section titled "CALCULATION OF EMISSION OFFSETS FOR ROC AND NO_x".

NO_x: The amount of NO_x offsets required for this source is 339 lb/quarter.

SO₂: The amount of SO₂ offsets required for this new source is 6 lb/quarter.

PM₁₀: The amount of PM₁₀ offsets required for this source is 25 lb/quarter.

CO: The amount of CO offsets required for this source is 0 lb/quarter.

The amount of CO offsets required to be provided is 0 lb/quarter because the CO offset exemption requirements of SMAQMD Rule 202 Section 302.7 are met. SMAQMD Rule 202 New Source Review Section 302.7 exempts CO emissions from being offset if air quality modeling shows that the increase in the ambient concentration of CO at and beyond the property line is less than 500 mg/m³ for an 8 hour average.

The ISCST CO modeling analysis is shown in Attachment B. The ISCST model results show that the maximum expected increase in the concentration of CO at any location is less than 1.5 micrograms/m³ which is much less than the exemption level of 500 micrograms/m³. The emissions of CO are therefore exempt from offset requirements.

ERCs Provided

The applicant is proposing to provide ERCs consisting of leased ERCs from the Essential Public Services Account of the SMAQMD Priority Reserve Bank.

As with the first street sweeper, this second street sweeper is eligible to obtain ERCs from the Essential Public Services Account of the SMAQMD Priority Reserve Bank. SMAQMD Rule 205 Section 204 considers "solid waste management systems, including landfill gas control or processing systems" as essential public services. Kiefer Landfill states that the use of street sweepers is required in order for them to comply with stormwater and dust control regulations that govern the operation of their solid waste management system.

The following table shows how the proposed ERCs will be applied to the emission liability associated with the operation of the second street sweeper.

Emission Reduction Credit Certificate No.	Face Value of ERC Certificates Surrendered lb/quarter				Offset Ratio	Value Applied to the Project Emission Liability lb/quarter				
	Qtr 1	Qtr 2	Qtr 3	Qtr 4		Qtr 1	Qtr 2	Qtr 3	Qtr 4	
A/C 21893 IC Engine (SS2) [auxiliary on Street Sweeper No. 2]										
Essential Public Services Account SMAQMD Priority Reserve Bank PXX-XXXX Lease Expires on: XX-XX-20XX										
NOx	339	339	339	339	1:1	339	339	339	339	339
SO2	6	6	6	6	1:1	6	6	6	6	6
PM10	25	25	25	25	1:1	25	25	25	25	25

(A) The offset ratio for NOx, SO2 and PM10 is 1:1 because the facility's cumulative emission change over the previous five year emissions window does not exceed the major modification level of 25 tons for NOx, 40 tons for SO2 and 15 tons for PM10. Therefore, this permitting action is considered a "Minor Modification".

ERCs will be required to be surrendered to the SMAQMD Air Pollution Control Officer prior to operating the IC engine (SS2).

Section 307 - Denial, Failure to Meet CEQA

The SMAQMD has developed a comprehensive permitting CEQA Guidance document for IC engines. Project reviews conducted in accordance with the IC Engine Permitting Manual meet the CEQA criteria of ministerial and do not require additional CEQA review.

This project falls within the scope of the IC Engine Permitting Manual and has been determined to be ministerial. No further review is required.

Section 404 - Enhanced New Source Review

This permit action will be processed using SMAQMD Rule 202 Section 404 Enhanced New Source Review. The procedural requirements in SMAQMD Rule 207 Sections 401 through 408 will be used. A public notice will be published in the Sacramento Bee requesting comments within a 30 day review period. The U.S. EPA Region 9 will have a 45 day review period.

The use of the Enhanced New Source Review process will allow this permit action to be incorporated into the facility's Title V permit through a Title V administrative permit amendment (see SMAQMD Rule 207 Section 202.5).

3. PSD COMPLIANCE:

A PSD analysis is not required because there are no emissions of an attainment pollutant that exceed the following levels -

Attainment Pollutants within the SMAQMD	Primary PSD Applicability Level (A) (i.e. federal PSD "major" source level) tons/year	Secondary PSD Applicability Level (B) (i.e. federal PSD "significance" level) tons/year
NO2	≥ 250	≥ 40
SO2	≥ 250	≥ 40
CO	≥ 250	≥ 100

(A) Except that the "major" source level is ≥ 100 tons/year for stationary sources listed in 40 CFR 51.166(b)(1)(i)(a).

(B) If emissions of one of the "attainment" pollutants qualifies the stationary source as a federal PSD "major" source, then PSD is also applicable to any other "attainment" pollutant that exceeds the federal PSD "significance" level for both (1) the project emissions increase **and** (2) the facility net emissions increase.

4. PROHIBITORY RULES COMPLIANCE

SMAQMD Rule 401 - Ringelmann Chart

Visible emissions from the IC engine (SS2) are expected to comply with the 20% opacity requirement of this rule.

SMAQMD Rule 402 - Nuisance

Health Risk Assessment (HRA):

Diesel particulate matter (DPM) in the exhaust of diesel fueled IC engines has been declared by CARB to be a toxic air contaminant.

The theoretical increased cancer risk due to DPM emissions from the proposed IC engine (SS2) [auxiliary for Street Sweeper No. 2] in the following combination with the existing diesel fueled IC engines is discussed in this HRA section.

Combined Sources Used for Modeling	[1. PROPOSED - IC engine (SS2) for Street Sweeper No. 2 (A/C 21893)
		2. EXISTING - IC engine (SS1) for Street Sweeper No. 1 (P/O 19163)
		3. EXISTING - IC engine (TS) for the trommel screen (P/O 21262)
		4. EXISTING - IC engine (GG) for the greenwaste grinder (P/O 21792)

The ISCST3 air quality dispersion model (Attachment A) was used to determine the ground

level concentration of PM10 (surrogate for diesel particulate matter) in the ambient air at the maximum point of impact along the fence line.

The applicant supplied the following parameters used in the ISCST3 model run:

A/C 21893 IC Engine (SS2) [auxiliary for Street Sweeper No. 2]

Stack height: 10 feet
Stack diameter: 0.25 feet
Stack volume flow rate: 1034 acfm
Stack gas temperature: 850 deg. F
Emission rate: annual average = 0.0014 grams/sec of diesel particulate matter (PM10) based on an emission factor of 0.22 grams/hp-hour, 99 hp and 2080 hours of operation averaged over one year

P/O 19363 IC Engine (SS1) [auxiliary for Street Sweeper No. 1]

Stack height: 9.3 feet
Stack diameter: 0.25 feet
Stack volume flow rate: 1034 acfm
Stack gas temperature: 850 deg. F
Emission rate: annual average = 0.0012 grams/sec of diesel particulate matter (PM10) based on an emission factor of 0.18 grams/hp-hour, 99 hp and 2080 hours of operation averaged over one year

P/O 21262 IC Engine (TS) [Trommel Screen] (originally P/O 19349)

Stack height: 10 feet
Stack diameter: 0.25 feet
Stack volume flow rate: 1493 acfm
Stack gas temperature: 850 deg. F
Emission rate: annual average = 0.0014 grams/sec of diesel particulate matter (PM10) based on an emission factor of 0.16 grams/hp-hour, 158 hp and 1768 hours of operation averaged over one year

P/O 21792 IC Engine (GG) [Greenwaste Grinder] (originally P/O 18184)

Stack height: 10 feet
Stack diameter: 0.833 feet
Stack volume flow rate: 5400 acfm
Stack gas temperature: 850 deg. F
Emission rate: annual average = 0.0029 grams/sec of diesel particulate matter (PM10) based on an emission factor of 0.067 grams/hp-hour, 860 hp and 1560 hours of operation averaged over one year.

NOTE: The 0.067 grams/hp-hour PM10 emission factor is not the same as the 0.09 grams/hp-hour emission factor listed in the Permit to Operate condition. The Permit to Operate condition has an incorrect value because the U.S. EPA certification is 0.09 grams/kw-hour, which equates to 0.067 grams/hp-hour.

The following factors and assumptions were used to estimate the increased cancer risk as a result of the proposed emissions from this source:

- Risk = Theoretical number of increased cancers in a population of 1,000,000 exposed persons.
- C = Concentration of Diesel Particulate Matter (PM10) downwind of the stack from the ISCST modeling results (ug/m3).
- U = Diesel Particulate Matter unit risk number = 0.0003 increased cancers/(1 ug/m3).
- R = Residential risk factors: (70 years/70 years).
- O = Operation factor
Each IC engine operates a different number of hours per year so the operation factor was used to modify the emission rate input parameter (grams PM10/second) for each IC engine in the ISCST model. Because of this modification to the emission rate, an operation factor of 1 is used in the risk calculation equation that follows.
- BRF = The calculated risk uses a Breathing Rate Factor (BRF) adjustment of 1.25 in order to account for changes in OEHHA breathing factors and receptor dosage slope equations. OEHHA has issued guidance regarding how new research findings in the human breathing process affects the risk calculation. OEHHA recommends that the unit risk factors increase by a maximum of 25%, so an adjustment factor of 1.25 is used to account for the new research findings.

Maximum Combined Fenceline Cancer Risk:

- a. The theoretical cancer risk calculation uses a residential cancer risk assumption by representing a person at the fenceline of the property for 24 hours/day, 7 days/week and 70 years in a 70 year lifetime.
- b. ISCST Modeling Results - Maximum fenceline concentration was determined to be located along the northeast property line with a value of 0.010 ug/m3.
- c. Risk = (C) x (U) x (R) x (O) x (BRF)
= (0.010) x (0.0003) x (70/70) x (1) x (1.25)
= 3.8 in 1 million increased theoretical cancer risk

The increased theoretical cancer risk due to the DPM emissions from the proposed auxiliary IC engine for street sweeper No. 2 (A/C 21893) in the following combination with the existing IC engines is less than the SMAQMD's allowable 10 in 1 million increased theoretical cancer risk.

Combined Sources Used for Modeling	{	<ul style="list-style-type: none">1. PROPOSED - IC engine (SS2) for Street Sweeper No. 2 (A/C 21893)2. EXISTING - IC engine (SS1) for Street Sweeper No. 1 (P/O 19163)3. EXISTING - IC engine (TS) for the trommel screen (P/O 21262)4. EXISTING - IC engine (GG) for the greenwaste grinder (P/O 21792)
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It should be noted that the calculation of the ambient DPM concentrations and the subsequent calculation of increased theoretical cancer risk used several worst case assumptions. Therefore, the increased theoretical cancer risk that has been calculated represents the upper bound increased theoretical cancer risk. The **actual** increased theoretical cancer risk would be less than that calculated.

TBACT Requirements

SMAQMD policy requires the use of TBACT if the increased cancer risk is 1 in 1 million or greater for the proposed permit unit. The increased cancer risk for the proposed IC engine (SS2) is 0.75 in 1 million. TBACT for the IC engine (SS2) will be required.

The following is the methodology used for determining the TBACT HRA -

The DPM concentration for the TBACT HRA was determined by basing it on the annual fenceline CO concentration modeling results (Attachment B) because those results are specific for the IC engine (SS2) only and not the combination of the four IC engines. A ratio between the DPM emissions and the CO emissions from the IC engine (SS2) was then created to scale the modeled CO concentration to reflect what the DPM concentration would be if it had been modeled.

$$\begin{aligned} \text{DPM concentration} &= \frac{\text{DPM emission rate}}{\text{CO emission rate}} \times \text{annual CO concentration} \\ &= \frac{(0.0014 \text{ grams/second})}{(0.0044 \text{ grams/second})} \times 0.006 \text{ micrograms/m}^3 \\ &= 0.002 \text{ micrograms/m}^3 \end{aligned}$$

- a. The theoretical cancer risk calculation uses a residential cancer risk assumption by representing a person at the fenceline of the property for 24 hours/day, 7 days/week and 70 years in a 70 year lifetime.
- b. ISCST Modeling Results - Maximum fenceline concentration was determined to be located along the northeast property line with a value of 0.002 ug/m³.
- c. Risk = (C) x (U) x (R) x (O) x (BRF)
= (0.002) x (0.0003) x (70/70) x (1) x (1.25)
= 0.75 in 1 million increased theoretical cancer risk

SMAQMD Rule 406 - Specific Contaminants

Emissions from the IC engine (SS2) are expected to comply with the emissions limit of 0.2% by volume sulfur compounds as SO₂ and 0.1 grains/dscf of other combustion gases calculated at 12% CO₂ as shown below:

Diesel fuel F-factor	= 9,190 dscf/MMBTU at 0% O ₂
Molecular Weight of SO ₂	= 64 grams/mole
Standard Molar Volume	= 0.8493 dscf/mol (at 68 degrees F and 1 atm)
SO ₂ Emission Factor	= 0.05 grams/hp-hour
PM Emission Factor	= 0.22 grams/hp-hour

Engine Efficiency = 35% (assumed)
Outlet Carbon Dioxide = 12% (assumed)

PM10 concentration (combustion contaminants):

- =
$$\frac{\text{IC engine PM10 mass emission rate (grains/hour)}}{\text{IC engine volumetric combustion gas flow rate (ft}^3\text{/hour)}}$$
- =
$$\frac{(0.22 \text{ grams PM10/hp hour}) (15.43 \text{ grains/gram}) (99 \text{ hp})}{(99 \text{ hp})(2546 \text{ BTU/hp hour}) (1 \text{ BTU input}/0.35 \text{ BTU output}) (9190 \text{ E-6 ft}^3\text{/BTU})}$$
- =
$$\frac{336 \text{ grains/hour}}{6618 \text{ ft}^3\text{/hour}}$$
 at 0% O2 by definition of F factor
- =
$$\frac{336 \text{ grains/hour}}{23443 \text{ ft}^3\text{/hour}}$$
 at 15% O2 actual operating condition
- = 0.01 grains/ft3 at 12% CO2

SO2 Concentration (% SO2 by volume):

- =
$$\frac{\text{IC engine volumetric SO2 emission rate (ft}^3\text{/hp hour)}}{\text{IC engine volumetric combustion gas emission rate (ft}^3\text{/hp hour)}}$$
- =
$$\frac{(0.05 \text{ grams SO2/hp-hour}) (0.8493 \text{ ft}^3\text{/mole}) (1 \text{ mole}/64 \text{ grams}) (99 \text{ hp})}{(99 \text{ hp}) (2546 \text{ BTU/hp hour}) (1 \text{ BTU input}/0.35 \text{ BTU output}) (9190 \text{ E-6 ft}^3\text{/BTU})}$$
- =
$$\frac{0.066 \text{ ft}^3\text{/hour}}{6618 \text{ ft}^3\text{/hour}}$$
 at 0% O2 by definition of F factor
- =
$$\frac{0.066 \text{ ft}^3\text{/hour}}{23443 \text{ ft}^3\text{/hour}}$$
 at 15% O2 actual operating condition
- = 0.0003% SO2 by volume

SMAQMD Rule 412 - Stationary Internal Combustion Engines Located At Major Stationary Sources of NOx

This rule limits the NOx concentration from IC engines of this type to 65 ppmvd NOx at 15% O2. In addition, the rule limits the CO concentration from IC engines of this type to 4000 ppmvd CO at 15% O2.

SMAQMD Rule 412 Section 114 exempts non-road engines from the requirements of the rule. The proposed auxiliary IC engine (SS2) meets the requirements specified for a non-road IC engine as defined in SMAQMD Rule 412 Section 212.

SMAQMD Rule 412 requirements are therefore not applicable.

SMAQMD Rule 420 - Sulfur Content of Fuels

The use of CARB diesel fuel, which has a maximum of 0.015% sulfur by weight in the fuel, will comply with the rule limitation of 0.5% sulfur by weight in the fuel.

5. NEW SOURCE PERFORMANCE STANDARDS (NSPS) COMPLIANCE:

The following NSPS is only applicable to stationary compression ignition IC engines and is discussed here to document non-applicability -

40 CFR Part 60 Subpart IIII - STANDARDS OF PERFORMANCE FOR STATIONARY COMPRESSION IGNITION INTERNAL COMBUSTION ENGINES
[begin at 60.4200]

The proposed IC engine (SS2) is mobile and does not meet the definition of "stationary" IC engine in the NSPS and is therefore not subject to the requirements of the NSPS.

6. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP) AND CARB AIR TOXIC CONTROL MEASURES (ATCM) COMPLIANCE:

NESHAP

The following NESHAP is only applicable to stationary compression ignition IC engine and is discussed here to document non-applicability -

40 CFR 63 Subpart ZZZZ - NATIONAL EMISSIONS STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR STATIONARY RECIPROCATING INTERNAL COMBUSTION ENGINES
[begin at 63.6580]

The proposed IC engine (SS2) is mobile and does not meet the definition of "stationary" IC engine in the NESHAP and is therefore not subject to the requirements of the NESHAP.

ATCM

Airborne Toxic Control Measure For Diesel Particulate Matter from Portable Engines Rated at 50 Horsepower and Greater [California Code of Regulations, Title 17, begin at Section 93116]:

This IC engine (SS2) is required to comply with the following requirements of this ATCM.

[Section 93116.3(a)]

- (a) Diesel-fueled portable engines shall only use one of the following fuels:
- (1) CARB diesel fuel; or
 - (2) Alternative diesel fuel that has been verified through the Verification Procedure for In-Use Strategies to Control Emissions from Diesel Engines; or
 - (3) CARB diesel fuel utilizing fuel additives that have been verified through the Verification Procedure for In-Use Strategies to Control Emissions from Diesel Engines.

The permit will have a condition that the diesel fuel combusted by the IC engine meet the above requirements

[Section 93116.3(b)]

(b) Diesel PM Standards

(1) Requirements for in-use portable diesel-fueled engines

(A) Except as provided in sections 93116.3(b)(1)(B) and 93116.3 (b)(4) of the ATCM, starting January 1, 2010, all portable diesel fueled engines shall be certified to meet a federal or California standard for newly manufactured non-road engines pursuant to 40 CFR Part 89 or Title 13 of the California Code of Regulations (that is, certified to Tier 1, 2 or 3 non-road engine standards).

This IC engine is certified to Tier 3 standards by U.S. EPA and CARB and complies with this section of the ATCM.

K. RECOMMENDATION:

The proposed IC engine (SS2) should comply with all applicable SMAQMD, CARB and U.S. EPA rules and regulations.

1. **PRELIMINARY DECISION** - Propose that an Authority to Construct be issued to Kiefer Landfill, Department of Waste Management and Recycling, Municipal Services Agency, County of Sacramento with the conditions on Authority to Construct No. 21893.
2. **NOTICING FOR ERC USE** - Following the procedures in SMAQMD Rule 202 Section 405:
 - a. Publish a public notice in the Sacramento Bee newspaper and request comments within the 30 day review period regarding the use of ERCs for the project.
 - b. Transmit to the U.S. EPA Region 9 the proposed Engineering Evaluation and Authority to Construct and request comments within the 30 day review period.
3. **ENHANCED NEW SOURCE REVIEW PROCESSING** - Following the procedures in SMAQMD Rule 207 Sections 401 through 408:
 - a. Publish a public notice in the Sacramento Bee newspaper and request comments within the 30 day review period regarding the preliminary decision to issue the Authority to Construct.
 - b. Transmit to the U.S. EPA Region 9 the proposed Engineering Evaluation and Authority to Construct and request comments within the 45 day review period.
4. Finalize A/C 21893 after the close of the U.S. EPA Region 9 and public comment periods by making any necessary changes due to the comments received.

REVIEWED BY: _____ **DATE:** _____

ATTACHMENT A

ISCST Modeling Analysis for:

Diesel Particulate Matter (DPM) Annual Average Concentration

ATTACHMENT B

ISCST Modeling Analysis for: Carbon Monoxide 8-Hour Average Concentration