

Bay Area Air Quality Management District

939 Ellis Street
San Francisco, CA 94109
(415) 771-6000

**Permit Evaluation
and
Statement of Basis
for
RENEWAL and REVISIONS of

MAJOR FACILITY REVIEW PERMIT**

for
**Redwood Landfill, Inc.
Facility #A1179**

Facility Address:
8950 Redwood Highway
Novato, CA 94948

Mailing Address:
P. O. Box 793
Novato, CA 94948

Application Engineer: Carol Allen
Site Engineer: Carol Allen

Applications: 17987, 16609, 18689, 20623, & 21288

TABLE OF CONTENTS

A.	BACKGROUND	3
B.	FACILITY DESCRIPTION	4
C.	PERMIT CONTENT	6
I.	Standard Conditions	6
II.	Equipment	7
III.	Generally Applicable Requirements	10
IV.	Source-Specific Applicable Requirements.....	12
V.	Schedule of Compliance.....	19
VI.	Permit Conditions.....	19
VII.	Applicable Limits and Compliance Monitoring Requirements	23
VIII.	Test Methods	30
IX.	Permit Shield:.....	31
X.	Revision History.....	32
XI.	Glossary.....	32
XII.	Applicable State Implementation Plan	32
D.	ALTERNATIVE OPERATING SCENARIOS.....	33
E.	COMPLIANCE STATUS	33
F.	DIFFERENCES BETWEEN THE APPLICATION AND THE PROPOSED PERMIT.....	34
	APPENDIX A BAAQMD COMPLIANCE REPORT	36
	APPENDIX B GLOSSARY	40
	APPENDIX C FACILITY-WIDE EMISSIONS and EMISSION CHANGES	51
	APPENDIX D REPORTS FOR GAS COLLECTION SYSTEM ALTERATIONS.....	58
	APPENDIX E REPORTS FOR FLARE REPLACEMENT PROJECT.....	71
	APPENDIX F REPORTS FOR PORTABLE ENGINES REPLACEMENT PROJECT	149
	APPENDIX G REPORTS FOR LANDFILL EXPANSION PROJECT	165

TITLE V STATEMENT OF BASIS

Redwood Landfill, Inc.; PLANT # A1179

APPLICATIONS # 17987, 16609, 18689, 20623, & 21288

A. BACKGROUND

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act, Part 70 of Title 40 of the Code of Federal Regulations (CFR), and BAAQMD Regulation 2, Rule 6, Major Facility Review, because it is a major facility as defined by BAAQMD Regulation 2-6-212.1. It is a major facility because it has the “potential to emit,” as defined by BAAQMD Regulation 2-6-218, of more than 100 tons per year of a regulated air pollutant (in this case, carbon monoxide). Therefore, this facility is required to have an MFR permit pursuant to Regulation 2-6-301.

In addition, it is a designated facility as defined by BAAQMD Regulation 2-6-204. The Standards of Performance for Municipal Solid Waste Landfills (40 CFR Part 60, Subpart WWW) require the owner or operator of a landfill that is subject to this part and that has a design capacity of greater than or equal to 2.5 million megagrams and 2.5 million cubic meters to obtain an operating permit pursuant to Part 70. This facility is subject to this NSPS because it commenced construction on a modification after May 30, 1991 and has design capacities that are larger than 2.5 million Mg and larger than 2.5 million m³. Therefore, this facility is required to have an MFR permit pursuant to Regulation 2-6-304.

Major Facility Operating permits (Title V permits) must meet specifications contained in 40 CFR Part 70 as contained in BAAQMD Regulation 2, Rule 6. The permits must contain all applicable requirements (as defined in BAAQMD Regulation 2-6-202), monitoring requirements, recordkeeping requirements, and reporting requirements. The permit holders must submit reports of all monitoring at least every six months and compliance certifications at least every year.

In the Bay Area, state and District requirements are also applicable requirements and are included in the permit. These requirements can be federally enforceable or non-federally enforceable. All applicable requirements are contained in Sections I through VI of the permit.

Each facility in the Bay Area is assigned a facility identifier that consists of a letter and a 4-digit number. This identifier is also considered to be the identifier for the permit. The identifier for this facility is A1179.

This facility received its initial Title V permit on November 10, 2003. The permit was revised on November 10, 2004, July 27, 2005, December 29, 2005, April 18, 2006, July 13, 2006, September 20, 2006, August 28, 2007, and October 24, 2007. Application #17987 is for a permit renewal. Although the current permit expired on October 31, 2008, it continues in force until the District takes final action on the permit renewal. The standard sections of the permit have been

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

upgraded to include new standard language used in all Title V permits. The proposed renewal permit clearly shows all proposed changes to the permit in strikeout/underline format.

Application #16609 is for a minor revision of this Title V permit to incorporate a new landfill gas flare (A-60) that replaced one of the existing flares (A-51). The District evaluated this flare replacement project pursuant to new source review (NSR) Applications #16608 and #19908. Application #18689 is for an administrative amendment to the Title V permit that would modify several non-federally enforceable landfill gas concentration limits for toxic air contaminants. Application #20623 is for a significant revision of the Title V permit that would allow an expansion of the existing landfill. The District evaluated the toxic air contaminate concentration limit changes and the landfill expansion project pursuant to NSR Application #20607. Application #21288 is for a minor revision of the Title V permit to replace two portable diesel engines. The District evaluated the diesel engine replacements pursuant to NSR Application #21287. All of the above revisions will be included with this proposed Title V permit renewal.

Redwood Landfill, Inc. has submitted the following permit applications for new or modified operations that are still undergoing District review: NSR Application #22889 and Title V Minor Revision Application #22891 for a new Dry Waste Materials Recovery Facility; NSR Application #23228 and Title V Significant Revision Application #23247 for a new Landfill Gas to Energy Facility (five landfill gas fired internal combustion engines and generators); and NSR Application #23434 and Title V Minor Revision Application #23435 for new composting operations, modifications to the existing composting operations, and modifications of related feed stock and compost processing equipment. Since the District's review of these projects is not complete, these applications will not be included in this Title V permit renewal. After the District has completed the evaluation for these projects, the projects will be incorporated into the Title V permit pursuant to the application numbers noted above and in accordance with the Title V permit revision procedures in Regulation 2, Rule 6.

B. FACILITY DESCRIPTION

Redwood Landfill, Inc. operates the Redwood Landfill Facility in Novato, CA. This facility includes an active MSW landfill equipped with an active landfill gas collection system, two enclosed landfill gas flares, cover material stockpiles, yard and green waste processing operations and stockpiles, sludge handling and composting operations, a non-retail gasoline dispensing facility, an aerated leachate pond, and several diesel engines that provide portable or standby power.

The Redwood Landfill is an active MSW landfill that is equipped with a continuously operated landfill gas collection system. For active landfills, the District has changed the manner in which landfill permits are described. For this site, the single source number for Redwood Landfill (S-5) has been split into three source numbers: S-5 for the waste decomposition process, S-76 for the waste and cover material dumping process, and S-77 for the excavation, bulldozing and compacting activities. These source description changes were made to improve the emission

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

calculation methodology for each of these processes. In addition, this permitting action will incorporate a landfill expansion and related permit condition revisions that were approved by the District pursuant to Application #20607. The landfill expansion will increase the design capacity for Redwood Landfill from 19.1 million yd³ to 25.0 million yd³ and will increase the limit on the amount of decomposable materials placed in the landfill from 17.1 million tons to 23.185 million tons. Many other throughput limits, operational limits, and emission limits are being added to this permit pursuant to Application #20607. This project is discussed in detail in the Engineering Evaluation Report for Application #20607 (see Appendix G). This permit revision will also incorporate landfill gas collection system updates that were approved pursuant to NSR Application #21623 (see Appendix D).

Currently, all collected landfill gas is vented to the two enclosed flares (A-51 or A-60). Each flare is individually permitted to operate at full capacity (90 MM BTU/hour each), but the two flares combined are limited to processing 2,207,520,000 scf/year of landfill gas, which is equivalent to an annual average of 4200 scfm or 126 MM BTU/hour combined. Permit condition changes for the flares were made pursuant to NSR Application #16608. The A-60 Landfill Gas Flare was permitted pursuant to District NSR Application #19098, and it replaced the A-50 Landfill Gas Flare in 2009. These flare permit changes are discussed in more detail in Appendix E.

In 2010, Redwood Landfill replaced two portable diesel fired IC engines (S-46 and S-48) with two new portable diesel fired engines equipped with diesel particulate filters (S-61 abated by A-61 and S-62 abated by A-62). The District evaluated these portable diesel engine replacements pursuant to District NSR Application #21287. This Engineering Evaluation Report for Application #21287 (see Appendix F) describes the emission increases for this change and all applicable requirements for the new engines.

Since the last Title V permit revision in October 2007, the District has made a number of changes to the descriptions of the composting operations permits. For consistency with the permitting procedures for other compost facilities in the District, the District combined the operations previously described under S-28, S-34, S-35, S-37, and S-38 under a single source number: S-34 Compost Facility Operations. This source consolidation did not impact any emission limitations for S-34.

Redwood Landfill has shut down the S-47 PACO Water Pump Engine and has requested that it be removed from this permit.

Redwood Landfill has requested corrections to the source description of the S-49 Diesel Engine for an Emergency Back-Up Generator. The District has confirmed that the original source descriptions were not accurate and that these changes are necessary to correct erroneous information and do not constitute a replacement of a source.

All of these changes will be reflected in this Title V renewal permit.

C. PERMIT CONTENT

The legal and factual basis for the permit follows. The permit sections are described in the order that they are presented in the permit. Routine changes to the standard permit text in Sections I “Standard Conditions”, III “Generally Applicable Requirements”, and X “Glossary” are not considered part of the Title V permit renewal process, but may be made at the discretion of the District during the term of this permit.

I. Standard Conditions

This section contains administrative requirements and conditions that apply to all facilities. If the Title IV (Acid Rain) requirements for certain fossil-fuel fired electrical generating facilities or the accidental release (40 CFR § 68) programs apply, the section will contain a standard condition pertaining to these programs. This permit does not include Title IV or accidental release provisions.

Many of these conditions derive from 40 CFR § 70.6, Permit Content, which dictates certain standard conditions that must be placed in the permit. The language that the District has developed for many of these requirements has been adopted into the BAAQMD Manual of Procedures, Volume II, Part 3, Section 4, and therefore must appear in the permit.

The standard conditions also contain references to BAAQMD Regulation 1 and Regulation 2. These are the District’s General Provisions and Permitting rules.

Changes to Permit, Section I:

- The District is updating the dates of adoption and approval of rules in Standard Condition 1.A. The District is also adding BAAQMD Regulation 2, Rule 5 and SIP Regulation 2, Rule 6 to Standard Condition 1.A.
- The District is adding the following language to Standard Condition I.B.1: "If the permit renewal has not been issued by [5th anniversary of issue date], but a complete application for renewal has been submitted in accordance with the above deadlines, the existing permit will continue in force until the District takes final action on the renewal application." This is the "application shield" pursuant to BAAQMD Regulation 2-6-407.
- The basis for Standard Condition I.B.11 is being amended by adding “Regulation 2-6-409.20” to conform to changes in Regulation 2, Rule 6.
- The following language is added as Standard Condition I.B.12: "The permit holder is responsible for compliance, and certification of compliance, with all conditions of the permit, regardless whether it acts through employees, agents, contractors, or subcontractors. (Regulation 2-6-307)." The purpose is to reiterate that the Permit Holder is responsible for ensuring that all activities at the facility comply with all applicable requirements.
- The District is correcting errors in the bases for Standard Conditions I.E.2 and I.F.

II. Equipment

This section of the permit lists all permitted or significant sources. Each source is identified by an S and a number (e.g., S24).

Permitted sources are those sources that require a BAAQMD operating permit pursuant to BAAQMD Rule 2-1-302.

Significant sources are those sources that have a potential to emit of more than 2 tons of a “regulated air pollutant,” as defined in BAAQMD Rule 2-6-222, per year or 400 pounds of a “hazardous air pollutant,” as defined in BAAQMD Rule 2-6-210, per year. As discussed for the September 20, 2006 revision of this permit, the S-56 Portable Horizontal Grinder was added to this permit because it is a significant source. This facility has no other unpermitted significant sources.

All abatement (control) devices that control permitted or significant sources are listed. Each abatement device whose primary function is to reduce emissions is identified by an A and a number (e.g., A-24). If a source is also an abatement device, such as when an engine controls VOC emissions, it will be listed in the abatement device table but will have an “S” number. An abatement device may also be a source (such as a thermal oxidizer that burns fuel) of secondary emissions. If the primary function of a device is to control emissions, it is considered an abatement (or “A”) device. If the primary function of a device is a non-control function, the device is considered to be a source (or “S”).

The District is adding an exempt equipment list to this section to clarify the status of various sources and operations. Table II-C will identify any equipment or operations that are located at this facility but that are exempt from Title V permitting requirements. Typically, this table will include equipment or operations that are exempt from the District requirement to have a permit to operate pursuant to BAAQMD Regulation 2, Rule 1, Sections 103, 105, or 113-128 and that are not significant sources. However, it may also include equipment or operations that are required to have a District permit to operate but that are exempt from BAAQMD Regulation 2, Rule 6, Major Facility Review pursuant to Regulation 2, Rule 6, Sections 110-114. The applicable exemption will be identified in Table II-C. Although equipment listed in Table II-C is not required to be identified in the Title V permit, this exempt equipment must still comply with any applicable District, state, or federal regulations.

The equipment section is considered to be part of the facility description. It contains information that is necessary for applicability determinations, such as fuel types, contents or sizes of tanks, etc. This information is part of the factual basis of the permit.

Each of the permitted sources has previously been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. These permits are issued in accordance with state law and the District’s regulations. The capacities in the permitted sources table are the

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

maximum allowable capacities for each source, pursuant to Standard Condition I.J and Regulation 2-1-403.

Following is a summary of the differences in the equipment list between the time that the Title V permit was last revised (October 2007) and the permit proposal date. In Table II-A, S-5 was split into S-5, S-76, and S-77; the gas collection system description for S-5 was updated; S-28, S-34, S-35, S-37, and S-39 have been combined into a single source (S-34); S-46, S-47, and S-48 have been shut down; and the description of S-49 has been modified. In Table II-B, A-50 has been removed and replaced with A-60 and the description and minimum temperature limit for A-51 were updated. Table II-C identifying exempt equipment was added to the proposed permit. Table II-C includes an existing PERP engine that is exempt from both District and Title V permitting requirements and the two new portable diesel engines: S-61 abated by A-61 and S-62 abated by A-62. The reasons for each of these equipment changes are summarized above in Section B and explained in detail below.

Changes to Permit, Section II:

- The description of S-5 is being changed to: Redwood Landfill – Waste Decomposition Process to clarify that this source number will be used to identify emissions related to the waste decomposition process from the landfill. The landfill gas collection system will remain as part of S-5, because the gas collection system is being used to capture the gases generated by the waste decomposition process. The gas collection system description in Table II-A is being updated in accordance with permit condition changes approved under NSR Application # 21623. The landfill design capacity, decomposable materials limits, and decomposable material acceptance rates are being updated in accordance with permit condition changes approved under NSR Application # 20607.
- Sources S-28, S-35, S-37, and S-39 are being deleted because all of these operations have been consolidated under S-34. These changes were necessary in order to make the composting permits for this site consistent with the compost permitting procedures for other facilities. The description of S-34 was changed to Compost Facility Operations to reflect this source consolidation. The type of composting conducted at S-34 (uncontrolled windrows) and the activities included in S-34 were added to the “Make or Type” column of Table II-A.
- For the S-39 Trommel Screening Processes, the District is changing the source description to reflect that a diesel engine that powers a portable trommel screen (S-48) was shut down and replaced by S-62. Other trammel screens are powered by electric motors.
- Sources S-46, S-47, and S-48 are being removed from Table II-A, because this equipment has been shut down and removed from the site. S-46 Tipper Engine was replaced by S-61 Portable Diesel Engine for Waste Tipper. S-47 PACO Water Pump Engine was replaced by electrical pumps. S-48 Retec Power Screen Engine was replaced by S-62 Portable Diesel Engine for Power Screens.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

- The active landfilling operations at Redwood Landfill were split into 3 source numbers (S-5, S-76, and S-77) to better represent the air pollution emitting activities associated with each source. As noted above, the waste decomposition process remained under S-5. Two new source numbers, S-76 Redwood Landfill – Waste and Cover Material Dumping and S-77 Redwood Landfill – Excavation, Bulldozing, and Compacting Activities have been added to Table II-A to represent the particulate emission generating activities that occur at active landfills. These operations are controlled by the A-18 Water Sprays. In Table II-B, the list of sources controlled by A-18 has been modified accordingly. The regulatory citation for the applicable limit for A-18 has been revised in accordance with the Regulation 6, Rule 1 renumbering amendments.
- The A-50 Landfill Gas Flare has been shut down and replaced by the A-60 Landfill Gas Flare. These changes are reflected in Table II-B.
- For A-51, the description of the capacity of the flare was changed from 90 MM BTU/hr to 90 E6 BTU/hr per Redwood Landfill’s request and to clarify this rate. The minimum combustion zone temperature for A-51 was reduced from 1422 °F to 1400 °F, for consistency with the temperature identified in Section VI, Condition #19867, Part 22.
- The District is adding Section II.C, Exempt Equipment List, to clarify the status of non-road engines and other types of sources or operations that are exempt from Title V permitting requirements. PERP engines are portable non-road engines that have been registered by the California Air Resources Board in accordance with CARB’s portable equipment registration program (PERP) and Health and Safety Code Section 41753. PERP engines are exempt from District permit requirements pursuant to BAAQMD Regulation 2-1-105. PERP engines are also exempt from major facility review pursuant to BAAQMD Regulation 2-6-113 Exemption, Registered Portable Engines, which states: “Portable internal combustion engines, except gas turbines, that are registered in accordance with Health and Safety Code Section 41753 are exempt from this regulation. Other types of non-road engines, such as portable engines that are not eligible for PERP registration, are exempt from major facility review pursuant to BAAQMD Regulation 2-6-114 Exemption, Non-Road Engines, which states: “Engines as defined by 40 CFR Part 89 are exempt from this regulation.” From 40 CFR Part 89.2, a nonroad engine is defined below:

Nonroad engine means:

- (1) Except as discussed in paragraph (2) of this definition, a nonroad engine is any internal combustion engine:
 - (i) 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); or
 - (ii) In or on a piece of equipment that is intended to be propelled while performing its function (such as lawnmowers and string trimmers); or
 - (iii) That, 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.
- (2) An internal combustion engine is not a nonroad engine if:

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

- (i) the engine is used to propel a motor vehicle or a vehicle used solely for competition, or is subject to standards promulgated under section 202 of the Act; or
 - (ii) the engine is regulated by a federal New Source Performance Standard promulgated under section 111 of the Act; or
 - (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. This paragraph does not apply to an engine after the engine is removed from the location.
- The S-57 PERP Diesel Engine powering the S-56 Portable Horizontal Grinder is a portable engine that has been registered by CARB and has a PERP registration certificate. This portable engine is moved around to various on-site locations while it is operating at this site. It is routinely moved off-site and used at other facilities. S-57 qualifies for the Regulation 2-6-113 exemption. Therefore, S-57 is being added to Table II-C.
 - The portable diesel engines (S-61 and S-62) that replaced S-46 and S-48 are being added to Table II-C. Each of these diesel engines is abated by a catalyzed diesel PM filter (A-61 and A-62), which are also identified in Table II-C. These portable engines (S-61 and S-62) move around from location to location within this facility. In accordance with paragraph (1)(iii) above, such portable engines are nonroad engines unless paragraph (2) applies. While S-61 and S-62 remain within the property boundaries of this facility for more than 12 consecutive months, they do not remain at any single site at a building, structure, or installation for more than 12 consecutive months. Since these engines operate at multiple locations within this facility, these engines meet the definition above of nonroad engine and qualify for the Regulation 2-6-114 exemption.

III. Generally Applicable Requirements

This section of the permit lists requirements that generally apply to all sources at a facility including insignificant sources and portable equipment that may not require a District permit. If a generally applicable requirement applies specifically to a source that is permitted or significant, the standard will also appear in Section IV and the monitoring for that requirement will appear in Sections IV and VII of the permit. Parts of this section apply to all facilities (e.g., particulate, architectural coating, odorous substance, and sandblasting standards). In addition, standards that apply to insignificant or unpermitted sources at a facility (e.g., refrigeration units that use more than 50 pounds of an ozone-depleting compound) are placed in this section.

Unpermitted sources are exempt from normal District permits pursuant to an exemption in BAAQMD Regulation 2, Rule 1. They may, however, be specifically described in a Title V

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

permit if they are considered *significant sources* pursuant to the definition in BAAQMD Rule 2-6-239. The S-56 Portable Horizontal Grinder is an unpermitted significant source.

Changes to Permit, Section III:

- The District is adding language to Section III to clarify that this section contains requirements that may apply to temporary sources. This provision allows contractors that have "portable" equipment permits that require them to comply with all applicable requirements to work at the facility on a temporary basis, even if the permit does not specifically list the temporary source. Examples are temporary sand-blasting, wood chipping, or soil-vapor extraction equipment.
- The District is adding EPA's website address for the SIP standards to Section III.
- For Table III, the District is amending dates of adoption or approval of the rules, correcting the "federal enforceability" status for these rules, and adding or deleting rules and standards to conform to current practice. The rules that are being amended, added, or removed are listed below:
 - Regulation 1, General Provisions and Definitions
 - Regulation 2, Rule 1, General Requirements
 - Regulation 2, Rule 5, New Source Review of Toxic Air Contaminants
 - Regulation 4, Air Pollution Episode Plan
 - Regulation 5, Open Burning
 - Regulation 6, General Requirements
 - Regulation 6, Rule 1, General Requirements
 - Regulation 8, Rule 2, Miscellaneous Operations
 - Regulation 8, Rule 3, Architectural Coatings
 - Regulation 8, Rule 15, Emulsified and Liquid Asphalts
 - Regulation 8, Rule 40, Aeration of Contaminated Soil and Removal of Underground Storage Tanks
 - Regulation 8, Rule 47, Air Stripping and Soil Vapor Extraction Operations
 - Regulation 9, Rule 1, Sulfur Dioxide
 - Regulation 9, Rule 2, Hydrogen Sulfide
 - California Health and Safety Code Section 41750 et seq., Portable Equipment
 - California Code of Regulations Title 17, Section 93105 et seq., Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations
 - California Code of Regulations Title 17, Section 93106 et seq., Airborne Toxic Control Measure for Asbestos Containing Serpentine
 - California Code of Regulations Title 17, Section 93116 et seq., Airborne Toxic Control Measure for Diesel Particulate Matter from Portable Engines Rated at 50 Horsepower and Greater
 - EPA Regulation 40 CFR Part 61, Subpart A.
- The District is deleting the footnote to Table III, because it is not necessary. The applicability of SIP requirements is discussed elsewhere in the MFR permit.

IV. Source-Specific Applicable Requirements

This section of the permit lists the applicable requirements that apply to permitted or significant sources. These applicable requirements are contained in tables that pertain to one or more sources that have the same requirements. The order of the requirements is:

- District Rules
- SIP Rules (if any) are listed following the corresponding District rules. SIP rules are District rules that have been approved by EPA for inclusion in the California State Implementation Plan. SIP rules are “federally enforceable” and a “Y” (yes) indication will appear in the “Federally Enforceable” column. If the SIP rule is the current District rule, separate citation of the SIP rule is not necessary and the “Federally Enforceable” column will have a “Y” for “yes”. If the SIP rule is not the current District rule, the SIP rule or the necessary portion of the SIP rule is cited separately after the District rule. The SIP portion will be federally enforceable; the non-SIP version will not be federally enforceable, unless EPA has approved it through another program.
- Other District requirements, such as the Manual of Procedures, as appropriate.
- Federal requirements (other than SIP provisions)
- State requirements (such as ATCMs)
- BAAQMD permit conditions. The text of BAAQMD permit conditions is found in Section VI of the permit.
- Federal permit conditions. The text of Federal permit conditions, if any, is found in Section VI of the permit.

Section IV of the permit contains citations to all of the applicable requirements. The text of the requirements is found in the regulations, which are readily available on the District’s or EPA’s websites, or in the permit conditions, which are found in Section VI of the permit. All monitoring requirements are cited in Section IV. Section VII is a cross-reference between the limits and monitoring requirements. A discussion of monitoring is included in Section C.VII of this permit evaluation/statement of basis.

NSPS and NESHAP Applicability for Redwood Landfill (S-5, S-76, S-77):

The landfill at this site is subject to BAAQMD Regulation 8, Rule 34, because Redwood Landfill has accepted waste within the last 30 years and contains more than 1,000,000 tons of decomposable refuse. The landfill is also subject to the NSPS for MSW Landfills (40 CFR, Part 60, Subpart WWW) and the NESHAP for MSW Landfills (40 CFR, Part 63, Subpart AAAA), because (1) it commenced construction on a design capacity increase after May 30, 1991, (2) it has accepted waste after November 8, 1987, (3) it has a design capacity of greater than 2.5 million cubic meters and greater than 2.5 million megagrams, and (4) the uncontrolled NMOC generation rate from the landfill exceeds 50 Mg/year. The District has approved another design capacity increase at Redwood Landfill pursuant to NSR Application # 20607; however, this change will not trigger any new applicable requirements under the NSPS or NESHAP for MSW Landfills.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

Regulation 8, Rule 2 and Permit Shield Applicability for S-42 and S-76:

Regulation 8, Rule 2 “Miscellaneous Operations” is only applicable to sources of precursor organic compounds that are not otherwise limited by Regulation 8 or Regulation 10 rules. In the case of an active landfill, the storage, handling, reuse (such as for cover material), and disposal of soil that contains volatile organic compounds (VOC) results in the transfer of some of the VOCs from the soil into the atmosphere. This process is called aeration. Soil which has an organic content exceeding 50 ppmw or that registers an organic concentration greater than 50 ppmv (expressed as methane, C1) at the soil surface is defined as “contaminated” soil in Regulation 8-40-205. VOC-laden soil is soil that contains some VOCs but that has less VOCs than the contaminated soil thresholds above. The aeration of contaminated soil is subject to Regulation 8, Rule 40. However, the aeration of the low concentration VOC-laden soils is subject to Regulation 8, Rule 2.

In the current Title V permit, the District has indicated that Regulation 8, Rule 2 applies to S-5 Redwood Landfill due to the aeration of VOC-laden soil that occurs at this source during the transfer of VOC-laden soils to the landfill or during re-use of VOC-laden soil as cover material. With this permit renewal, the District is proposing to split S-5 into S-5, S-76, and S-77. The aeration of VOC-laden soil will be removed from S-5 and attributed to S-76 Redwood Landfill – Waste and Cover Material Dumping instead. Since VOC-laden soil aeration may also occur at the S-42 Waste and Cover Material Stockpiles during the transfer of VOC-laden soils to and from these stockpiles or during the storage of VOC-laden soil in a stockpile, the District is adding Regulation 8, Rule 2 requirements to Tables IV-E and VII-E for S-42.

As discussed in Section IX of the current permit, a permit shield applies to S-5 for the VOC-laden soil aeration operation. In particular, the Regulation 8-2-601 source testing procedure for the total carbon concentration limit in Regulation 8-2-301 is subsumed by the Regulation 8-40-604 soil testing procedures for VOC-laden soil aeration operations. The District is proposing to modify this permit shield by replacing S-5 with S-76 in Table IX-A and by adding S-42 to Table IX-A, because of the applicability determinations described above.

NSPS or NESHAP Applicability for Stationary IC Engines (S-49)

The NSPS for Compression Ignition Internal Combustion Engines (40 CFR Part 60, Subpart III) is potentially applicable to any stationary compression ignition engines at a site. The S-49 Diesel Engine for Emergency Back-Up Generator is a compression-ignition (CI) internal combustion (IC) engine. As defined in 40 CFR Part 60.4219, S-49 is a stationary CI IC engine. S-49 began operating at this site prior to 1995. Since S-49 commenced construction before July 11, 2005, Subpart III does not apply to S-49.

The NESHAP for Stationary Reciprocating Internal Combustion Engines (40 CFR, Part 63, Subpart ZZZZ) applies to reciprocating IC engines (RICE) located at major and area sources of HAP. This facility is not a major source of HAP, but it is an area source of HAP. The S-49 Diesel Engine for Emergency Back-Up Generator is a stationary compression-ignition RICE. This engine is considered to be an existing RICE, because the engine commenced construction prior to June 12, 2006 (40 CFR Part 63.6590(a)(1)(iii)). In accordance with 40 CFR Part

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

63.6595(a)(1), existing stationary compression-ignition (CI) RICE must comply with the applicable emission and operating limitations of Subpart ZZZZ by no later than May 3, 2013. Section 63.6603(a) identifies the location of the applicable emissions and operating limitations for existing stationary RICE located at area sources of HAP. For S-49, the applicable limitations are in Table 2d. For emergency CI engines, these limitations include only engine maintenance criteria (frequencies of inspections and oil and filter changes) and do not include any emission limitations. Therefore, the testing requirements in Sections 63.6612, 63.6615, and 63.6620 and Tables 1b, 2b, 3, and 4 do not apply. The diesel fuel usage requirements of Section 63.6604 (i.e. the engine must use diesel fuel that complies with 40 CFR 80.510(b)) do not apply to emergency CI RICE. Section 64.6605 applies to all engines subject to this subpart. Other applicable monitoring, operating, and administrative requirements are contained in Sections 63.6625, 63.6630, 63.6635, 63.6640, 63.6645, 63.6650, 63.6655, 63.6660, and 63.6665. All applicable Subpart ZZZZ requirements for S-49 are identified in Table IV-F, and the operating limitations are summarized in Table VII-F.

Compliance Assurance Monitoring (CAM)

Sources at Title V facilities may be subject to the Compliance Assurance Monitoring (CAM) requirements in 40 CFR, Part 64. The District has reviewed applicability of the Compliance Assurance Monitoring (CAM) requirements in 40 CFR, Part 64, for this facility. A source must meet all three of the criteria specified in 40 CFR Part 64.2(a)(1-3) in order for CAM to apply. These three CAM applicability criteria are:

- The source must be subject to a federally enforceable emission limit for a regulated air pollutant, other than an exempt limitation.
- The source must use a control device to achieve compliance with this emission limitation.
- The pre-controlled emissions of the specific pollutant being controlled must be greater than the major facility emissions threshold for that pollutant.

At this facility, the following sources do not meet the second CAM applicability criteria listed above, because these sources have no control devices: S-2, S-49, S-55, and S-58. Therefore, CAM does not apply to these sources. The CAM applicability determinations for each of the other sources at this site are presented below.

CAM Applicability for Redwood Landfill – Waste Decomposition Process (S-5)

At this facility, the landfill waste decomposition process (S-5) and its related emission control devices (A-51 and A-60) are exempt from the first CAM applicability criteria, 40 CFR Part 64.2(a)(1), pursuant to 40 CFR Part 64.2(b)(1)(i), because the landfill and landfill gas control systems are subject to NSPS and NESHAPS requirements and these NSPS and NESHAP requirements were adopted pursuant to Sections 111 and 112 of the Clean Air Act after November 15, 1990. Since the applicable federal requirements contain adequate monitoring provisions, additional compliance monitoring is not necessary and CAM does not apply to S-5, A-51, or A-60.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

CAM Applicability for Compost Facility Operations (S-34)

The S-34 Compost Facility Operations emit particulate matter that is controlled by the A-18 Water Sprays. Although S-34 also emits precursor organic compounds (POC), the POC emissions are not controlled by any abatement equipment. Therefore, CAM does not apply to the POC emissions from S-34, but CAM is potentially applicable to the particulate matter emissions from S-34.

Based on the initial permit application (NSR Application # 25812) for the compost facility operations, which have now been consolidated under S-34, the District has estimated the following uncontrolled particulate emission rates for the composting operations.

Post-Control Emission Factor for Material Transfers:	3.48E-4 lbs PM ₁₀ /ton/transfer
Number of Transfers Within Compost Operations:	5 transfers for each ton processed
Maximum Throughput Rate:	50,000 tons/year
Post-Control Material Transfer Emissions:	0.044 tons/year of PM ₁₀
Water Spray Control Efficiency:	80% by weight for PM ₁₀
Uncontrolled Material Transfer Emissions:	0.220 tons/year of PM ₁₀

Active Compost Windrow Turning (156 turns/year):	156 acres turned/year
Curing Compost Windrow Turning (104 turns/year):	468 acres turned/year
Tilling Emission Factor (AP-42 4 th Ed. Chapter 11.2.2):	$(0.21)(4.8)(5)^{0.6} = 2.648$ lbs/acre
Uncontrolled Window Turning Emissions:	0.826 tons/year of PM ₁₀

Uncontrolled Road Dust Emission Rate:	1.506 lbs/VMT
Total Vehicle Miles Traveled (VMT):	6586 VMT/year
Uncontrolled Road Dust Emissions:	4.858 tons/year of PM ₁₀

The total uncontrolled emissions from S-34 are 5.9 tons/year of PM₁₀ based on the maximum permitted emission rates identified above. All of these emissions are fugitive in nature with most of the emissions due to on-site vehicle travel (feed stock delivery trucks, windrow turners traveling on unpaved roads, equipment transporting the compost product around the site, etc.). Although some PM₁₀ emission reductions are employed for these road dust emissions, such as using water sprays, dust suppressants, road sweeping, etc., these measures are more passive in nature and are intended to prevent PM₁₀ emissions from forming. Therefore, these passive emission controls do not constitute a control device as defined in Section 64.1, and the second CAM applicability criteria does not apply to road dust emissions. In any case, total uncontrolled PM₁₀ emissions from S-34 do not exceed the major facility threshold of 100 tons/year PM₁₀. Therefore, the third CAM applicability criteria is not met, and CAM does not apply to S-34.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

CAM Applicability for Screening and Stockpile Operations (S-39 and S-41)

The S-39 Trommel Screening Processes and S-41 Temporary Stockpiles for Yard and Green Waste Shredding Operation emit particulate matter that is controlled by the A-18 Water Sprays. Therefore, CAM is potentially applicable to these sources for PM₁₀ emissions. The uncontrolled PM₁₀ emission factors and uncontrolled PM₁₀ emissions from S-39 and S-41 are presented below.

	Post-Control Emission Factors *	Water Spray Control Efficiency	Uncontrolled Emission Factors	Maximum Throughput Rate	Uncontrolled PM ₁₀ Emissions
	lbs PM ₁₀ /ton		lbs PM ₁₀ /ton	tons/year	tons/year
S-39	3.48E-4	80%	1.75E-3	50,000	0.044
S-41	1.31E-4	80%	6.55E-4	200,000	0.066

* Emission rates after water spray application were determined using AP-42 Chapter 13.2.4 (Equation 1) for S-39 and S-41.

Since uncontrolled PM₁₀ emissions from S-39 and S-41 are not expected to exceed the major facility threshold of 100 tons/year PM₁₀, the third CAM applicability criteria is not met, and CAM does not apply to PM₁₀ emissions from S-39 or S-41.

CAM Applicability for Soil and Cover Material Stockpiles (S-42)

The S-42 Soil and Cover Material Stockpiles may emit precursor organic compounds (POC) due to aeration of VOC-laden cover soil (soil that contains some VOCs but less than the contaminated soil threshold of 50 ppm by weight); however, these aeration-related POC emissions are not controlled by any abatement equipment. Therefore, CAM does not apply to the POC emissions from S-42.

The S-42 Soil and Cover Material Stockpiles will also emit particulate matter that is controlled by the A-18 Water Sprays. Therefore, CAM is potentially applicable to PM₁₀ emissions from S-42. The uncontrolled PM₁₀ emission factors and uncontrolled PM₁₀ emissions from S-42 are presented below.

	Post-Control Emission Factors *	Water Spray Control Efficiency	Uncontrolled Emission Factors	Maximum Throughput Rate	Uncontrolled PM ₁₀ Emissions
	lbs PM ₁₀ /ton		lbs PM ₁₀ /ton	tons/year	tons/year
S-42	2.73E-4	80%	1.37E-3	105,500	0.072

* Emission rates after water spray application were determined using AP-42 Chapter 13.2.4 (Equation 1) for material transfers and AP-42 Chapter 13.2.5 for wind erosion.

Since uncontrolled PM₁₀ emissions from S-42 do not exceed the major facility threshold of 100 tons/year PM₁₀, this source does not meet the third CAM applicability criteria, and CAM does not apply to PM₁₀ emissions from S-42.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

CAM Applicability for Portable Horizontal Grinder (S-56)

The S-56 Portable Horizontal Grinder is equipped with integral water sprays to reduce particulate emissions. CARB PERP Registration Permit #117378 (Parts 14 and 16) limit emissions from S-56 to 82 pounds/day of PM₁₀ and to 10.0 tons/year of PM₁₀ (in any one air district). Assuming the integral water spray is achieving 80% control of PM₁₀ emissions, maximum permitted uncontrolled PM₁₀ emissions from S-56 are 50 tons/year. However, this permitted emission rate for S-56 was based on an unrealistically high emission factor of 0.1 lbs/ton. CARB PERP Registration Permit #117378 (Part 18) limits this source to processing 200,000 tons/year. The District typically estimates uncontrolled particulate emissions from wood waste grinders using an AP-42 emission factor of 0.024 lbs PM₁₀/ton for log debarking (AP-42 4th Edition, Table 10.3-1). Based on the throughput limit and this alternative emission factor, maximum uncontrolled emissions from S-56 are 2.4 tons/year of PM₁₀. Using either emission calculation method, uncontrolled PM₁₀ emissions from S-56 will not exceed the major facility threshold of 100 tons/year PM₁₀. Since S-56 does not meet the third CAM applicability, CAM does not apply to PM₁₀ emissions from S-56.

CAM Applicability for Redwood Landfill Material Handling Operations (S-76 and S-77)

The particulate emissions from the landfill material handling operations (S-76 Redwood Landfill - Waste and Cover Material Dumping and S-77 Redwood Landfill – Excavating, Bulldozing, and Compacting Activities) are controlled by water sprays (A-18). Although, S-76 may also emit VOC emissions during the dumping of VOC-laden cover material, these VOC emissions are not controlled. Thus, CAM does not apply to VOC emissions from S-76.

As shown in the emission calculations for the landfill expansion project (see Appendix G), the post-control emissions rate for S-76 and S-77 are low. Uncontrolled PM₁₀ emissions are estimated below based on the assumption that the water sprays are achieving 80% control for PM₁₀ emissions. Since uncontrolled PM₁₀ emissions from S-76 and S-77 do not exceed the major facility threshold of 100 tons/year PM₁₀, these sources do not meet the third CAM applicability criteria, and CAM does not apply to PM₁₀ emissions from S-76 or S-77.

	Post-Control PM ₁₀ Emissions	Water Spray Control Efficiency	Uncontrolled PM ₁₀ Emissions
	tons/year		tons/year
S-76	0.049	80%	0.245
S-77	5.585	80%	27.925

CAM Applicability for Redwood Landfill Road Dust Emissions

Most of the particulate emissions from Redwood Landfill are road dust emissions resulting from vehicle travel on paved and unpaved roads with this site. As discussed in Appendix G, maximum permitted road dust emissions were determined to be 42.6 tons/year of PM₁₀ from paved roads and 103.6 tons/year of PM₁₀ from unpaved roads. Although some PM₁₀ emission reduction measures are employed for road dust emissions - such as using water sprays, dust suppressants, wheel wash stations, road sweeping, etc. - these measures are more passive in

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

nature and are intended to prevent PM₁₀ emissions from forming rather than capturing and removing PM₁₀ emissions from an air stream. Therefore, these passive emission controls do not constitute a control device as defined in Section 64.1, and the second CAM applicability criteria is not applicable to road dust emissions. Furthermore, all of these emissions are fugitive in nature. Since landfills are not in one of the 28 categories for which fugitive emissions must be included, these fugitive emissions are excluded from the major source threshold applicability determination. Thus, fugitive road dust emissions cannot exceed 100% of the major source threshold for this site, which is 100 tons/year of non-fugitive PM₁₀ emissions. Since neither the second nor third CAM criteria apply, CAM does not apply to road dust emissions

Changes to Permit, Section IV:

- Section IV is being modified by adding EPA's website address for the SIP standards.
- Throughout Section IV, the District is updating the Section IV tables for consistency with the source and abatement device changes identified in Section II. In particular, the District is removing Tables IV-F, IV-G, and IV-H because these sources have been removed; the District is updating the titles of Tables IV- B, C, F, G, H, and I.
- Throughout Section IV, the District is updating amendment dates for BAAQMD Regulation 1 and BAAQMD Regulation 8, Rule 2.
- In 2007, the District replaced and renumbered SIP Regulation 6 as BAAQMD Regulation 6, Rule 1. This change is reflected in Tables IV- B, C, D, E, F, and H.
- In Table IV-B, the District is updating amendment dates for 40 CFR Part 60, Subparts A and WWW and for 40 CFR Part 63, Subpart A and AAAA. The District is also removing the non-applicable section of 40 CFR Part 63.1955(a)(2) that applies to EG landfills.
- In Section VI, the District is making numerous changes to Condition # 19867. These changes, which include numerous corrections to the condition bases, the removal of Part 24, and the addition of Part 33, are reflected in Table IV-B.
- The District is deleting the footnote to Table IV-B because it is not necessary. The applicability of SIP requirements is discussed elsewhere in the MFR permit.
- In Table IV-E, the District is adding the missing Regulation 8, Rule 2 requirements for the Soil and Cover Material Stockpiles (S-42).
- In Table IV-F, the District is adding BAAQMD Regulation 8-1-110.2 to clarify that S-49 is exempt from all Regulation 8 rules.
- In Table IV-F, the District is including the 2007 amendments to BAAQMD Regulation 9, Rule 8.
- In Table IV-F, the District is adding a new NESHAP requirement (40 CFR Part 63, Subpart ZZZZ) that applies to stationary reciprocating engines.
- In Table IV-F, the District is adding a new CARB ATCM (CCR, Title 17, Section 93115) that applies to stationary compression-ignition engines.
- For S-49, the District has replaced Condition # 19613 with standard Condition # 22820 for emergency diesel engines. This change is reflected in Table IV-F.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

- In Table IV-G, the District is adding BAAQMD and SIP requirements for Regulation 8, Rule 5. In 2006, the District amended Regulation 8, Rule 5, but this revision has not been adopted into the SIP. Therefore, S-55 is now subject to both BAAQMD Regulation 8, Rule 5 (which exempts the storage tank associated with S-55 from all Regulation 8, Rule 5 requirements) and SIP Regulation 8, Rule 5.
- In Table IV-G, the basis of Condition # 14098 is being corrected due to the District's adoption of BAAQMD Regulation 2, Rule 5 in 2005, which replaced the District's Toxic Risk Management Policy.

V. Schedule of Compliance

A schedule of compliance is required in all Title V permits pursuant to BAAQMD Regulation 2-6-409.10 which provides that a major facility review permit shall contain the following information and provisions:

“409.10 A schedule of compliance containing the following elements:

- 10.1 A statement that the facility shall continue to comply with all applicable requirements with which it is currently in compliance;
- 10.2 A statement that the facility shall meet all applicable requirements on a timely basis as requirements become effective during the permit term; and
- 10.3 If the facility is out of compliance with an applicable requirement at the time of issuance, revision, or reopening, the schedule of compliance shall contain a plan by which the facility will achieve compliance. The plan shall contain deadlines for each item in the plan. The schedule of compliance shall also contain a requirement for submission of progress reports by the facility at least every six months. The progress reports shall contain the dates by which each item in the plan was achieved and an explanation of why any dates in the schedule of compliance were not or will not be met, and any preventive or corrective measures adopted.”

Since the District has not determined that the facility is out of compliance with an applicable requirement, the schedule of compliance for this permit contains only sections 2-6-409.10.1 and 2-6-409.10.2.

Changes to Permit, Section V:

- The District is not proposing any changes to this section.

VI. Permit Conditions

During the Title V permit development, the District has reviewed the existing permit conditions, deleted the obsolete conditions, and, as appropriate, revised the conditions for clarity and enforceability. Each permit condition is identified with a unique numerical identifier, up to five digits.

When necessary to meet Title V requirements, additional monitoring, recordkeeping, or reporting has been added to the permit.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

All changes to existing permit conditions are clearly shown in “strike-out/underline” format in the proposed permit. When the permit is issued, all “strike-out” language will be deleted and all “underline” language will be retained, subject to consideration of comments received.

The existing permit conditions are derived from previously issued District Authorities to Construct (A/C) or Permits to Operate (P/O). Permit conditions may also be imposed or revised as part of the annual review of the facility by the District pursuant to California Health and Safety Code (H&SC) § 42301(e), through a variance pursuant to H&SC § 42350 et seq., an order of abatement pursuant to H&SC § 42450 et seq., or as an administrative revision initiated by District staff. After issuance of the Title V permit, permit conditions are revised using the procedures in Regulation 2, Rule 6, Major Facility Review.

Conditions that are obsolete or that have no regulatory basis have been deleted from the permit.

The regulatory basis is listed following each condition. The regulatory basis may be a rule or regulation. The District is also using the following terms for regulatory basis:

- BACT: This term is used for a condition imposed by the Air Pollution Control Officer (APCO) to ensure compliance with the Best Available Control Technology in Regulation 2-2-301.
- Cumulative Increase: This term is used for a condition imposed by the APCO which limits a source’s operation to the operation described in the permit application pursuant to BAAQMD Regulation 2-1-403.
- Offsets: This term is used for a condition imposed by the APCO to ensure compliance with the use of offsets for the permitting of a source or with the banking of emissions from a source pursuant to Regulation 2, Rules 2 and 4.
- PSD: This term is used for a condition imposed by the APCO to ensure compliance with a Prevention of Significant Deterioration permit issued pursuant to Regulation 2, Rule 2.
- TRMP: This term is used for a condition imposed by the APCO to ensure compliance with limits that arose from the District’s Toxic Risk Management Policy and that were imposed prior to the District’s 2005 adoption of Regulation 2, Rule 5 NSR for Toxic Air Contaminants.

Under previous Title V permit applications, parameter monitoring was added for each abatement device. Additional monitoring was added, where appropriate, to assure compliance with the applicable requirements.

The District is proposing to modify BAAQMD Conditions #13123, #14098, #16516, #19865, #19866, and #19867. As discussed below, these permit condition revisions will: incorporate changes approved pursuant to NSR applications, improve the readability of the conditions; clarify monitoring and notification requirements; remove unnecessary citations; and correct bases. In addition, the District is proposing to delete Conditions #17843, #17844, and # 17845 because the sources have been shut down and removed from this site and to replace Condition #19613 with Condition #22820 for S-49. All proposed changes are marked with strike-through and underline formatting in the proposed permit.

The proposed changes to each permit condition are explained in more detail below.

Changes to Permit, Section VI:

- Condition #13123: The list of applicable equipment for this condition is being modified in accordance with the source description changes discussed in Section II. In particular, the District is combining the operations of S-28, S-34, S-35, and S-37 under a single source number (S-34 Compost Facility Operations).
- Condition #13123, Part 1: The text that explains the throughput limits is being revised to reflect the source renumbering changes discussed above; however, the throughput limits are not changing.
- Condition #13123, Part 3: Editorial revisions are being made to clarify this part.
- Condition #13123, Parts 3-5: The particulate emission limit citation is being corrected in the basis for each of these parts due to the District's replacement and renumbering of Regulation 6, Rule 1.
- Condition #14098: The basis for this condition is being corrected due to the District's adoption of BAAQMD Regulation 2, Rule 5 in 2005, which replaced the District's Toxic Risk Management Policy.
- Condition #16516: This condition is being revised in order to clarify the applicability of the static pressure performance test and to clarify the notification and reporting procedures for this performance test.
- Condition #17843 for S-46 Tipper Engine is being deleted because S-46 has been removed from the site. This source was replaced by S-61.
- Condition #17844 for S-47 PACO Water Pump Engine is being deleted because S-47 has been removed from the site. This source was replaced by electrically powered pumps.
- Condition #17845 for S-48 Retec Power Screens Engine is being deleted because S-48 has been removed from the site. This source was replaced by S-62.
- Condition #19613 for S-49 is being removed and replaced with Condition #22820. Condition #22820 is a standard condition that applies to many emergency standby engines within the District. It incorporates the most recent amendments to the ATCM requirements that apply to this engine.
- Condition #19865, Parts 3-4: The particulate emission limit citation is being corrected in the basis for each of these parts due to the District's replacement and renumbering of Regulation 6, Rule 1.
- Condition #19866, Parts 3-4: The particulate emission limit citation is being corrected in the basis for each of these parts due to the District's replacement and renumbering of Regulation 6, Rule 1.
- Condition #19867: The list of applicable equipment for this condition is being modified in accordance with the source and abatement device changes discussed in Section II. In particular, the District is splitting S-5 into three source numbers (S-5, S-76, and S-77) and is revising the description of S-5, and the District is replacing the A-50 Landfill Gas Flare with the A-60 Landfill Gas Flare.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

- Condition #19867, Parts 1-4: These parts are being revised to incorporate permit condition revisions that were approved pursuant to NSR Applications #19098 and #20607 (see Appendices E and G). In particular, these changes will: replace A-50 with A-60, revised design capacity limits and acceptance rate limits for the modified landfill, revise POC emission limits for the modified landfill, and establish particulate emission limits for the modified landfill.
- Condition #19867, Parts 6-9: These parts include limits on vehicle fleet weights and vehicle miles traveled (VMT), which are necessary to ensure that road dust emissions do not exceed permitted levels. These fleet weight and VMT limits are being revised pursuant to NSR Application #20607.
- Condition #19867, Part 11: The particulate emission limit citation is being corrected in the basis for this part due to the District's replacement and renumbering of Regulation 6, Rule 1.
- Condition #19867, Part 13: The basis for this condition is being corrected due to the District's adoption of BAAQMD Regulation 2, Rule 5 in 2005, which replaced the District's Toxic Risk Management Policy.
- Condition #19867, Parts 16, 19, 20, 22, 23, 24, 25, 26, 29, and 30: The proposed changes to these parts are all due to the flare replacement project, which was permitted pursuant to NSR Application #19098. A new A-60 Landfill Gas Flare is replacing an existing A-50 Landfill Gas Flare. Most of these proposed changes simply reflect this device number change. In Part 20, this project will increase the flaring capacity on an hourly basis, but the annual throughput limit for the two flares combined (A-60 and another existing flare, A-51) remains unchanged. In Part 22, combustion zone temperature limits for the new flare were established based on source test data. The non-federally enforceable Part 24 destruction efficiency requirement for toxic air contaminant emissions was removed because it was found to be unnecessary and unenforceable. For most TACs, the concentrations in the stack gases from flares are too low to be detected. Compliance with the District's project risk limits in Regulation 2-5-302 will be established through testing of landfill gas delivered to the flares and TAC concentrations on this inlet landfill gas (see Parts 18 and 31). Part 26 includes a new, lower CO emission limit for A-60 versus A-50. An obsolete test requirement (for THC) is being removed from Part 30b because the flares are no longer subject to any THC limits. The basis for Part 30 is also being corrected.
- Condition #19867, Part 17: This part describes the landfill gas collection system and its operating requirements. The District is revising the gas collection system description and clarifying the permitting requirements for future gas collection system changes in accordance with permit condition changes approved pursuant to NSR Application # 21623.
- Condition #19867, Part 18: This part limits the concentrations of NMOC, TACs, and TRS in collected landfill gas. These limits are necessary to ensure that landfill and flare emissions will not exceed permitted emission levels. Many of these concentrations are being revised in accordance with the landfill modification that was approved pursuant to NSR Application # 20607.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

- Condition #19867, Part 31: This part describes the types of landfill gas analyses that are required and the frequency of these analyses. The District is making changes to the compound test list for consistency with the Part 18 limits. Testing frequencies are not changing. The District is correcting the bases for each of the subparts.
- Condition #19867, Part 33: This part is being added pursuant to NSR Application # 20607. This part will require ground level hydrogen sulfide (H₂S) monitoring using a portable analyzer near the fence-line of the site to assure compliance with the non-federally enforceable H₂S limits in BAAQMD Regulation 9-2-301.

VII. Applicable Limits and Compliance Monitoring Requirements

This section of the permit is a summary of numerical limits and related monitoring requirements for each source. The summary includes a citation for each monitoring requirement, frequency of monitoring, and type of monitoring. The applicable requirements for monitoring are completely contained in Sections IV, Source-Specific Applicable Requirements, and VI, Permit Conditions, of the permit.

The District has reviewed all monitoring and has determined that the existing or proposed monitoring is adequate. The tables below contain only the federally enforceable limits for which there is no monitoring in the applicable requirements. The District has examined the monitoring for other limits and has determined that monitoring is adequate to provide a reasonable assurance of compliance. Calculations for potential to emit will be provided in the discussion when no monitoring is proposed due to the size of a source.

Monitoring decisions are typically the result of a balancing of several different factors including: 1) the likelihood of a violation given the characteristics of normal operation, 2) degree of variability in the operation and in the control device, if there is one, 3) the potential severity of impact of an undetected violation, 4) the technical feasibility and probative value of indicator monitoring, 5) the economic feasibility of indicator monitoring, and 6) whether there is some other factor, such as a different regulatory restriction applicable to the same operation, that also provides some assurance of compliance with the limit in question.

These factors are the same as those historically applied by the District in developing monitoring for applicable requirements. It follows that, although Title V calls for a re-examination of all monitoring, there is a presumption that these factors have been appropriately balanced and incorporated in the District's prior rule development and/or permit issuance. It is possible that, where a rule or permit requirement has historically had no monitoring associated with it, no monitoring may still be appropriate in the Title V permit if, for instance, there is little likelihood of a violation. Compliance behavior and associated costs of compliance are determined in part by the frequency and nature of associated monitoring requirements. As a result, the District will generally revise the nature or frequency of monitoring only when it can support a conclusion that existing monitoring is inadequate.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

SO₂ Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
Landfill Gas Flares (A-51 and A-60) and Diesel Engine (S-49)	BAAQMD 9-1-301	Property Line Ground Level Limits: ≤ 0.5 ppm for 3 minutes, AND ≤ 0.25 ppm for 60 minutes, AND ≤ 0.05 ppm for 24 hours	None

SO₂ Discussion:

Potential to Emit for A-51 and A-60 Landfill Gas Flares ⁽¹⁾: 64.338 tons/year of SO₂
 Potential to Emit for A-49 Standby Diesel Engine ⁽²⁾: <0.001 tons/year of SO₂
 Total Potential to Emit for Permitted Sources: 64.34 tons/year of SO₂

- (1) Maximum potential SO₂ emissions were determined using on the maximum permitted landfill gas throughput limit (2,207,520,000 scf/year for the two flares combined) and the maximum permitted landfill gas sulfur content (350 ppmv).
- (2) For diesel engines, the maximum potential SO₂ emissions were determined based on the CARB diesel fuel sulfur content limit (15 ppm S by weight). The operating time for S-49 is assumed to be 500 hours/year total for testing and emergency use.

BAAQMD 9-1-301: Sulfur dioxide (SO₂) emissions from diesel engines are negligible compared to SO₂ emissions from the flares. Although SO₂ emissions from the flares are substantial, this facility is subject to federally enforceable limits that will ensure compliance with the Regulation 9-1-302 gas stream emission limit of 300 ppmv of SO₂ in the exhaust from each flare (the source limits are equivalent to about one-third of this outlet concentration limit). Based on modeling analyses conducted at another landfill site, sources complying with the Regulation 9-1-302 limit are not expected to result in an excess of the ground level concentration limits listed in Regulation 9-1-301. Monitoring for ground level SO₂ concentrations in addition to the existing quarterly landfill gas monitoring, annual source testing, and record keeping requirements would not be appropriate.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

PM Sources

# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
Landfill Gas Flares (A-51 and A-60)	BAAQMD 6-1-301 and SIP 6-301	≤ Ringelmann 1.0 for 3 minutes in any hour	None
Diesel Engine (S-49)	BAAQMD 6-1-303.1 and SIP 6-303.1	≤ Ringelmann 2.0 for 3 minutes in any hour	None
Landfill Gas Flares (A-51 and A-60) and Diesel Engine (S-49)	BAAQMD 6-1-310 and SIP 6-310	≤ 0.15 grains/dscf	None
Compost Facility Operations (S-34), Trommel Screening Processes (S-39), Temporary Yard and Green Waste Stockpiles (S-41), Soil and Cover Material Stockpiles (S-42), Portable Horizontal Grinder (S-56), and Redwood Landfill – Waste and Cover Material Dumping (S-76)	BAAQMD 6-1-311 and SIP 6-311	$E = 0.026(P)^{0.67}$ where E = Allowable Emissions (lbs/hr) P = Process Rate (lbs/hr) and $E \leq 40 \text{ pounds/hour}$ if $P > 57,320 \text{ lbs/hr}$	None

PM Discussion:

Potential to Emit for A-51 and A-60 Landfill Gas Flares ⁽¹⁾ :	9.440 tons/year of PM ₁₀
Potential to Emit for A-49 Standby Diesel Engine ⁽²⁾ :	0.091 tons/year of PM ₁₀
Potential to Emit for S-34 Compost Facility Operations ⁽¹⁾⁽³⁾ :	0.870 tons/year of PM ₁₀
Potential to Emit for S-39 Trommel Screening Processes ⁽¹⁾ :	0.009 tons/year of PM ₁₀
Potential to Emit for S-41 Yard and Green Waste Stockpiles ⁽¹⁾ :	0.013 tons/year of PM ₁₀
Potential to Emit for S-42 Soil and Cover Material Stockpiles ⁽¹⁾ :	0.015 tons/year of PM ₁₀
Potential to Emit for S-56 Portable Horizontal Grinder ⁽¹⁾ :	10.000 tons/year of PM ₁₀
Potential to Emit for S-76 Redwood Landfill – Dumping ⁽¹⁾⁽³⁾ :	0.049 tons/year of PM ₁₀

- (1) Maximum potential PM₁₀ emissions for these sources are equal to the maximum permitted PM₁₀ emission rates. For detailed emission calculations, see Appendix E for the flares, see Appendix G for S-76, and see CAM discussions in Section IV for all other sources.
- (2) For the S-49 emergency standby engine, maximum potential PM₁₀ emissions are based on the AP-42 emission factor (2.2E-3 lbs PM/bhp-hr) and 500 hour/year of operation for testing and emergencies.
- (3) The PM₁₀ emissions listed above for these activities do not include road dust emissions. The site has a road dust monitoring and mitigation plan in place to minimize road dust emissions.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

BAAQMD 6-1-301 and SIP 6-301 for Landfill Gas Flares: Visible particulate emissions are normally not associated with combustion of gaseous fuels, such as natural gas, propane, or landfill gas. Since particulate emissions from each flare are not substantial, and it is highly unlikely that violations of the Ringelmann 1.0 limit would occur at these enclosed flares, periodic monitoring for the Ringelmann limit is not justified.

BAAQMD 6-1-303.1 and SIP 6-303.1 for Diesel Engines: Visible emissions darker than Ringelmann 2.0 are normally not expected for the proper combustion of low-sulfur diesel oil. Since this small diesel engine (S-49) is not expected to exceed this limit and PM emissions are very low (< 0.1 tons/year), no additional monitoring is warranted for this diesel engine.

BAAQMD 6-1-310 and SIP 6-310 for Flares: BAAQMD Regulation 6-1-310 and SIP 6-310 limit filterable particulate (FP) emissions in the stack from any source to 0.15 grains per dry standard cubic foot (gr/dscf) of exhaust volume. Based on the AP-42 emission factor for landfill gas flares, A-51 and A-60 will each emit 0.012 gr/dscf of exhaust at 0% oxygen. The grain loading limit (0.15 gr/dscf) is far above any expected PM emissions for these devices: a 12:1 compliance ratio for the flares. Since maximum potential PM emissions from the flares are fairly low and an excess of the emission standard is highly unlikely, it would not be appropriate to add periodic monitoring for this standard.

BAAQMD 6-1-310 and SIP 6-310 for S-49 Diesel Engine for Emergency Back-up Generator: The S-49 emergency back-up engine is also subject to the grain loading standard of 0.15 gr/dscf. This engine is permitted to operate for no more than 20 hours/year for reliability related testing and has been operated infrequently for emergency conditions. Actual emissions in 2010 were < 0.0004 tons/year of PM₁₀. Based on the District's experience with permitting standby diesel engines of this small size, the District does not expect any excesses of this grain loading standard. The District expects that the Ringelmann standard would be exceeded before the grain loading standard is exceeded. Since emissions are negligible, compliance with this limit is expected, and the testing necessary to demonstrate compliance with this standard would be very expensive, monitoring has not been required for this grain loading standard.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

POC Sources

S# & Description	Emission Limit Citation	Federally Enforceable Emission Limit	Monitoring
Sewage Sludge Storage, Main Pond (S-2) and Compost Facility Operations (S-34)	BAAQMD 8-2-301	Total Carbon Emissions: ≤ 15 pounds/day or ≤ 300 ppmv, dry basis	None

POC Discussion:

Potential to Emit for S-2 Sewage Sludge Storage Pond ⁽¹⁾: 0.482 tons/year of POC
 Potential to Emit for S-34 Compost Facility Operations ⁽²⁾: 7.020 tons/year of POC

- (1) Maximum potential POC emissions from the sewage sludge storage pond are based on the emission factor in the District's inventory for this source, 0.01 pounds of POC/ton, and the new maximum permitted sludge acceptance rate, 96,410 wet tons/year.
- (2) When the compost operations were first permitted at this site in 1996 (Application # 25812), there were no available VOC emission factors for windrow composting. At that time, the District expected that VOC emissions due to green waste composting would be negligible and that VOC emissions from co-composting of green waste and municipal sewage sludge would not be substantial. The District limited the total VOC emissions for this composting project to the BACT trigger level of 10 pounds/day for POC and required testing to establish VOC emission rates. The site conducted testing on the co-compost windrows in 1996. Emission rates from co-composting were determined to be 38.5 lbs/day of POC and 7.02 tons/year of POC. The highest surface concentration detected was 11 ppmv as heptane (77 ppmv as methane). Since emissions could exceed 10 lbs/day of POC, the District required a BACT review for this project. Enclosure of the active composting operations and venting to a biofilter was not determined to be cost effective for this project and thus was not required pursuant to BACT, but the site agreed to investigate and employ other potential emission reduction measures, such as adjusting compost mix ratios, adding enzymes or other VOC reducing materials to the compost piles, and adjusting windrow turning practices to minimize VOC and odorous emissions. The emission rate determined pursuant to the 1996 tests on this source is assumed to be both the maximum permitted and maximum potential POC emission rate for S-34. However, source testing by the South Coast Air Quality Management District (SCAQMD)¹ and others have demonstrated that VOC emissions from green waste composting may be 2-3 times higher than co-composting emissions.

BAAQMD 8-2-301 for S-2 Sewage Sludge Storage, Main Pond: BAAQMD Regulation 8-2-301 limits emissions from any operation to either 15 pounds/day of total carbon or less than 300 ppmv, dry, in an exhaust point. In accordance with Condition # 19867, Part 3, this site will accept no more than 310 wet tons of sewage sludge per day. The site is using daily records to demonstrate compliance with this throughput rate (see Condition # 19867, Part 5). Using the District's inventory emission factor for S-2, 0.01 pounds of POC per ton, the maximum daily

¹ See Table 2-10 on page 2-7 of the SCAQMD Technology Assessment for Proposed Rule 1133 (March 2002): http://www.aqmd.gov/rules/doc/r1133/r1133_techassessment.pdf. A number of new compost emissions studies have been conducted since this report was published. The District is reviewing this data and may adjust the emission factor for S-34 at a later date.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

emission rate for S-2 is 3.10 tons/day. An emission rate of 3.10 pounds/day of methane is equal to 2.32 pounds/day of total carbon. The margin of compliance with the BAAQMD Regulation 8-2-301 limit is 6.5 to 1. Since the compliance margin is high, POC emissions from this source are low, and the site will be conducting periodic monitoring to demonstrate compliance with the daily sludge acceptance rate limit, additional periodic monitoring for compliance with the 8-2-301 limit is not justified.

BAAQMD 8-2-301 for S-34 Compost Facility Operations: BAAQMD Regulation 8-2-301 limits emissions from any operation to either 15 pounds/day of total carbon or less than 300 ppmv, dry, in an exhaust point. The organic emissions from this source are fugitive in nature and cannot be measured using the District's standard stack test measure (ST-7). However, in 1996, the District required this facility to conduct source testing on S-34 to determine VOC emissions. The 1996 source testing was conducted on the surface of the co-compost windrows using the flux box test method. Based on this 1996 source test, the maximum daily emission rate was determined to be 38.5 pounds/day (expressed as heptane), which is equivalent to 32.2 pounds/day of total carbon, and the maximum measured concentration from all flux boxes was 11 ppmv as heptane (77 ppmv, expressed as total carbon). Although the total carbon emission rate from S-34 could exceed 15 pounds/day, the maximum measured concentration was well below the 300 ppmv total carbon concentration limit. Thus, S-34 was expected to comply with Regulation 8-2-301 with a compliance margin of 3.9 to 1.0. The District is aware that source testing on other compost operations indicates that green waste composting emissions could be 2 or 3 times higher than the emissions from co-composting operations. If this is the case, the concentration from green waste composting at this site could be as high as $(77*3)= 231$ ppmv of total carbon. Since this concentration is still less than 300 ppmv of total carbon, the District expects that S-34 will also comply with Regulation 8-2-301 during green waste only composting. Although the compliance margin is not high in this case, the flux box source testing method is cumbersome, time consuming, and expensive, and is not appropriate as a periodic monitoring method. Since no viable periodic monitoring methods are available to demonstrate compliance with Regulation 8-2-301 at fugitive emission sources, the District relies on alternative compliance demonstration methods. In accordance with Condition # 13123, this source is required to maintain monthly throughput records and is required to employ measures to reduce VOC emissions and odors. Odorous emissions would likely be detected before the operation exceeds the Regulation 8-2-301 300 ppmv total carbon concentration limit. Therefore, the District expects that the current monitoring measures at S-34 to prevent odorous emissions are sufficient to assure compliance with Regulation 8-2-301.

Changes to Permit, Section VII:

- A note is being added at the beginning of the section to clarify that this section is a summary of the limits and monitoring, and that in the case of a conflict between Sections I-VI and Section VII, the preceding sections take precedence.
- The District is deleting Table VII-F for S-46, Table VII-G for S-47, and Table VII-H for S-48, because these sources have been shut down.
- The District is renumbering Tables VII-I through VII-L for S-49, S-55, S-56, S-58, respectively, as Tables VII-F through VII-I.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

- In Tables VII- B, C, D, E, F, and G, the District is adding symbols (\leq or \geq) to clarify limits.
- In Tables VII- B, C, D, E, F, and H, the District is correcting the Regulation 6 particulate limit citations due to the renumbering of SIP Regulation 6 as BAAQMD Regulation 6, Rule 1.
- In Table VII-B, the District is making corrections to the title and several limit citations to include the source and abatement device changes discussed in Section II.
- In Table VII-B, the District is incorporating all revisions to flare landfill gas throughput rates, flare temperature limits, flare NO_x and CO emission limits, landfill material acceptance rates, vehicle fleet weights, vehicle miles traveled, landfill gas concentration limits, and landfill fugitive POC emission limits that are identified in Section VI for Condition # 19867.
- In Table VII-B, the District is adding a missing limit for Regulation 6-1-311 and SIP 6-311 for the active landfilling operations (S-76 and S-77) and is adding the new PM10 emission limits for road dust emissions and active landfilling operations.
- In Table VII-B, the District is adding a new non-federally enforceable monitoring procedure for H₂S emissions from the landfill.
- In Table VII-B, the District is deleting a non-federally enforceable TAC destruction efficiency limit for the flares, which has been deleted from Condition # 19867.
- In Table VII-C for the S-34 Compost Facility Operations and S-39 Trommel Screening Processes, the District is making corrections to the title and the throughput limit citations to reflect the source number changes discussed in Section II.
- In Table VII-E, the District is adding the missing Regulation 8-2-301 limit that applies to the aeration of VOC-laden soil at the S-42 Soil and Cover Material Stockpiles.
- In Table VII-F for the S-49 Diesel Engine for Emergency Back-Up Generator, the District is deleting all references to Condition #19613 and replacing them with the appropriate limits and monitoring requirements in Condition #22820.
- In Table VII-F, the District is replacing the requirement to maintain vendor certified records of the fuel oil sulfur content with the requirements to purchase and use only CARB certified diesel fuel, which contains no more than 15 ppm by weight of sulfur.
- In Table VII-F, the District is including the applicable NO_x and CO limits, revised operating time limits, and monitoring requirements from the Regulation 9, Rule 8 amendments that were adopted in 2007.
- In Table VII-F, the District is adding the applicable operating limitations from the CARB ATCM for Stationary Compression Ignition Engines that was adopted in 2004 and amended in 2011.
- In Table VII-F, the District is including the applicable operating and idle time limits and the required maintenance provisions from the 40 CFR, Part 63, Subpart ZZZZ RICE NESHAP that was adopted in 2010.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

- In Table VII-G for the S-55 Gasoline Dispensing Facility, the District is incorporating the Regulation 8, Rule 5 amendments approved in 2006. S-55 is exempt from BAAQMD Regulation 8, Rule 5. Therefore, only SIP Regulation 8, Rule 5 applies to S-55 at this time. The District is also adding a missing gas tight limit for the pressure vacuum valve on the above ground gasoline from SIP Regulation 8, Rule 5.
- The District is making an editorial revision to Table VII-I to clarify the TAC concentration limits.

VIII. Test Methods

This section of the permit lists test methods that are associated with standards in District or other rules. It is included only for reference. In most cases, the test methods in the rules are source test methods that can be used to determine compliance but are not required on an ongoing basis. They are not applicable requirements.

If a rule or permit condition requires ongoing testing, the requirement will also appear in Section IV of the permit.

Changes to Permit, Section VIII:

- The introductory text to Section VIII is being corrected.
- In Table VIII, the District is revising the particulate limit citations to reflect that SIP Regulation 6 has been renumbered and is now BAAQMD Regulation 6, Rule 1. The District is also adding the applicable EPA test methods for the particulate emission limits.
- In Table VIII, the District is making editorial revisions to the descriptions for several requirements to correct errors, to improve the clarity of these descriptions, and to identify the applicable pollutant if it is missing.
- The District is adding a missing test method for SIP Regulation 8, Rule 5.
- The District is removing the citation for Regulation 8-34-301.4, because section does not apply to any equipment at this site.
- The District is adding the test methods for the new Regulation 9, Rule 8 NO_x and CO emission limits.
- The District is adding a missing test method for the 40 CFR, Part 60.758(c)(1)(i) flare temperature limit.
- The District is adding the CARB test methods for diesel fuel sulfur content that apply to the diesel engines at this site.
- The District is adding missing test methods for the S-55 Gasoline Dispensing Facility.
- The District is adding calculation methods for the landfill POC and PM10 emission limits and for the landfill fleet weight and VMT limits.
- The District is adding several other missing test methods for limits identified in Condition # 19867.
- The District is deleting the test method for determining TAC destruction efficiency at the landfill gas flares because the limit has been deleted from Condition #19867.

IX. Permit Shield:

The District rules allow two types of permit shields. The permit shield types are defined as follows: (1) A provision in a major facility review permit explaining that specific federally enforceable regulations and standards do not apply to a source or group of sources, or (2) A provision in a major facility review permit explaining that specific federally enforceable applicable requirements for monitoring, recordkeeping and/or reporting are subsumed because other applicable requirements for monitoring, recordkeeping, and reporting in the permit will assure compliance with all emission limits.

The second type of permit shield is allowed by EPA's White Paper 2 for Improved Implementation of the Part 70 Operating Permits Program. The District uses the second type of permit shield for all streamlining of monitoring, recordkeeping, and reporting requirements in Title V permits. The District's program does not allow other types of streamlining in Title V permits.

This facility has the second type of permit shield for BAAQMD and SIP Regulation 8, Rule 2. For this facility, the S-76 Redwood Landfill - Waste and Cover Material Dumping and the S-42 Soil and Cover Material Stockpiles are subject to Regulation 8-2-301 due to the aeration of VOC-laden soil at these sources. During the transfer, handling, storage, or re-use of VOC-laden soil, some of the VOC in this soil will be released to the atmosphere, which constitutes aeration of the VOC-laden soil. All of the VOC emissions from S-76 and S-42 are fugitive in nature.

Regulation 8-2-301 limits organic compound emissions (expressed as total carbon) from an operation to 15 pounds per day, if the emission from the operation has an organic compound concentration greater than 300 ppmv (expressed as total carbon, dry basis). Thus, an operator may verify compliance with Regulation 8-2-301 by either demonstrating compliance with the 15 pound/day total carbon emission limit or by demonstrating compliance with the 300 ppmv total carbon concentration limit. Compliance with the total carbon emission limit can be demonstrated using standard emission calculation procedures. Compliance with the total carbon concentration limit is typically determined using the District's source test method (ST-7) identified in Regulation 8-2-601. However, this test method applies to emissions from a stack, while all of the emissions from S-76 and S-42 are fugitive in nature. Therefore, the District is using alternative compliance demonstration procedures for this Regulation 8-2-301 total carbon concentration limit at S-76 and S-42.

Condition #19867, Part 14 identifies these two compliance options for the VOC-laden soil aeration operations that occur at S-76 and S-42. Part 14a specifies emission limits, acceptance limits, emission calculation procedures, and record keeping requirements that assure compliance with the 15 pound/day total carbon emission limit. Part 14b discusses the alternative measures that may be used to verify compliance with the 300 ppmv total carbon concentration limit. If the operator chooses to demonstrate compliance with Regulation 8-2-301 using Condition #19867 Part 14b, the operator will be required to use the Regulation 8-40-604 test procedures to verify

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

that the soil is not contaminated (i.e., does not contain more than 50 ppmw of VOC or will not emit more than 50 ppmv of VOC from the surface of the soil). Since soil found not to be contaminated using the procedures of Regulation 8-40-604 will have a surface VOC concentration of less than 50 ppmv (expressed as methane, C1) it can reasonably be assumed that the concentration that occurs in the atmosphere during the aeration of VOC-laden soil will also be less than 300 ppmv (total carbon, dry basis) as determined by the procedures of Regulation 8-2-601. Since these VOC-laden soil aeration operations will comply with the total carbon concentration limit (< 300 ppmv), they will also comply with Regulation 8-2-301.

In summary, measurements conducted under Regulation 8-40-604 that show surface VOC concentrations are less than 50 ppmv (expressed as methane, C1) are conclusive to demonstrate that any aeration of VOC-laden soil will comply with Regulation 8-2-301.

Changes to Permit, Section IX:

- The District is proposing changes to Table IX-A to clarify that this permit shield applies to S-76 instead of S-5, because S-5 was split into S-5, S-76, and S-77 and the VOC-laden soil aeration operation occurs at S-76.
- The District is adding S-42 to Table IX-A because VOC-laden soil aeration may occur at S-42 during the transfer or storage of VOC-laden soil at these stockpiles.
- The District is making editorial revisions to this section to clarify the applicability of this permit shield and to improve the explanation of the need for this permit shield.

X. Revision History

This section of the permit summarizes each revision to the permit.

Changes to Permit, Section X:

- The District is adding the permit revisions associated with this MFR Renewal Permit (Application # 17987) to Section X.

XI. Glossary

This section of the permit defines and explains acronyms, abbreviations, and other terms that are used in this permit.

Changes to Permit, Section XI:

- The District is updating the Section XI Glossary by clarifying explanations and adding numerous new terms.

XII. Applicable State Implementation Plan

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

Changes to Permit, Section XII:

- The District is deleting this section. The address for EPA's website is now found in Sections III and IV.

D. ALTERNATIVE OPERATING SCENARIOS

No alternate operating scenarios have been requested for this facility.

E. COMPLIANCE STATUS

A January 19, 2012 office memorandum from the Director of Compliance and Enforcement, to the Director of Permit Services, presents a review of the compliance record of Redwood Landfill, Inc. (Site # A1179). This review was initiated as part of the District evaluation of an application by renewal of a Title V permit and is contained in Appendix A.

The Compliance and Enforcement Division staff has reviewed the compliance history for Redwood Landfill, Inc. for the prior five-year permit term October 1, 2006 through January 6, 2012 and has reviewed Redwood Landfill's Annual Compliance Certifications submitted between 2006 and 2011. Most recently, the owner certified that all equipment was operating in compliance on November 29, 2011. The Compliance and Enforcement Division staff found no on-going non-compliance and no recurring pattern of violations.

The Compliance and Enforcement Division staff also reviewed the compliance history for this site from October 1, 2006 through January 6, 2012. During this period, activities known to the District include:

- The District issued 1 Notice of Violation. One violation was issued on March 23, 2009 for a violation of Regulation 2-1-301 and 2-1-302 for not having an authority to construct or permit to operate for a source. During an independent audit, Redwood Landfill discovered that an existing portable diesel engine, S-47, had been replaced with a new 75 bhp engine in July 2004. Redwood Landfill reported this deviation to the District, and the District issued the above violation notice. On April 21, 2009, Redwood Landfill submitted Application #20557 to obtain a permit to operate for this small portable engine. However, before the District had completed the engineering review of this source, Redwood Landfill decided to permanently remove the source from this facility and withdrew the permit application.
- The District received 9 air pollution complaints (all occurred during November and December 2006) alleging Redwood Landfill as the source of odors. The District investigated these odor complaints but could not confirm that any of the alleged odors were coming from Redwood Landfill.
- The District received 5 notifications of a Reportable Compliance Activity (RCA) during this period. All of these RCAs concerned the operation of the A-51 landfill gas flare between October 23, 2009 and April 5, 2010. This flare is equipped with an automated louver that adjusts the inlet air flow to the flare. Louver malfunctions resulted in flare temperature fluctuations. On October 23, 2009 and December 10, 2009, Redwood Landfill shut down the

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

flare to prevent emission excess. On April 5, 2010, the louver motor failed, and the flare had to be shut down to conduct repairs.

- The facility is not operating under an Enforcement Agreement, a Variance, or an Order of Abatement.

The Compliance and Enforcement Division has determined that for the periods reviewed, Redwood Landfill was in intermittent compliance. However, there is no evidence of on-going non-compliance and no recurring pattern of violations that would warrant consideration of a Title V permit compliance schedule.

F. DIFFERENCES BETWEEN THE APPLICATION AND THE PROPOSED PERMIT

The Title V permit application for renewal was originally submitted on April 30, 2008. On March 5, 2009, Redwood Landfill requested additional administrative amendments to the Title V permit to correct the description of S-49 contained in Table II-A. In addition, Redwood Landfill submitted the following requests to revise the Title V permit: Application # 16609 to replace a landfill gas flare (received 8/27/2007), Application # 18689 for a revision of TAC concentration limits (received 8/6/2008), Application # 20623 for an expansion of the landfill (received 5/7/2009), and Application # 21288 to replace two portable engines (received 11/6/2009). All of the permit revisions requested above have been incorporated into the proposed Title V permit. The October 24, 2007 version of the Title V permit for Site # A1179 is the basis for constructing the proposed Title V permit.

After the Title V renewal application was submitted on April 30, 2008, Redwood Landfill shut down the following equipment: S-46 Tipper Engine, S-47 PACO Water Pump Engine, S-48 Retec Power Screens Engines, and A-50 Landfill Gas Flare. These devices are being removed from the Title V permit. The following new equipment is being added to the Title V permit pursuant to the permit revision applications listed above: S-61 Portable Diesel Engine for Waste Tipper, S-62 Portable Diesel Engine for Power Screens, A-60 Landfill Gas Flare, A-61 Catalyzed Diesel PM Filter, and A-62 Catalyzed Diesel PM Filter, except that S-61, A-61, S-62, and A-62 are only identified in Section II (Table II-C), because this equipment is exempt from Title V permitting requirements pursuant to BAAQMD Regulation 2-6-114. In accordance with source description changes made during recent annual District permit renewal periods to ensure consistency among the District's permitted facilities, the District is proposing to:

- Split the S-5 Redwood Landfill source into the following three sources: S-5 Redwood Landfill – Waste Decomposition Process, S-76 Redwood Landfill – Waste and Cover Material Dumping, and S-77 Redwood Landfill – Excavating, Bulldozing, and Compacting Activities, and
- Combine the following sources: S-28 Co-compost Biosolids Feed Stockpile, S-34 Active Compost and Co-Compost Windrows and Associated Activities, Compost and Co-Compost Curing Piles and Associated Activities, S-37 Compost and Co-Compost Final

Statement of Basis: Site A1179, Redwood Landfill, Inc.
Applications # 17987, 16609, 18689, 20623 & 21288 8950 Redwood Highway, Novato, CA 94948

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

Product Storage Piles and Associated Activities, and S-38 On-Site Material Hauling into S-34 Compost Facility Operations.

In addition to the source and abatement device changes listed above, the District is proposing to modify the list of sources that are subject to the permit shield in Section IX. The District is also proposing changes to several standard language sections, updates of regulatory amendment dates, inclusions of new generally applicable regulatory requirements, modifications of permit conditions, removal of non-applicable requirements, clarifications of numerous limits, changes to the glossary, and removal of Section XII. These revisions were not identified by the applicant.

*H:\Engineering\TitleV Permit Appls\1 All T5 Application Files Here\A1179\Renewal-17987\3.0 Proposed Docs\
A1179_renewal_SOB_Jan2012.doc*

APPENDIX A
BAAQMD COMPLIANCE REPORT

Statement of Basis:
Applications # 17987, 16609, 18689, 20623 & 21288

Site A1179, Redwood Landfill, Inc.
8950 Redwood Highway, Novato, CA 94948

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

COMPLIANCE & ENFORCEMENT DIVISION

Inter-Office Memorandum

January 19, 2012

TO: JIM KARAS – ACTING DIRECTOR OF ENGINEERING
FROM: BRIAN BATEMAN – DIRECTOR OF ENFORCEMENT
SUBJECT: REVIEW OF COMPLIANCE RECORD OF:

JK 11/24/12
BB 1/29/12

REDWOOD LANDFILL, INC.; SITE #A1179

Background

This review was initiated as part of the District evaluation of an application by REDWOOD LANDFILL, INC. (REDWOOD) for a Title V Permit Renewal. It is standard practice of the Compliance and Enforcement Division to undertake a compliance record review in advance of a renewal of a Title V Permit. The purpose of this review is to assure that any non-compliance problems identified during the prior five-year permit term have been adequately addressed, or, if non-compliance persists, that a schedule of compliance is properly incorporated into the Title V permit compliance schedule. In addition, the review checks for patterns of recurring violation that may be addressed by additional permit terms. Finally, the review is intended to recommend, if necessary, any additional permit conditions and limitations to improve compliance.

Compliance Review

Compliance records were reviewed for the time period from October 1, 2006 (the date of issuance of the initial Title V permit) through January 6, 2012. The results of this review are summarized as follows.

1. Violation History

Staff reviewed REDWOOD Annual Compliance Certifications and found no ongoing non-compliance and no recurring pattern of violations.

Staff also reviewed the District compliance records for the review period. During this period REDWOOD activities known to the District include:

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

REVIEW OF COMPLIANCE RECORD OF:
REDWOOD LANDFILL, INC. – SITE #A1179
 January 19, 2012
 Page 2 of 3

District-issued 1 Notice of Violation(s):

NOV#	Regulation	Date Occur	# of Days	Comments	Disposition
A49667	2-1-301/2	3/23/2009	1	No permit to operate for source	Resolution, Attorney

2. Complaint History

The District received 9 air pollution complaints alleging REDWOOD as the source.

3. Reportable Compliance Activity

Reportable Compliance Activity (RCA), also known as “Episode” reporting, is the reporting of compliance activities involving a facility as outlined in District Regulations and State Law. Reporting covers breakdown requests, indicated monitor excesses, pressure relief device releases, inoperative monitor reports and flare monitoring.

Within the review period, the District received 5 notifications for RCA's. 0 NOV's were issued as a result of these RCA's.

The District received 5 notifications for Reportable Compliance Activities (RCA).

Episode	Date Occur	# of Days	Comments	Disposition
05P91	10/23/2009	1	Indicated excess of landfill flare temperature requirements	No action, Excess did not occur
05Q98	12/10/2009	1	Breakdown due to flare louver malfunction (Related to Excess 05Q99)	No action, Excess did not occur
05Q99	12/10/2009	1	Indicated excess due to flare louver	No action, excess did not occur
05S77	4/5/2010	1	Breakdown due to louver motor failure (Related Excess 05S78)	Relief Granted, No Action
05S78	4/5/2010	1	Excess due to louver motor failure (Related Breakdown 05Q77)	Relief Granted, No Action

4. Enforcement Agreements, Variances, or Abatement Orders

There were no enforcement agreements, variances, or abatement orders for REDWOOD over review period.

Statement of Basis:
Applications # 17987, 16609, 18689, 20623 & 21288

Site A1179, Redwood Landfill, Inc.
8950 Redwood Highway, Novato, CA 94948

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

REVIEW OF COMPLIANCE RECORD OF:
REDWOOD LANDFILL, INC. – SITE #A1179
January 19, 2012
Page 3 of 3

Conclusion

Following its review of all available facility and District compliance records from October 1, 2006 (the date of issuance of the initial Title V permit) through January 6, 2012, the District's Compliance and Enforcement Division has determined that REDWOOD was in intermittent compliance from the initial permit period through the present. However, REDWOOD has demonstrated no evidence of ongoing noncompliance and no recurring pattern of violations that would warrant consideration of a Title V permit compliance schedule for this facility.

Based on this review and analysis of all the violations for the review period, the District has concluded that no schedule of compliance or change in permit terms is necessary beyond what is already contained in the facility's current Title V permit.

05S78	4/5/2010	1	failure (Related Breakdown 05Q77)	Action
-------	----------	---	-----------------------------------	--------

4. Enforcement Agreements, Variances, or Abatement Orders

There were no enforcement agreements, variances, or abatement orders for REDWOOD over review period.

A 94948

H:\Enforcement\Title V Cert\Title V Compliance Review Memo-REDWOODLANDFILL-2012-final.doc

APPENDIX B

GLOSSARY

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

ACT

Federal Clean Air Act

AP-42

An EPA Document "Compilation of Air Pollution Emission Factors" that is used to estimate emissions from numerous source types. It is available electronically from EPA's web site at: <http://www.epa.gov/ttn/chief/ap42/index.html>

APCO

Air Pollution Control Officer: Head of Bay Area Air Quality Management District

ARB

Air Resources Board (same as CARB)

ASTM

American Society for Testing and Materials

ATC

Authority to Construct

ATCM

Airborne Toxic Control Measure

BAAQMD

Bay Area Air Quality Management District

BACT

Best Available Control Technology

BARCT

Best Available Retrofit Control Technology

Basis

The underlying authority that allows the District to impose requirements.

C1

An organic chemical compound with one carbon atom, for example: methane

C3

An organic chemical compound with three carbon atoms, for example: propane

C5

An organic chemical compound with five carbon atoms, for example: pentane

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

C6

An organic chemical compound with six carbon atoms, for example: hexane

C₆H₆

Benzene

CAA

The federal Clean Air Act

CAAQS

California Ambient Air Quality Standards

CAPCOA

California Air Pollution Control Officers Association

CARB

California Air Resources Board (same as ARB)

CCR

California Code of Regulations

CEC

California Energy Commission

CEQA

California Environmental Quality Act

CEM

A “continuous emission monitor” is a monitoring device that provides a continuous direct measurement of some pollutant (e.g. NO_x concentration) in an exhaust stream.

CFR

The Code of Federal Regulations. 40 CFR contains the implementing regulations for federal environmental statutes such as the Clean Air Act. Parts 50-99 of 40 CFR contain the requirements for air pollution programs.

CH₄ or CH₄

Methane

CI

Compression Ignition

CIWMB

California Integrated Waste Management Board

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

CO

Carbon Monoxide

CO₂ or CO₂

Carbon Dioxide

CO₂e

Carbon Dioxide Equivalent. A carbon dioxide equivalent emission rate is the emission rate of a greenhouse gas compound that has been adjusted by multiplying the mass emission rate by the global warming potential of the greenhouse gas compound. These adjusted emission rates for individual compounds are typically summed together, and the total is also referred to as the carbon dioxide equivalent (CO₂e) emission rate.

CT

Combustion Zone Temperature

Cumulative Increase

The sum of permitted emissions from each new or modified source since a specified date pursuant to BAAQMD Rule 2-1-403, Permit Conditions (as amended by the District Board on 7/17/91) and SIP Rule 2-1-403, Permit Conditions (as approved by EPA on 6/23/95). Used to determine whether threshold-based requirements are triggered.

District

The Bay Area Air Quality Management District

E6, E9, E12

Very large or very small number values are commonly expressed in a form called scientific notation, which consists of a decimal part multiplied by 10 raised to some power. For example, 4.53E6 equals $(4.53) \times (10^6) = (4.53) \times (10 \times 10 \times 10 \times 10 \times 10 \times 10) = 4,530,000$. Scientific notation is used to express large or small numbers without writing out long strings of zeros.

EG

Emission Guidelines

EO

Executive Order

EPA

The federal Environmental Protection Agency.

Excluded

Not subject to any District regulations.

Federally Enforceable, FE

All limitations and conditions which are enforceable by the Administrator of the EPA including those requirements developed pursuant to 40 CFR Part 51, subpart I (NSR), Part 52.21 (PSD), Part 60 (NSPS), Part 61 (NESHAPs), Part 63 (MACT), and Part 72 (Permits Regulation, Acid Rain), including limitations and conditions contained in operating permits issued under an EPA-approved program that has been incorporated into the SIP.

FP

Filterable Particulate as measured by BAAQMD Method ST-15, Particulate.

FR

Federal Register

GDF

Gasoline Dispensing Facility

GHG

Greenhouse Gas

GLM

Ground Level Monitor

Grains

1/7000 of a pound

GWP

Global Warming Potential. A comparison of the ability of each greenhouse gas to trap heat in the atmosphere relative to that of carbon dioxide over a specific time period.

H₂S or H₂S

Hydrogen Sulfide

H₂SO₄ or H₂SO₄

Sulfuric Acid

H&SC

Health and Safety Code

HAP

Hazardous Air Pollutant. Any pollutant listed pursuant to Section 112(b) of the Act. Also refers to the program mandated by Title I, Section 112, of the Act and implemented by 40 CFR Part 63.

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

Hg
Mercury

HHV
Higher Heating Value. The quantity of heat evolved as determined by a calorimeter where the combustion products are cooled to 60F and all water vapor is condensed to liquid.

LEA
Local Enforcement Agency

LFG
Landfill gas

LHV
Lower Heating Value. Similar to the higher heating value (see HHV) except that the water produced by the combustion is not condensed but retained as vapor at 60°F.

Long ton
2200 pounds

Major Facility
A facility with potential emissions of: (1) at least 100 tons per year of regulated air pollutants, (2) at least 10 tons per year of any single hazardous air pollutant, and/or (3) at least 25 tons per year of any combination of hazardous air pollutants, or such lesser quantity of hazardous air pollutants as determined by the EPA administrator.

MAX or Max.
Maximum

MFR
Major Facility Review. The District's term for the federal operating permit program mandated by Title V of the Federal Clean Air Act and implemented by District Regulation 2, Rule 6.

MIN or Min.
Minimum

MOP
The District's Manual of Procedures.

MSDS
Material Safety Data Sheet

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

MSW

Municipal solid waste

MW

Molecular weight

N2

Nitrogen

NA

Not Applicable

NAAQS

National Ambient Air Quality Standards

NESHAPS

National Emission Standards for Hazardous Air Pollutants. See in 40 CFR Parts 61 and 63.

NMHC

Non-methane Hydrocarbons (Same as NMOC)

NMOC

Non-methane Organic Compounds (Same as NMHC)

NO_x or NO_x

Oxides of nitrogen.

NO₂ or NO₂

Nitrogen Dioxide.

NSPS

Standards of Performance for New Stationary Sources. Federal standards for emissions from new stationary sources. Mandated by Title I, Section 111 of the Federal Clean Air Act, and implemented by 40 CFR Part 60 and District Regulation 10.

NSR

New Source Review. A federal program for pre-construction review and permitting of new and modified sources of pollutants for which criteria have been established in accordance with Section 108 of the Federal Clean Air Act. Mandated by Title I of the Federal Clean Air Act and implemented by 40 CFR Parts 51 and 52 and District Regulation 2, Rule 2. (Note: There are additional NSR requirements mandated by the California Clean Air Act.)

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

O2 or O₂

Oxygen

Offset Requirement

A New Source Review requirement to provide federally enforceable emission offsets for the emissions from a new or modified source. Applies to emissions of POC, NO_x, PM₁₀, and SO₂.

PERP

Portable Equipment Registration Program

Phase II Acid Rain Facility

A facility that generates electricity for sale through fossil-fuel combustion and is not exempted by 40 CFR 72 from Titles IV and V of the Clean Air Act.

POC

Precursor Organic Compounds

PM

Particulate Matter

PM₁₀ or PM₁₀

Particulate matter with aerodynamic equivalent diameter of less than or equal to 10 microns

PSD

Prevention of Significant Deterioration. A federal program for permitting new and modified sources of those air pollutants for which the District is classified "attainment" of the National Air Ambient Quality Standards. Mandated by Title I of the Act and implemented by both 40 CFR Part 52 and District Regulation 2, Rule 2.

PV or P/V Valve or PRV

Pressure/Vacuum Relief Valve

RICE

Reciprocating Internal Combustion Engine

RMP

Risk Management Plan

RWQCB

Regional Water Quality Control Board

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

S

Sulfur

SCR

A “selective catalytic reduction” unit is an abatement device that reduces NOx concentrations in the exhaust stream of a combustion device. SCRs utilize a catalyst, which operates within a specific temperature range, and injected ammonia to promote the conversion of NOx compounds to nitrogen gas.

Short ton

2000 pounds

SIP

State Implementation Plan. State and District programs and regulations approved by EPA and developed in order to attain the National Air Ambient Quality Standards. Mandated by Title I of the Act.

SO₂ or SO₂

Sulfur dioxide

SO₃ or SO₃

Sulfur trioxide

SSM

Startup, Shutdown, or Malfunction

SSM Plan

A plan, which states the procedures that will be followed during a startup, shutdown, or malfunction, that is prepared in accordance with the general NESHAP provisions (40 CFR Part 63, Subpart A) and maintained on site at the facility.

TAC

Toxic Air Contaminant (as identified by CARB)

TBACT

Best Available Control Technology for Toxics

THC

Total Hydrocarbons (NMHC + Methane)

therm

100,000 British Thermal Units

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

Title V

Title V of the federal Clean Air Act. Requires a federally enforceable operating permit program for major and certain other facilities.

TOC

Total Organic Compounds (NMOC + Methane, Same as THC)

TPH

Total Petroleum Hydrocarbons

TRMP

Toxic Risk Management Policy

TRS

Total Reduced Sulfur, which is a measure of the amount of sulfur-containing compounds in a gas stream, typically a fuel gas stream, including, but not limited to, hydrogen sulfide. The TRS content of a fuel gas determines the concentration of SO₂ that will be present in the combusted fuel gas, since sulfur compounds are converted to SO₂ by the combustion process.

TSP

Total Suspended Particulate

TVP

True Vapor Pressure

VOC

Volatile Organic Compounds

VMT

Vehicle Miles Traveled

Symbols:

<	=	less than
>	=	greater than
≤	=	less than or equal to
≥	=	greater than or equal to

Units of Measure:

atm	=	atmospheres
bbl	=	barrel of liquid (42 gallons)
bhp	=	brake-horsepower
btu	=	British Thermal Unit
BTU	=	British Thermal Unit

Renewal and Revisions of the Title V Permit for Redwood Landfill, Inc., Site # A1179

°C	=	degrees Centigrade
cfm	=	cubic feet per minute
dscf	=	dry standard cubic feet
°F	=	degrees Fahrenheit
ft ³	=	cubic feet
g	=	grams
gal	=	gallon
gpm	=	gallons per minute
gr	=	grains
hp	=	horsepower
hr	=	hour
in	=	inches
kW	=	kilowatts
lb	=	pound
lbmol	=	pound-mole
m ²	=	square meter
m ³	=	cubic meters
min	=	minute
mm	=	millimeter
MM	=	million
MM BTU	=	million BTU
MMcf	=	million cubic feet
Mg	=	mega grams
M scf	=	one thousand standard cubic feet
MW	=	megawatts
ppb	=	parts per billion
ppbv	=	parts per billion, by volume
ppm	=	parts per million
ppmv	=	parts per million, by volume
ppmw	=	parts per million, by weight
psia	=	pounds per square inch, absolute
psig	=	pounds per square inch, gauge
scf	=	standard cubic feet
scfm	=	standard cubic feet per minute
sdcf	=	standard dry cubic feet
sdcfm	=	standard dry cubic feet per minute
yd	=	yard
yd ³	=	cubic yards
yr	=	year

APPENDIX C

FACILITY-WIDE EMISSIONS and EMISSION CHANGES

Redwood Landfill, Inc.; Site # A1179

APPLICATIONS # 17987, 16609, and 21288

FACILITY-WIDE EMISSIONS and EMISSION CHANGES

Redwood Landfill, Inc.; Site # A1179

APPLICATIONS # 17987, 16609, 18689, 20623, and 21288

A. SITE-WIDE EMISSIONS SUMMARY

The current facility wide maximum potential emission rates for each source and the total criteria pollutant emission rates for this site are summarized in Table 1.

Table 1. Potential to Emit for Site # A1179 as of August 2011

Device Number	Source Description	Maximum Potential Emissions (tons/year)				
		NOx	CO	POC	PM10	SO2
S-2	Sewage Sludge Storage, Main Pond			0.482	0.106	
S-5	Redwood Landfill, waste decomposition process			26.380		
S-34	Compost Facility Operations			7.020	5.904	
S-39	Trommell Screening Processes				0.009	
S-41	Temporary Stockpiles for Yard and Green Waste Shredding Operations				0.013	
S-42	Soil Stockpiles (including VOC-laden soil)			2.638	0.015	
S-49	Diesel Engine (BUG)	0.034	0.004	0.001	0.001	0.001
S-55	Gasoline Dispensing Facility G# 8573			0.987		
S-56	Horizontal Grinder (exempt from District permit)				10.000	
S-57	Portable Diesel Engine for Horizontal Grinder (exempt from District and Title V permits)	10.000	1.667	0.120	0.131	0.257
S-58	Aerated Leachate Pond			0.084		
S-61	Portable Diesel Engine for Waste Tipper	0.828	0.385	0.044	0.010	0.018
S-62	Portable Diesel Engine for Power Screens	0.828	0.385	0.044	0.010	0.018
S-76	Redwood Landfill - waste and cover material dumping				0.049	
S-76	Redwood Landfill – during contaminated soil disposal			0.312		
S-76	Redwood Landfill – using VOC-laden soil as daily cover			2.721		
S-77	Redwood Landfill - excavating, bulldozing, and compacting activities				5.584	
	Redwood Landfill - road dust and wind erosion emissions				148.617	
A-51 & A-60	Landfill Gas Flares	33.113	110.376	7.716	9.440	64.338
Total	All Sources and Abatement Devices	44.803	112.817	48.549	179.889	64.632

Overall, this facility has had a small net increase (+6.4 tons/year of POC) in facility-wide maximum potential POC emissions since the Title V permit was last revised in October 2007. This emission increase is primarily due to the permit condition changes that were approved for Redwood Landfill pursuant to NSR Application # 20607. The potential to emit for all other criteria pollutants has been reduced since October 2007.

The emission changes associated with this current Title V permitting action are discussed in Section B. All emission increases for this facility that occurred between the time the initial Title V permit was issued in November 2003 and this last permit revision in October 2007 were discussed in detail in the Statements of Basis for the Title V permit revisions that were issued between 2004-2007 (Applications #8501, #6943, #9565, #10873, #10874, #11948, #12966, #13026, #14140, #14420, and #11370).

B. SITE-WIDE EMISSIONS CHANGES

This proposed Title V permit action includes three revisions (Applications #16609, #20623, and #21288) and several other source changes, which have altered the maximum permitted emission levels for this site. The emission changes for each project are discussed in detail below; however, the net result of these changes is a small increase (+6.4 tons/year of POC) in site-wide maximum permitted POC emission rates and small reductions in the maximum permitted emission levels for the other criteria pollutants (NO_x, CO, SO₂, and PM₁₀). Engineering Evaluations and other supporting documentation for these projects are attached in Appendices D-G.

Application # 16609: A-60 Landfill Gas Flare Replacement Project

As discussed in the Engineering Evaluation for Application # 19098, this project involves the replacement of the A-50 Landfill Gas Flare with a new enclosed flare. Originally, Redwood Landfill had proposed to replace A-50 with a flare designated as A-59. The District issued an Authority to Construct for A-59 pursuant to Application # 16608. However, Redwood Landfill later requested to use a different flare (A-60, 90 MM BTU/hour capacity) with extreme turn down capability. The District permitted the A-60 Landfill Gas Flare pursuant to NSR Application # 19098 and cancelled the Authority to Construct for the A-59 Flare.

Prior to this flare replacement project, A-50 was limited to processing 630,720,000 scf/year of landfill gas and A-51 was limited to processing 1,576,800,000 scf/year of landfill gas, and the total throughput limit for the two flares combined was 2,207,520,000 scf/year. When A-50 was replaced by A-60, the District applied the current combined throughput limit of 2,207,520,000 scf/year to the combined operations for A-51 and A-60.

Emission limits for A-50 and A-51 were the same, except for carbon monoxide (CO). The A-50 Flare was subject to a CO emission limit of 0.30 pounds/MM BTU, while A-51 was subject to a CO emission limit of 0.20 pounds/MM BTU. The CO limit for A-60 was set to 0.20 pounds/MM BTU. For the flare replacement project, the calculation procedure for the POC emission rate limit was corrected and the landfill gas inlet sulfur content limit was reduced. The new POC emission limit for both flares is 0.01398 pounds/MM BTU, while the old calculation

APPENDIX C: Facility-Wide Emissions and Emission Changes

procedure for A-50 and A-51 resulted in a POC emission rate limit of 0.01358 pounds/MM BTU. In 2008, A-50 and A-51 were subject to an annual average landfill gas sulfur content limit of 425 ppmv of TRS, expressed as H₂S. For Application # 19098, the annual average inlet landfill gas sulfur content limit was reduced to 350 ppmv of TRS. The net result of these emission rate changes was a slight increase in maximum permitted annual POC emissions and decreases in maximum permitted annual emissions for CO and SO₂ from the operation of two landfill gas flares at Redwood Landfill. These changes in permitted emissions are summarized in Table 2.

Table 2. Changes in Maximum Permitted Emissions Due to the Flare Replacement Project

	Old Emission Limits			New Limits	Difference
	A-50	A-51	A-50 & A-51	A-51 & A-60	
	TPY	TPY	TPY	TPY	TPY
NO _x	9.461	23.652	33.113	33.113	-
CO	47.304	78.840	126.144	110.376	-15.768
POC	2.141	5.352	7.493	7.716	+ 0.223
PM ₁₀	2.697	6.743	9.440	9.440	-
SO ₂	22.321	55.803	78.124	64.338	-13.786

Application # 20623: Expansion of Redwood Landfill and Other Permit Condition Changes

As discussed in the Engineering Evaluation for Application # 20607, Redwood Landfill applied for and received a number of permit condition revisions that would allow an expansion of the design capacity of Redwood Landfill. This project resulted in 6.433 tons/year of POC emission increases due an increase in the maximum permitted fugitive waste decomposition emission limit for S-5.

Application # 21288: S-61 and S-62 Portable Diesel Engines Replacement Project

As discussed in the Engineering Evaluation for Application # 21287, Redwood Landfill was required to replace two existing Tier 0 portable diesel-fired IC engines (S-46 and S-48) with two new portable diesel-fired IC engines (S-61 and S-62) pursuant to the CARB ATCM for portable compression ignition engines. The new engines are a little larger than the engines they are replacing but have lower emission rates for most pollutants. A comparison of the current potential emissions for S-46 and S-48 to the new maximum permitted emission levels for S-61 and S-62 is presented in Table 3.

Table 3. Changes in Maximum Potential Emissions Due to Portable Engine Replacements

	Max Potential Emissions		Max Permitted Limits		Difference
	S-46	S-48	S-61	S-62	S61+S62-S46-S48
	TPY	TPY	TPY	TPY	TPY
NOx	3.094	1.903	0.828	0.828	-3.341
CO	0.276	0.098	0.385	0.385	+0.396
POC	0.183	0.087	0.044	0.044	-0.182
PM10	0.258	0.025	0.010	0.010	-0.263
SO2	0.043	0.046	0.002	0.002	-0.085

Other Changes: Shut Down of S-47 and Correction of S-49

Redwood Landfill has shut down the S-47 PACO Water Pump Engine and provided permit corrections for the S-49 Diesel Engine for a Back-up Generator. These source changes will impact the site-wide potential to emit. The emission changes are summarized below in Table 4.

Table 4. Changes in Maximum Potential Emissions Due to Other Engine Changes

	Old Potential	New Potential	Old Potential	New Potential	Net Difference
	S-47	S-47	S-49	S-49	
	TPY	TPY	TPY	TPY	TPY
NOx	2.707	0.000	0.021	0.034	-2.694
CO	0.682	0.000	0.003	0.004	-0.681
POC	0.110	0.000	0.001	0.001	-0.110
PM10	0.220	0.000	0.000	0.001	-0.219
SO2	0.035	0.000	0.000	0.001	-0.034

Summary of Site-Wide Potential to Emit Changes

The net changes to the site-wide potential to emit since the Title V permit was last revised in 2007 are presented in Table 5.

Table 5. Summary of Potential to Emit Changes Since the Last Title V Permit Revision in 2007

	Flare Replacement	Portable Engines Replacements	S-5 Expansion	S-47 Shut-Down	S-49 Correction	Net Difference
	TPY	TPY	TPY	TPY	TPY	TPY
NO _x	-	-3.341	-	-2.707	+0.013	-6.035
CO	-15.768	+0.396	-	-0.682	+0.001	-16.053
POC	+ 0.223	-0.182	+6.433	-0.110	+0.000	+6.364
PM ₁₀	-	-0.263	-	-0.220	+0.001	-0.482
SO ₂	-13.786	-0.085	-	-0.035	+0.001	-13.905

C. ACTUAL EMISSIONS CHANGES

A comparison of the actual criteria pollutant emissions for this site when the Title V permit was first issued in 2003 to the current actual emissions in 2011 is provided below.

Table 6. Changes in Site-Wide Actual Emissions Since Title V Permit Issuance

	Actual Emissions in 2003	Actual Emissions in 2010	Difference
	TPY	TPY	TPY
NO _x	14.1	21.5	+ 7.4
CO	40.5	69.8	+ 29.3
POC	42.3	37.4	- 4.9
PM ₁₀	16.8	134.4	+ 117.6
SO ₂	29.2	47.5	+ 18.3

The increases in the NO_x, CO, and SO₂ emission rates are primarily due to the collection and control of additional landfill gas from the landfill. The landfill gas collection rate was 7.96E8 scf/year in 2003 and was 1.38E9 scf/year in 2010. This increase in landfill gas collection rate is expected and will continue until the landfill reaches full capacity.

The POC and PM₁₀ emission rate changes are primarily due to corrections to the POC and PM₁₀ emission factors for the landfill, which the District made in 2007. Although the comparison above indicates that POC emissions decreased from 2003 to 2010, this decrease is likely due to an unrealistic 2003 POC emission rate for the landfill. The new landfill POC emission factor (implemented in 2007) was developed using updated landfill gas generation rates determined using LANDGEM and site-specific landfill gas concentration data. The new POC emission rate is a more accurate representation of the fugitive waste decomposition emissions from the landfill. As with landfill gas combustion emissions, the POC emission rate from the landfill is expected to increase in the future until the landfill reaches full capacity. Although

Table 6 shows a large increase in PM10 emissions from 2003 to 2010, this increase is mainly due to changes in the road dust emission factor for the landfill. The new PM10 emission factor for the landfill (revised in 2007) was developed based on site-specific vehicle trip data and updated haul road distances that were provided by Redwood Landfill for Application # 20607. In addition, the new PM10 emission factor was determined using updated AP-42 emission calculation methodology for road dust emissions. The detailed analysis of the particulate emission rates from the landfill that was presented in the Engineering Evaluation for Application # 20607 indicates that particulate emission rates from the landfill have actually decreased over time, but these particulate emission rates are significantly higher than the reported PM10 emissions in 2003.

APPENDIX D

REPORTS FOR GAS COLLECTION SYSTEM ALTERATIONS

APPLICATIONS # 13027 and # 21623

Permit to Operate Report
for
Landfill Gas Collection System Alterations

Redwood Landfill, Inc.; PLANT # 1179

APPLICATION # 13027

A. BACKGROUND

Redwood Landfill, Inc. owns and operates a landfill facility (Site # A1179) in Novato, CA. This facility includes an active MSW landfill (S-5), which is equipped with an active landfill gas collection system. Currently, all collected landfill gas is vented to two flares (A-51 and A-60). As of October 11, 2007, Redwood Landfill's gas collection system included 76 vertical wells and 9 horizontal collectors.

On October 16, 2007, the District issued Redwood Landfill an extension of an Authority to Construct (ATC #13027) for landfill gas collection system alterations that were necessary to ensure sufficient collector density in newly filled landfill areas, to repair the gas collection system in older landfill areas, and to maintain adequate gas collection throughout the landfill. This ATC extension authorized the installation of 30 vertical wells and 9 horizontal collectors, the decommissioning of 8 vertical wells and 4 horizontal collectors, and the relocation of 15 wells.

Redwood Landfill submitted start-up and/or decommissioning notification letters to the District on the following dates: 10/26/2007, 4/15/2008, 5/13/2008, 11/14/2008, 2/6/2009, 3/4/2009, and 7/17/2009. As of the July 17, 2009 notification letter, Redwood Landfill had installed a total of 21 new vertical wells and began operating 20 of these wells. Redwood Landfill also decommissioned a total of 6 vertical wells and 2 horizontal collectors. Redwood Landfill replaced or relocated an additional 11 vertical wells. The current operational gas collection system configuration consists of 90 vertical wells and 7 horizontal collectors. One additional well (Vertical Well #RLI0130E) has been installed but is not yet operating. These gas collection system components are identified in the table below. Note that the component ID numbers have been revised pursuant to Redwood Landfill's 2/6/2009 correspondence.

The District is proposing to issue the final Permit to Operate for the landfill gas collection system described above. Authority to Construct #13027 expired on October 11, 2009. Redwood Landfill submitted a request for additional landfill gas collection system alterations in March 2009. Although UPS tracking indicates that the District received this application, it was apparently lost and an application number was not assigned until 2/23/2010. Authorization of additional landfill gas collection system alterations is under way (see Application #21623).

Table 1. Authorized Landfill Gas Collection System Components as of July 17, 2009

Vertical Wells	Vertical Wells	Vertical Wells	Vertical Wells	Vertical Wells	Horizontal Collectors
1	29	65	101C	121D	83
2	32	66	102C	122D	84
3	33	67	103C	123D	85
5	34	68	104B	124G	87
6	35	69	105C	125C	89
7	40	70	106C	126C	90
8	42	71	107C	127B	98
9	43	72	108A	128A	
11	44	74	109E	129E	
12	45	76	110E	* 130E	
13	47	77	111E	131B	
14	49	78	112A		
16	51	79	113E		
17	53	80	114A		
18	57	81	115E		
19	59	92	116E		
22	61	93	117D		
26	62	95	118D		
27	63	97	119D		
28	64	100C	120D		

* Well RLI0130E is a new well that was installed as of February 2009, but the District has not received a start-up notification for this well yet, and it has not commenced operation.

B. STATEMENT OF COMPLIANCE

Regulation 8, Rule 34

The Redwood Landfill's Active Landfill with Gas Collection System (S-5) is expected to comply with Regulation 8 Rule 34 Section 301 by:

- continuously operating the gas collection system (90 vertical wells and 7 horizontal collectors) and flares,
- having no leaks (exceeding 1000 ppmv) from the gas collection system, and
- processing all collected gases in flares achieving at least 98% destruction efficiency or emitting no more than 30 ppmv of NMOC (as methane) at 3% O₂.

For this site, the District expects that Redwood should collect a minimum of 75% of the projected methane generation rate for the landfill. A comparison of the 2009 collection rate (2492 scfm of landfill gas at about 49% methane) to the 2009 projected generation rate (3043 scfm of landfill gas at 50% methane) indicates that Redwood is collecting about 80% of the methane that the landfill is generating.

The S-5 Active Landfill is also subject to 8-34-303, which limits leaks on the surface of the landfill to less than 500 ppmv as methane. The collection system alterations completed pursuant

to this application are intended to prevent surface emission leaks greater than this standard. Redwood Landfill has not found any surface emission leaks above this standard in the last few years.

Since the measured gas collection rate is adequate and surface leaks have not been detected, the gas collection system appears to be functioning properly.

C. PERMIT CONDITIONS

The following permit condition revisions are necessary to reflect the landfill gas collection system alterations that have been completed to date. Since the Authority to Construct for Application # 13027 has expired, no additional alterations are authorized at this time. However, the District expects to approve condition changes in the near future to authorize additional gas collection system alterations (see Application # 21623).

Condition # 19867

FOR: S-5 REDWOOD LANDFILL WITH GAS COLLECTION SYSTEM; A-18 WATER SPRAYS; A-51 LANDFILL GAS FLARE; AND A-60 LANDFILL GAS FLARE

No Changes to Parts 1-16

17. The landfill gas collection system described in subpart a below shall be operated continuously as defined in Regulation 8-34-219. Wells, collectors, and adjustment valves shall not be shut off, disconnected, or removed from operation without written authorization from the District, unless the Permit Holder complies with all applicable requirements of Regulation 8, Rule 34, Sections 113, 116, 117, and 118. The Permit Holder shall apply for and receive an Authority to Construct before modifying the landfill gas collection system described in subpart a below. Increasing or decreasing the number of wells or collectors, or significantly changing the length of collectors or the locations of wells or collectors are modifications that are subject to the Authority to Construct requirement. Adding or modifying risers, laterals, or header pipes are not subject to this Authority to Construct requirement. The authorized number of landfill gas collection system components is the baseline count listed below plus any components added and minus any components decommissioned pursuant to Part 17b as evidenced by start-up/shut-down notification letters submitted to the District.

a. The Permit Holder has been issued a Permit to Operate for the landfill gas collection system components listed below, which includes all start-up/shut-down notifications submitted through ~~October 11, 2007~~ July 17, 2009. Well and collector locations, depths, and lengths are as described in detail in Permit Application # 13027.

Required Components

Total Number of Vertical Wells:	<u>7690</u>
Total Number of Horizontal Collectors:	<u>97</u>

b. The Permit Holder has been issued an Authority to Construct for the landfill gas collection system components listed below. Specific well and

collector locations, depths, and lengths of associated piping are as described in detail in Permit Application # 13027.

	Minimum	Maximum
Install New Vertical Wells:	0	30 <u>1</u>
Decommission Vertical Wells:	0	80 <u>0</u>
Install New Horizontal Collectors	0	90 <u>0</u>
Decommission Horizontal Collectors	0	40 <u>0</u>
Replace Vertical Wells *	0	150 <u>0</u>

* one-for-one well replacement at new optimal locations

Wells installed or shutdown pursuant to subpart b shall be added to or removed from subpart a in accordance with the procedures identified in Regulations 2-6-414 or 2-6-415. The Permit Holder shall maintain records of the decommissioning date for each well that is shut down and the initial operation date for each new well.

(Basis: Regulations 2-1-301, 8-34-301.1, 8-34-304, 8-34-305, and 2-6-413)

No Changes to Parts 18-32

D. RECOMMENDATION

Issue a Permit to Operate for the gas collection system described below subject to the revised Condition # 19867.

S-5 Redwood Landfill; Gas Collection System: 90 vertical wells and 7 horizontal collectors.

By: signed by Carol S. Allen
 Carol S. Allen
 Principal Air Quality Engineer

February 25, 2010
 Date

ENGINEERING EVALUATION

Redwood Landfill, Inc.; PLANT # 1179

APPLICATION # 21623

for Gas Collection System Alterations

A. BACKGROUND

Redwood Landfill, Inc. (Redwood) operates the Redwood Landfill Facility in Novato, CA. This facility includes an active MSW landfill (S-5 with about 17.8 million tons of refuse in place), two landfill gas flares (A-51 and A-60), a sludge pond (S-2), composting operations (S-34), green waste processing sources (S-39, S-41, and S-56), soil stockpiles (S-42), a non-retail gasoline dispensing facility (S-55), an aerated leachate pond (S-58), and diesel engines that provide portable or standby power (S-49, S-57, S-61, and S-62). Trucks with water sprays (A-18) control the dust generated by land-filling activities, composting operations, green waste processing sources, and soil stockpiles.

Redwood submitted this application to obtain an Authority to Construct and Permit to Operate for landfill gas collection system alterations that are necessary to ensure that the S-5 Redwood Landfill remains in compliance with Regulation 8, Rule 34 and the federal NSPS requirements for MSW Landfills (40 CFR Part 60, Subpart WWW). In particular, Redwood has requested to (a) decommission up to 20 existing vertical wells, (b) install up to 35 new vertical wells, (c) decommission up to 5 horizontal collectors, and (d) install up to 10 horizontal collectors. In addition to these alterations, Redwood requested to replace and relocate up to 15 vertical wells. The one-for-one replacement of gas collection wells in essentially the same location as the existing wells is considered to a replacement of a component of the gas collection system rather than an alteration and does not normally require an Authority to Construct. However, these proposed replacements may involve significant relocations of wells or delayed start ups for the new wells. Therefore, these replacements/relocations will be authorized pursuant to this alteration request. During the one-for-one replacement of any landfill gas collection system components that are not specifically included in this alteration authorization, Redwood must comply with Regulation 8, Rule 34, especially Sections 116 and 117, which limit the number of wells that may be shut down at any one time and limit the duration of these well shutdowns.

Redwood has requested to use the accelerated permit application procedures for Application #21623. This application was deemed complete and an accelerated Permit to Operate was issued effective February 25, 2010.

B. EMISSIONS

Redwood Landfill currently vents all of their collected landfill gas to the A-51 and A-60 Landfill Gas Flares. The maximum permitted throughput rate for these two flares combined is an annual average of 4200 scfm of landfill gas. From October 2008 through September 2009, the actual annual average collection rate was 2492 scfm of landfill gas, which is 59% of the permitted flare capacity. Over the next four years, Redwood Landfill's gas generation is only expected to increase by about 280 scfm. The gas control system has sufficient capacity to handle this potential increase in the gas collection rate with no permit alterations. Therefore, this application will not result in any emission increases.

C. STATEMENT OF COMPLIANCE

Regulation 2, Rule 1 (CEQA and Public School Notifications)

This application involves permit condition changes for an existing permitted source that do not result in any emission increases. In addition, the gas collection system is part of the required abatement system for the landfill, and the requested collection system alterations are necessary to ensure that landfill gas emissions are properly controlled. Consequently, this request is categorically exempt from CEQA review in accordance with Regulations 2-1-312.1 and 2-1-312.2. This project has no potential for causing a significant adverse environmental impact. No further CEQA review is required.

The project is over 1000 feet from the nearest school and is therefore not subject to the public notification requirements of Regulation 2-1-412.

Regulation 2, Rule 2 (New Source Review) and Rule 5 (NSR of Toxic Air Contaminants)

Since there are no emission increases expected from this project, new source review (NSR) is not required. BACT, Offsets, PSD, TBACT and Project Risk limits do not apply.

Regulation 2, Rule 6

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act (40 CFR, Part 70) and BAAQMD Regulation 2, Rule 6, Major Facility Review (MFR), because it is a major facility, as defined by Regulation 2-6-212. This facility has the “potential to emit,” as defined by Regulation 2-6-218, more than 100 tons per year of a regulated air pollutant, specifically more than 100 tons per year of carbon monoxide. Therefore, this facility is required to have an MFR permit pursuant to Regulation 2-6-301.

This facility is also subject to the Title V operating permit requirements and Regulation 2, Rule 6, MFR permit requirements, because it is a designated facility as defined by Regulation 2-6-204. The Standards of Performance for Municipal Solid Waste Landfills (40 CFR Part 60, Subpart WWW) require the owner or operator of a landfill that is subject to Subpart WWW and that has a design capacity of greater than or equal to 2.5 million megagrams (Mg) and 2.5 million cubic meters (m³) to obtain an operating permit pursuant to Part 70. The landfill at this facility is subject to 40 CFR, Part 60, Subpart WWW and has design capacities of 14.6 million m³ and 15.5 million Mg. Therefore, this facility is a designated facility and is required to have an MFR permit pursuant to 2-6-304.

The initial MFR Permit for this facility was issued on November 10, 2003 and was last revised on October 24, 2007. The MFR permit revision incorporating the condition changes described in this application will be handled pursuant to Application #16608 or #17987.

Regulation 8, Rule 34

The Redwood Landfill’s Active Landfill with Gas Collection System (S-5) is expected to comply with Regulation 8 Rule 34 Section 301 by:

- (a) continuously operating the gas collection system (90 vertical wells and 7 horizontal collectors) and flares,
- (b) having no leaks (exceeding 1000 ppmv) from the gas collection system, and
- (c) processing all collected gases in flares achieving at least 98% destruction efficiency or emitting no more than 30 ppmv of NMOC (as methane) at 3% O₂.

The S-5 Active Landfill is also subject to 8-34-303, which limits leaks on the surface of the landfill to less than 500 ppmv as methane. The collection system alterations requested in this application are

intended to prevent surface leaks exceeding this standard. The current collection system components are identified in Table 1 below.

Table 1. Authorized Landfill Gas Collection System Components as of July 17, 2009

Vertical Wells	Vertical Wells	Vertical Wells	Vertical Wells	Vertical Wells	Horizontal Collectors
1	29	65	101C	121D	83
2	32	66	102C	122D	84
3	33	67	103C	123D	85
5	34	68	104B	124G	87
6	35	69	105C	125C	89
7	40	70	106C	126C	90
8	42	71	107C	127B	98
9	43	72	108A	128A	
11	44	74	109E	129E	
12	45	76	110E	* 130E	
13	47	77	111E	131B	
14	49	78	112A		
16	51	79	113E		
17	53	80	114A		
18	57	81	115E		
19	59	92	116E		
22	61	93	117D		
26	62	95	118D		
27	63	97	119D		
28	64	100C	120D		

* Well RLI0130E is a new well that was installed as of February 2009, but the District has not received a start-up notification for this well yet, and it has not commenced operation.

Federal Requirements:

The S-5 Redwood Landfill is subject to the NSPS for MSW Landfills (40 CFR, Part 60, Subpart WWW), because the design capacity for the landfill was modified in 1995. The collection and control standards for this site became effective on December 10, 1998. Recent source testing indicates that the flares are complying with 40 CFR 60.752(b)(2)(iii)(B) by emitting no more than 20 ppmv of NMOC (as hexane) at 3% O₂. The collection system alterations requested in this application are necessary to maintain compliance with the 500 ppmv as methane surface leak limit 40 CFR 60.753(d). Redwood Landfill is complying with the monthly wellhead and cover monitoring requirements (40 CFR 60.756(a) and 40 CFR 60.755(c)(5)) and quarterly surface monitoring requirements (40 CFR 60.755(c)(1-4) and (d)) of this NSPS. This application does not trigger any new NSPS requirements.

The S-5 Redwood Landfill is also subject to the NESHAPs for MSW Landfills (40 CFR, Part 63, Subpart AAAA). In accordance with NESHAP requirements, Redwood Landfill has prepared a Start-up, Shut-down, and Malfunction Plan and is now submitting the Regulation 8, Rule 34 Annual Report on a semi-annual basis.

D. PERMIT CONDITIONS

The S-5 Redwood Landfill is subject to Condition # 19867. These conditions will be revised as indicated

below in order to allow the necessary alterations of the landfill gas collection system. These collection system alterations are expected to (a) collect landfill gas in new fill areas, (b) replace aging gas collection components, and (c) optimize landfill gas collection.

Condition # 19867

FOR: S-5 REDWOOD LANDFILL WITH GAS COLLECTION SYSTEM; A-18 WATER SPRAYS; A-51 LANDFILL GAS FLARE, AND A-60 LANDFILL GAS FLARE

No changes to Parts 1-16

17. The landfill gas collection system described in subpart a below shall be operated continuously as defined in Regulation 8-34-219. Wells, collectors, and adjustment valves shall not be shut off, disconnected, or removed from operation without written authorization from the District, unless the Permit Holder complies with all applicable requirements of Regulation 8, Rule 34, Sections 113, 116, 117, and 118. The Permit Holder shall apply for and receive an Authority to Construct before ~~modifying~~ ~~altering~~ the landfill gas collection system described in subpart a below. Increasing or decreasing the number of wells or collectors, or significantly changing the length of collectors or the locations of wells or collectors are ~~modifications~~ ~~alterations~~ that are subject to the Authority to Construct requirement. Adding or ~~modifying~~ ~~altering~~ risers, laterals, or header pipes are not subject to this Authority to Construct requirement. The authorized number of landfill gas collection system components is the baseline count listed below plus any components added and minus any components decommissioned pursuant to Part 17b as evidenced by start-up/shut-down notification letters submitted to the District.

a. The Permit Holder has been issued a Permit to Operate for the landfill gas collection system components listed below, which includes all start-up/shut-down notifications submitted through ~~July 17, 2009~~ February 1, 2010. Well and collector locations, depths, and lengths are as described in detail in Permit Application # ~~1302721623~~.

	Required Components
Total Number of Vertical Wells:	90
Total Number of Horizontal Collectors:	7

b. The Permit Holder has been issued an Authority to Construct for the landfill gas collection system components listed below. Specific well and collector locations, depths, and lengths of associated piping are as described in detail in Permit Application # ~~1302721623~~.

	Minimum	Maximum
Install New Vertical Wells:	0	136
Decommission Vertical Wells:	0	020
Install New Horizontal Collectors	0	010
Decommission Horizontal Collectors	0	05
Replace Vertical Wells *	0	015

* one-for-one well replacement at new optimal locations

Wells installed or shutdown pursuant to subpart b shall be added to or removed from subpart a in accordance with the procedures identified in

Regulations 2-6-414 or 2-6-415. The Permit Holder shall maintain records of the decommissioning date for each well that is shut down and the initial operation date for each new well.

(Basis: Regulations 2-1-301, 8-34-301.1, 8-34-304, 8-34-305, and 2-6-413)

No changes to Parts 18-32.

E. RECOMMENDATION

Issue a Change of Conditions for the following source subject to the revised conditions above (Condition # 19867):

S-5 Redwood Landfill with Gas Collection System (90 vertical wells and 7 horizontal collectors).

By: signed by Carol S. Allen
Carol S. Allen
Principal Air Quality Engineer

February 25, 2010
Date

ENGINEERING EVALUATION

Redwood Landfill, Inc.; PLANT # 1179; APPLICATION # 21623

Updated GCS Descriptions and Authorized Alterations

A. BACKGROUND

On March 3, 2010, the District issued Redwood Landfill, Inc. (Redwood) a Change of Conditions that authorized landfill gas collection system alterations. At that time, the gas collection system included 90 vertical wells and 7 horizontal collectors. The authorized alterations were: install 36 vertical wells, decommission 20 vertical wells, install 10 horizontal collectors, and decommission 5 horizontal collectors. Redwood Landfill submitted start-up and decommissioning notifications as follows:

Table 1. Well Alteration Notifications Received Between 3/3/10 and 12/31/11

	Vertical Wells	
	Installed	Decommissioned
11/24/10	1	3
7/22/11		3
8/1/11	6	
8/22/11	4	

The specific well changes are shown below in strikeout and underline formatting.

Table 2. Authorized Landfill Gas Collection System Components as of 1/1/2012

Vertical Wells	Vertical Wells	Vertical Wells	Vertical Wells	Vertical Wells	Horizontal Collectors
1	29	65	101C	121D	83
2	32	66	102C	122D	84
3	33	67	103C	123D	85
5	34	68	104B	124G	87
6	35	69	105C	125C	89
7	40	70	106C	126C	90
8	42	71	107C	127B	98
9	43	72	108A	128A	
11	44	74	109E	129E	
12	45	76	110E	* <u>130E</u>	
13	47	77	111E	131B	
14	49	78	112A	<u>132</u>	
16	51	79	113E	<u>133</u>	
17	53	80	114A	<u>134</u>	
18	57	81	115E	<u>135</u>	
19	59	92	116E	<u>136</u>	
22	61	93	117D	<u>137</u>	
26	62	95	118D	<u>138</u>	
27	63	97	119D	<u>139</u>	
28	64	100C	120D	<u>140</u>	
				<u>141</u>	

* Well RLI0130E is a new well that was installed as of February 2009, but the District received a start-up notification for this well on 11/24/10 indicating that this well was expected to begin operation on 12/3/10. Well 130E is now part of the operating gas collection system.

B. PERMIT CONDITIONS

The gas collection system description in Part 17a and the authorized gas collection system alterations identified in 17b will be updated to reflect the well start-ups and decommissionings that that have been completed to date. These updates are shown below.

Condition # 19867

FOR: S-5 REDWOOD LANDFILL WITH GAS COLLECTION SYSTEM; A-18 WATER SPRAYS; A-51 LANDFILL GAS FLARE, AND A-60 LANDFILL GAS FLARE

No changes to Parts 1-16

- 17. The landfill gas collection system described in subpart a below shall be operated continuously as defined in Regulation 8-34-219. Wells, collectors, and adjustment valves shall not be shut off, disconnected, or removed from operation without written authorization from the District, unless the Permit Holder complies with all applicable requirements of Regulation 8, Rule 34, Sections 113, 116, 117, and 118. The Permit Holder shall apply for and receive an Authority to Construct before altering the landfill gas collection system described in subpart a below. Increasing or decreasing the number of wells or collectors, or significantly changing the length of collectors or the locations of wells or collectors are alterations that are subject to the Authority to Construct requirement. Adding or altering risers, laterals, or header pipes are not subject to this Authority to Construct requirement. The authorized number of landfill gas collection system components is the baseline count listed below plus any components added and minus any components decommissioned pursuant to Part 17b as evidenced by start-up/shut-down notification letters submitted to the District.
 - a. The Permit Holder has been issued a Permit to Operate for the landfill gas collection system components listed below, which includes all start-up/shut-down notifications submitted through February 1, 2010. Well and collector locations, depths, and lengths are as described in detail in Permit Application #21623.

Required Components

Total Number of Vertical Wells:	<u>9095</u>
Total Number of Horizontal Collectors:	7

- b. The Permit Holder has been issued an Authority to Construct for the landfill gas collection system components listed below. Specific well and collector locations, depths, and lengths of associated piping are as described in detail in Permit Application #21623.

	Minimum	Maximum
Install New Vertical Wells:	0	<u>3625</u>
Decommission Vertical Wells:	0	<u>2014</u>
Install New Horizontal Collectors	0	10
Decommission Horizontal Collectors	0	5
Replace Vertical Wells *	0	15

* one-for-one well replacement at new optimal locations

Wells installed or shutdown pursuant to subpart b shall be added to or removed from subpart a in accordance with the procedures identified in Regulations 2-6-414 or 2-6-415. The Permit Holder shall maintain records of the decommissioning date for each well that is shut down and the initial operation date for each new well.

(Basis: Regulations 2-1-301, 8-34-301.1, 8-34-304, 8-34-305, and 2-6-413)

No changes to Parts 18-32.

C. RECOMMENDATION

The Change of Conditions identified above will be made administratively and will be sent to Redwood Landfill upon renewal of the annual permit for this site, which is currently underway:

S-5 Redwood Landfill with Gas Collection System (95 vertical wells and 7 horizontal collectors).

By: signed by Carol S. Allen
 Carol S. Allen
 Supervising Air Quality Engineer

January 6, 2012
 Date

APPENDIX E
REPORTS FOR FLARE REPLACEMENT PROJECT
APPLICATIONS # 19098 and # 16608

ENGINEERING EVALUATION

APPLICATION # 19098

Redwood Landfill, Inc.; Site # A1179

A. BACKGROUND

Redwood Landfill, Inc. owns and operates an active MSW landfill in Novato, CA (S-5 at Plant # 1179). The S-5 Redwood Landfill is equipped with an active landfill gas collection system and a continuously operating landfill gas control system.

On October 14, 2008, the District revised the permit conditions for the S-5 Redwood Landfill and approved several modifications to the landfill's gas control system pursuant to Application # 16608. Prior to Application # 16608, the landfill was equipped with two enclosed flares: A-50 and A-51 with maximum permitted throughput limits of 630.72 MM scf/year and 1576.80 MM scf/year, respectively. These landfill gas throughput limits were equivalent to a combined annual average heat input rate of 126 MM BTU/hour. The A-50 Flare was shut down due to mechanical and performance problems. It has been dismantled and will soon be replaced by a new flare. Pursuant to Application # 16608, the District issued an Authority to Construct for a new flare: A-59 with a maximum heat input capacity of 120 MM BTU/hour. To ensure compliance with new source review requirements for the landfill and its associated control systems, the landfill gas throughput rate for the new emission control system (Flares A-51 and A-59) was limited to the same combined throughput rate: 2207.52 MM scf/year (or an annual average of 126 MM BTU/hour) as the previous limits.

Redwood Landfill has determined that a new type of extreme turn down enclosed flare (it has a 20 to 1 turndown ratio versus the standard 6 to 1 turndown ratio) will suit the landfill gas control needs for this site better than the previously proposed A-59 Flare. Redwood Landfill submitted Application # 19098 to request an Authority to Construct for this new A-60 Landfill Gas Flare. Redwood Landfill also requested to cancel the Authority to Construct for the A-59 Flare. The A-60 Flare will be able to achieve compliance with all emission limits when operating between 150 scfm of landfill gas (4.5 MM BTU/hour) and 3000 scfm of landfill gas (90 MM BTU/hour). Under low flow conditions (150-400 scfm of landfill gas), the A-60 Flare will operate on 4 burners in an isolated zone of the stack. The isolated operating zone is necessary to maintain the minimum operating temperature of 1400 °F and to achieve the necessary 0.6 second retention time. The isolated stack zone ends 4 feet from the top of the flare stack. Above 400 scfm (12 MM BTU/hour), the flare will operate in the standard mode using all 30 burners. Each operating zone will be equipped with its own temperature monitor and recorder.

As with A-59, A-60 will be permitted to operate at maximum capacity (90 MM BTU/hour for A-60) on an hourly and daily basis. However, the current maximum landfill gas throughput limit of 2207.52 MM scf/year (annual average of 126 MM BTU/hour or 1,103,760 MM BTU/year) for the two flares combined will be retained for A-51 and A-60.

B. EMISSIONS

Proposed Criteria Pollutant Emissions:

The NO_x and CO emission factors for A-60 are equal to the current RACT requirements for enclosed landfill gas flares: 0.06 pounds of NO_x per MM BTU and 0.20 pounds of CO per MM BTU. The flare vendor has guaranteed compliance with these emission limits for this flare operating between 4.5 and 90 MM BTU/hour.

The PM₁₀ emission factor for A-60 is derived from the AP-42 emission factor of 17 lbs PM₁₀/MM dscf of CH₄ burned. The Redwood Landfill gas is assumed to contain 50% methane with a heat content of 496.943 BTU/dscf. The PM₁₀ factor is calculated below:

$$(17 \text{ lbs PM}_{10}/1\text{E}6 \text{ dscf CH}_4) * (0.5 \text{ dscf CH}_4/1.0 \text{ dscf LFG}) / (496.943 \text{ BTU/dscf LFG}) * (1\text{E}6 \text{ BTU/MM BTU}) = 0.017105 \text{ lbs PM}_{10}/\text{MM BTU}$$

The sulfur dioxide (SO₂) emission factors are derived from the landfill gas sulfur content limits in Condition # 19867, Part 18. Assuming all of the TRS in the landfill gas is converted to SO₂, the proposed TRS limits are equivalent to the SO₂ emission factors derived below:

Daily SO₂ Emission Factor:

$$(600 \text{ scf H}_2\text{S}/1\text{E}6 \text{ scf LFG}) * (1 \text{ scf SO}_2/1 \text{ scf H}_2\text{S}) / (387.006 \text{ scf SO}_2/\text{lbmol SO}_2) * (64.059 \text{ lbs SO}_2/\text{lbmol}) / (496.943 \text{ BTU/scf LFG}) * (1\text{E}6 \text{ BTU/MM BTU}) = 0.199851 \text{ lbs SO}_2/\text{MM BTU}$$

Annual SO₂ Emission Factor:

$$(350 \text{ scf H}_2\text{S}/1\text{E}6 \text{ scf LFG}) * (1 \text{ scf SO}_2/1 \text{ scf H}_2\text{S}) / (387.006 \text{ scf SO}_2/\text{lbmol SO}_2) * (64.059 \text{ lbs SO}_2/\text{lbmol}) / (496.943 \text{ BTU/scf LFG}) * (1\text{E}6 \text{ BTU/MM BTU}) = 0.116580 \text{ lbs SO}_2/\text{MM BTU}$$

The POC and NPOC emission factors for A-60 are derived from the Regulation 8-34-301.3 outlet NMOC concentration limit of 30 ppmv of NMOC as methane at 3% oxygen. This NMOC outlet concentration limit results in higher emissions than organic emissions calculated using the NMOC inlet concentration limit (360 ppmv of NMOC as hexane in landfill gas) and 98% destruction efficiency. The POC emission rate is assumed to be 100% of the NMOC emission rate, while the NPOC emission rate is assumed to be no more than 1% of the total NMOCs, based on site-specific NPOC concentration data. Detailed calculations are available in the attached spreadsheets. The derived organic emission factors for the flares are:

0.006948 lbs POC/MM BTU and
0.000069 lbs NPOC/MM BTU.

The proposed maximum daily emissions from the current and proposed flares are presented in Table 1. The proposed maximum annual emissions for the two flares combined are presented in Table 2. As shown in Table 5, POC and NPOC are the only pollutants that will have increases in the maximum permitted emission levels from the flares.

Table 1. Proposed Maximum Daily Emissions for Redwood Landfill's Flares

	Emission Factors for both A-51 and A-60 Lbs/MM BTU	A-51 at 2160 MM BTU/day Pounds/Day	A-60 at 2160 MM BTU/day Pounds/Day	A-51 and A-60 at 4320 MM BTU/day Pounds/Day
NO _x	0.060000	129.60	129.60	259.20
CO	0.200000	432.00	432.00	864.00
PM ₁₀	0.017105	36.95	36.95	73.90
SO ₂	0.199851	431.68	431.68	863.36
POC	0.013980	30.20	30.20	60.40
NPOC	0.000140	0.30	0.30	0.60

Table 2. Proposed Maximum Annual Criteria Pollutant Emissions for Redwood Landfill's Flares

	Emission Factors (A-51 & A-60) Lbs/MM BTU	A-51 At Max Capacity: 788,400 MM BTU/Yr Tons/Year	A-60 At Max Capacity: 788,400 MM BTU/Yr Tons/Year	A-51 and A-60 At Combined Limit: 1,103,760 MM BTU/Yr (2207.52 MM scf/yr) Tons/Year
NO _x	0.060000	23.652	23.652	33.113
CO	0.200000	78.840	78.840	110.376
PM ₁₀	0.017105	6.743	6.743	9.440
SO ₂	0.116580	45.956	45.956	64.338
POC	0.013980	5.511	5.511	7.716
NPOC	0.000140	0.055	0.055	0.077

Cumulative Emission Increases:

As discussed in the Engineering Evaluation for Application # 16608, the emission increases for the gas control system changes were equal to the proposed limits for the new landfill gas control system (total emissions from A-51 and A-59 at the combined landfill gas throughput limit of 2207.52 MM scf/yr) minus the baseline emissions for the previous gas control system (actual average emissions from A-50 and A-51 during 2005-2007). For Application #19098, the A-60 Flare is simply replacing the A-59 Flare at the same proposed combined annual landfill gas throughput rate and annual emission limits. Therefore, the control system emission increases are the same as for Application # 16608. The control system emission increases for Application # 19908 are summarized in Table 3.

For secondary pollutants (CO, SO₂, NO_x, and PM₁₀), the control system emission increases are also the cumulative emission increases for Application #19098. The cumulative emission increases for Application # 16608 will be deleted when the Authority to Construct for A-59 is withdrawn.

The POC and NPOC residual emissions are attributed to the S-5 landfill. Since the proposed POC and NPOC residual emissions are the same as the current limits, this application does not result in any cumulative emission increases of POC or NPOC.

Table 3. Landfill Gas Control System Emission Increases

Pollutant	Proposed Control System Emissions from A-51 & A-60 Tons/Year	Actual Emissions from A-50 & A-51 Flares Tons/Year	Control System Emission Increases Tons/Year	Cumulative Emission Increases for Application #19098 Tons/Year
CO	110.376	15.131	95.245	95.245
SO ₂	64.338	32.318	32.020	32.020
NO _x	33.113	14.045	19.068	19.068
PM ₁₀	9.440	5.579	3.861	3.861
POC	7.716	0.756	6.960	
NPOC	0.077	0.000	0.077	

Toxic Emissions:

For the purposes of Regulation 2, Rule 5, the project shall include all emission increases from new or modified sources and related projects that were permitted within the last two years. At landfill facilities, the landfill and its flares are generally considered to be related operations, because the flares are an integral part of the control system for the landfill. For this site, the S-5 Redwood Landfill, the existing A-51 Landfill Gas Flare, and the proposed A-60 Landfill Gas Flare are related devices.

In accordance with Regulation 2-5-112.1, the toxic NSR requirements apply to applications for new or modified sources of toxic air contaminants submitted after July 1, 2005. While the District has corrected the TAC emission calculations for the S-5 Redwood Landfill based on updated gas generation rate profiles and more extensive landfill gas TAC concentration data, the S-5 Redwood Landfill has not undergone a modification as defined in Regulation 2-5-214 since July 1, 2005. The current daily waste acceptance rate limits and cumulative waste in place limits allowed waste to be placed in the landfill at a faster rate than originally predicted. Thus, the current higher gas generation rate estimate for S-5 is allowed by the current S-5 permit. Any increases in the current projected maximum fugitive TAC emission rates from S-5 compared to the maximum TAC emission rates predicted for the last S-5 modification (Application # 17552) are due to calculation improvements and are not caused by a modification of S-5. Since S-5 is not a modified source, these emission changes are not included in the project emission increases for Application # 19098.

The A-60 Landfill Gas Flare is a new source of toxic air contaminant (TAC) emissions. Since the A-51 Landfill Gas Flare was permitted less than two years ago and this device is related to A-60, the emission increases from A-51 are included in the project emission increases for Application # 19098. The residual TAC emissions from landfill gas flares are typically linked to the landfill for toxic NSR purposes. Since S-5 is not being modified and this application will not result in increases in the maximum annual landfill gas throughput rate to the flares, this application will not result in any residual TAC emission increases. Therefore, the Application # 19098 project emission increases include only the secondary emissions from the A-51 and A-60 Flares.

For completeness, the updated maximum expected emission rates for the S-5 Redwood Landfill, the A-51 Landfill Gas Flare, the A-60 Landfill Gas Flare, and the total maximum TAC emission rates from these related operations are presented below. However, only the secondary TAC emissions from the two flares

(A-51 and A-60) are subject to Regulation 2, Rule 5. Detailed toxic air contaminant emission calculations are provided in the attached spreadsheets. The calculation procedures for the landfill and flares are discussed briefly below followed by tables summarizing the hourly and annual emission rates for the TACs that cause the most significant health impacts.

The fugitive TAC emission from the landfill include emissions generated by the waste decomposition process plus emissions that occur during the disposal of contaminated soil or use of VOC laden soil as cover material. Maximum waste decomposition emissions were determined based on the peak landfill gas generation rate (3820 scfm of landfill gas) - which was determined pursuant to Application #16608 using EPA's LANDGEM program, an assumed landfill gas capture efficiency of 75% - which results in a fugitive emission rate of 25%, the maximum permitted landfill gas concentrations for the significant TACs, and the molecular weights for these compounds. The maximum permitted annual emissions for contaminated soil disposal were established in Application #17552. Maximum hourly emissions due to contaminated soil disposal were estimated by assuming that the annual emissions occur during a single day over an 8 hour period.

Maximum proposed residual landfill gas emissions from the flares were calculated based on the landfill gas TAC concentration limits, the molecular weights for these TACs, and an assumed flare destruction efficiency of 98% by weight for each individual compound. Secondary formaldehyde emissions from the flares were calculated using the CATEF emission factor for landfill gas fired turbines. Secondary acid gas emissions (HBr, HCl, and HF) from the flares were calculated using the following maximum estimated ion concentrations: 5,000 ppbv of bromine, 40,000 ppbv of chlorine, and 4,000 ppbv of fluorine. These ion concentration estimates were derived from on-site test data, landfill gas concentration limits, and EPA default concentration levels for halogenated compounds in landfill gas.

Table 4. Maximum Hourly TAC Emissions from the Redwood Landfill and Flares

	Fugitive Waste Decomposition Emissions from S-5 Pounds/Hour	Contaminated Soil Handling Emissions from S-5 Pounds/Hour	Emissions from A-51 Flare at 90 MM BTU/hr Pounds/Hour	Emissions from A-60 Flare at 90 MM BTU/hr Pounds/Hour	Total Landfill and Flare Emissions Pounds/Hour	Risk Screen Trigger Levels Pounds/Hour
Acrylonitrile	2.357E-3		1.490E-4	1.490E-4	2.655E-3	
Benzene	1.157E-2		7.311E-4	7.311E-4	6.988E+0	
1,3 Butadiene	2.403E-3		1.519E-4	1.519E-4	2.707E-3	
Carbon Tetrachloride	2.278E-3	6.975E+0	1.440E-4	1.440E-4	6.978E+0	
Chloroform	1.768E-3	8.365E+1	1.117E-4	1.117E-4	8.365E+1	
Chloroprene	3.933E-3		2.486E-4	2.486E-4	4.430E-3	
p-Dichlorobenzene	8.707E-3	1.046E+2	5.503E-4	5.503E-4	1.046E+2	
1,4 Dioxane	3.914E-3		2.474E-4	2.474E-4	4.409E-3	
Ethylene Dibromide	2.782E-3		1.758E-4	1.758E-4	3.133E-3	
Ethylene Dichloride	1.465E-3	6.975E+0	9.262E-5	9.262E-5	6.977E+0	
Ethylidene Dichloride	2.931E-3		1.852E-4	1.852E-4	3.301E-3	
Hydrogen Sulfide	3.028E-0		1.914E-1	1.914E-1	3.410E+0	
Isopropyl Alcohol	5.339E-2		3.375E-3	3.375E-3	6.014E-2	
Methyl Bromide	1.406E-3		8.886E-5	8.886E-5	1.584E-3	
Methyl t-Butyl Ether	3.916E-3		2.475E-4	2.475E-4	4.411E-3	
Methylene Chloride	8.804E-2		5.564E-3	5.564E-3	9.917E-2	
Perchloroethylene	1.228E-2	9.763E+0	7.761E-4	7.761E-4	9.776E+0	
1,1,2,2 Tetrachloroethane	2.485E-3		1.571E-4	1.571E-4	2.800E-3	
Toluene	1.501E-1		9.486E-3	9.486E-3	1.691E-1	
1,1,2 Trichloroethane	1.975E-3		1.249E-4	1.249E-4	2.225E-3	
Trichloroethylene	5.837E-3	6.975E+0	3.689E-4	3.689E-4	6.982E+0	
Vinyl Chloride	9.255E-3	2.788E+0	5.850E-4	5.850E-4	2.798E+0	
Xylenes	1.258E-1		7.949E-3	7.949E-3	1.417E-1	
Secondary Flare Emissions						
Formaldehyde			3.260E-2	3.260E-2	6.520E-2	2.100 E-1
Hydrogen Bromide			1.893E-1	1.893E-1	3.786E-1	NA

APPENDIX E: Engineering Evaluation for Application # 19098

	Fugitive Waste Decomposition Emissions from S-5 Pounds/Hour	Contaminated Soil Handling Emissions from S-5 Pounds/Hour	Emissions from A-51 Flare at 90 MM BTU/hr Pounds/Hour	Emissions from A-60 Flare at 90 MM BTU/hr Pounds/Hour	Total Landfill and Flare Emissions Pounds/Hour	Risk Screen Trigger Levels Pounds/Hour
Hydrogen Chloride			6.825E-1	6.825E-1	1.365E+0	4.600 E+0
Hydrogen Fluoride			3.745E-2	3.745E-2	7.490E-2	5.300 E-1

APPENDIX E: Engineering Evaluation for Application # 19098

Table 5. Maximum Annual TAC Emissions from the Redwood Landfill and Flares

	Fugitive Waste Decomposition Emissions from S-5 Pounds/Year	Contaminated Soil Handling Emissions from S-5 Pounds/Hour	Emissions from A-51 and A-60 at Combined Limit Pounds/Year	Total Landfill and Flare Emissions Pounds/Year	Risk Screen Trigger Levels Pounds/Year
Acrylonitrile	20.65		1.83	22.48	
Benzene	101.33	55.80	8.97	166.09	
1,3 Butadiene	21.05		1.86	22.91	
Carbon Tetrachloride	19.95	55.80	1.77	77.52	
Chloroform	15.48	669.20	1.37	686.05	
Chloroprene	34.45		3.05	37.50	
p-Dichlorobenzene	76.27	836.60	6.75	919.62	
1,4 Dioxane	34.29		3.03	37.32	
Ethylene Dibromide	24.37		2.16	26.53	
Ethylene Dichloride	12.84	55.80	1.14	69.77	
Ethylidene Dichloride	25.67		2.27	27.94	
Hydrogen Sulfide	15470.63		1368.97	16839.61	
Isopropyl Alcohol	467.72		41.39	509.11	
Methyl Bromide	12.31		1.09	13.40	
Methyl t-Butyl Ether	34.30		3.04	37.34	
Methylene Chloride	771.20		68.24	839.44	
Perchloroethylene	107.56	78.10	9.52	195.17	
1,1,2,2 Tetrachloroethane	21.77		1.93	23.70	
Toluene	1314.73		116.34	1431.07	
1,1,2 Trichloroethane	17.31		1.53	18.84	
Trichloroethylene	51.13	55.80	4.52	111.45	
Vinyl Chloride	81.07	22.30	7.17	110.54	
Xylenes	1101.73		97.49	1199.22	
Secondary Flare Emissions					
Formaldehyde			399.80	399.80	30.0
Hydrogen Bromide			2321.84	2321.84	930.0

APPENDIX E: Engineering Evaluation for Application # 19098

Hydrogen Chloride			8370.24	8370.24	350.0
Hydrogen Fluoride			459.28	459.28	540.0

Facility-Wide Potential to Emit:

A facility-wide potential to emit evaluation was conducted to determine the applicability of various District and federal requirements. The results of this potential to emit evaluation are summarized in Table 6.

Since the total facility-wide emissions of each pollutant are less than 250 tons/year, this site is not a PSD facility.

Since this site will emit more than 100 tons/year of CO, Redwood Landfill is a major facility for CO.

Although PM₁₀ emissions will also exceed 100 tons/year, Redwood Landfill is not considered a major facility of PM₁₀ emissions, because the major facility emission thresholds exclude fugitive emissions, and Redwood Landfill will only emit 23.6 tons/year of non-fugitive PM₁₀.

Redwood Landfill is not a major facility for SO₂ emissions, because facility wide SO₂ emissions are less than 100 tons/year.

NO_x and POC emissions are also less than 100 tons/year but are greater than the District's small facility banking account threshold of 35 tons/year.

APPENDIX E: Engineering Evaluation for Application # 19098

Table 6. Facility Wide Potential to Emit for Plant # 1179, January 2009

Device #	Source Description	Maximum Annual Emissions (tons/year)					
		NOx	CO	POC	NPOC	PM10	SO2
S-2	Sewage Sludge Storage, main pond			0.106		0.106	
S-5	Redwood Landfill, waste decomposition			20.397	0.208		
S-5	Redwood Landfill, waste disposal					212.030	
S-5	Redwood Landfill, contaminated soil disposal			0.312			
S-5	Redwood Landfill, VOC-laden soil as daily cover			2.638			
S-34	Compost and Co-Compost Operations (pre-mixing, windrows, curing piles, product storage pile)			22.500		1.055	
S-39	Trommell Screening Processes					0.009	
S-41	Temporary Stockpiles for Yard and Green Waste Shredding Operations					2.430	
S-42	Soil Stockpiles (including VOC-laden soil)			2.638		0.026	
S-46	Diesel Engine (Tipper)	3.094	0.276	0.183		0.258	0.043
S-47	Diesel Engine (Pump)	2.707	0.682	0.110		0.220	0.035
S-48	Diesel Engine (Screen)	1.903	0.098	0.087		0.025	0.046
S-49	Diesel Engine (BUG)	0.021	0.003	0.001		0.000	0.000
S-55	Gasoline Dispensing Facility G# 8573			0.987			
S-58	Aerated Leachate Pond			0.084	0.050		
A-51 & A-60	Landfill Gas Flares at 126 MM BTU/hr	33.113	110.376	7.716	0.077	9.440	64.338
Total	All Permitted Sources and Abatement Devices	40.837	111.435	57.757	0.335	235.599	64.462

C. STATEMENT OF COMPLIANCE

Regulation 2, Rule 1 (CEQA and Public Notification Requirements):

This application involves the permitting of an abatement device with no modification of the landfill source and no increase in the total capacity of the control devices for this landfill. This project will have no significant impact of biological resources, water quality, dust, smoke, odors, noise, or the need for municipal services. Since this application involves a permit for an abatement device only and there is no possibility that this device will have any significant adverse environmental impact, this application is categorically exempt from CEQA review pursuant to Regulation 2-1-312.2. No further CEQA review is required.

This site is a major facility, because CO emissions have the potential to exceed 100 tons/year of CO, but this application is not for a new major facility. The landfill and flares are subject to source-specific MACT requirements instead of the Regulation 2-2-317 MACT requirement. As shown in Table 3, the cumulative emission increases for this application are less than the Regulation 2-2-221 major modification levels (40 tons/year of POC, NO_x, or SO₂, 15 tons/year of PM₁₀, and 100 tons/year of CO). Therefore, this application will not be subject to the Regulation 2-2-405 publication and public comment requirements.

The project is over 1000 feet from the nearest school and is therefore not subject to the public school notification requirements of Regulation 2-1-412.

Regulation 2, Rule 2 (New Source Review: BACT/RACT)

Regulation 8, Rule 34 requires that Redwood Landfill collect and control landfill gas in landfill gas flares or energy recovery devices in order to reduce POC emissions caused by waste decomposition in the landfill (S-5). The A-51 and A-60 Landfill Gas Flares are necessary to meet these BARCT requirements of Regulation 8, Rule 34. Pursuant to Regulation 2-2-112, the secondary emissions from A-51 and A-60 (NO_x, CO, SO₂, and PM₁₀) are exempt from the BACT requirements of Regulation 2-2-301, because A-51 and A-60 are complying with BARCT for POC emissions. Regulation 2-2-112 requires that NO_x, CO, SO₂, and PM₁₀ emissions from A-51 and A-60 comply with RACT instead of BACT. As discussed in more detail below, A-51 and A-60 will comply with RACT for each of these pollutants.

RACT for NO_x: The District's BACT/TBACT Workbook (Document # 80.1 12/16/91), the RACT limit for NO_x emissions from a landfill gas flare is 0.06 pounds NO_x/MM BTU. The District has permitted numerous other new landfill gas fired flares at this emission limit. While it may be feasible to achieve a lower NO_x emission level, the proposed NO_x limit allows a reasonable compliance margin and is accepted as RACT for landfill gas fired flares. Permit conditions will require that both the existing A-51 Flare and the new A-60 Flare meet this NO_x RACT limit. Redwood Landfill will demonstrate compliance with this limit by conducting an annual source test. Annual source testing is a standard method of demonstrating compliance with NO_x RACT limits.

RACT for CO: RACT for CO is the same as the BACT requirements for POC and includes the use of an enclosed ground flare with (1) a minimum retention time of 0.6 seconds, (2) a minimum combustion zone temperature of 1400 °F, and (3) automatic controls for combustion air, gas shut-off, and flare restart. The existing A-51 Flare and the new A-60 Flare are enclosed ground flares that meet the three design criteria identified above. Therefore, A-51 and A-60 satisfy the RACT requirements for CO emissions. To ensure adequate POC destruction, permit conditions will require that the new A-60 Flare be maintained

at a minimum combustion zone temperature of at least 1400 °F and will require Redwood Landfill to demonstrate compliance with this temperature limit by continuously monitoring and recording the combustion zone temperature. The District typically issues a CO limit of 0.20 pounds CO/MM BTU for new landfill gas flares. Permit conditions will require the A-51 and A-60 Flares to meet this CO RACT limit. Redwood Landfill will demonstrate compliance with this limit by conducting an annual source test. Annual source testing is a standard method of demonstrating compliance with CO RACT limits.

RACT for PM₁₀: PM₁₀ emissions from landfill gas flares are low with emission rates that are similar to natural gas combustion. The use of fuel pretreatment systems to remove large particles and excess water are considered RACT for PM₁₀ emissions from landfill gas fired flares. Since A-60 will be equipped with a fuel pretreatment system, it will comply with RACT for PM₁₀ emissions. PM₁₀ emissions monitoring is not justified for these flares, because the emissions are low (less than 10 tons/year for the two flares combined) and the expected grain loading rate of 0.0124 gr/dscf (see discussion for Regulation 6, Rule 1 below for calculations) is less than 10% of the limit (0.15 gr/dscf).

RACT for SO₂: Application # 10874 contains a detailed discussion of the SO₂ RACT determination for the A-50 Landfill Gas Flare. The District determined that landfill gas sulfur treatment systems do not constitute a “reasonably” available control measure. Instead, RACT for SO₂ emissions from landfill gas combustion operations was determined to be compliance with reasonable landfill gas sulfur content limits. Initially, the Regulation 9-1-302 limit was used to establish a reasonable peak landfill gas sulfur content limit of 1300 ppmv as H₂S. An annual average landfill gas sulfur content limit of 425 ppmv (expressed as H₂S) was determined to be a reasonable RACT limit for the existing flare based on the limited landfill gas sulfur content test data that was available at that time. Since these sulfur content limits were established, Redwood Landfill has been monitoring the landfill gas for hydrogen sulfide content on a weekly basis. The weekly H₂S data is exhibiting a slight downward trend since mid 2006. Measured values ranged from 131-410 ppmv with an average of 229 ppmv and a standard deviation (□) of 33 ppmv. The maximum H₂S plus 3□ is 578 ppmv. The annual average sulfur content (average of 52 rolling weeks) ranged from 197-289 ppmv of TRS, with an average of 241 ppmv of TRS and a standard deviation (□) of 33 ppmv. The average TRS plus 3□ is 340 ppmv. The District has determined that a peak TRS limit of 600 ppmv and an annual average TRS limit of 350 ppmv are reasonable limits considering this weekly sulfur content data. The District recommends that sulfur testing continue at the weekly frequency.

Regulation 2, Rule 2 (New Source Review: Offsets)

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. If facility-wide emissions are greater than 35 tons/year of NO_x or POC, the facility must usually provide their own offsets. However, H&S Code 42301.2 supercedes this District requirement, if the emission increases are due to secondary emissions from abatement devices, and if the capacity of the source being abated is not increasing.

- 42301.2. A district shall not require emission offsets for any emission increase at a source that results from the installation, operation, or other implementation of any emission control device or technique used to comply with a district, state, or federal emission control requirement, including, but not limited to, requirements for the use of reasonably available control technology or best available retrofit control technology, unless there is a modification that results in an increase in capacity of the unit being controlled.

Since this application does not involve any increases to the landfill and the A-51 and A-60 flares are necessary for compliance with BARCT requirements, H&S Code 42301.2 applies to the emission

increases from the flares in this application. Per Brian Bateman’s direction and to ensure that no net increase requirements are fully satisfied, the District will provide the necessary emission reduction credits from an account created for projects subject to this H&S Code and funded from the small facility banking account.

From Table 3, this application will result in net cumulative increases of 19.068 tons/year of NO_x. The offset ratio is 1.15 to 1.0. Therefore, this application requires 21.928 tons/year of NO_x offsets from the H&S Code 42301.2 account. If the S-5 Redwood Landfill is modified in the future, any emission increases associated with this modification, including secondary emissions from the flare may be subject to reimbursement.

Regulation 2-2-303 requires offsets for SO₂ and PM₁₀ emission increases if (a) the site is a major facility and (b) facility-wide emissions of SO₂ or PM₁₀ are greater than 100 tons/year. Since this site is not a major facility of SO₂ or PM₁₀ emissions, SO₂ and PM₁₀ offsets are not required.

Regulation 2, Rule 5 (NSR of Toxic Air Contaminants):

Regulation 2, Rule 5 applies to projects, as defined in Regulation 2-5-216. As discussed in detail in the Toxic Emissions Section above, this project includes only the secondary emission increases from the A-51 and A-60 Landfill Gas Flares. The HRSA that was conducted for Application # 16608 (for the A-51 and A-59 Flares) was updated for Application #19098 by replacing the A-59 emissions and stack parameter data with the emissions and stack data for the smaller A-60 Flare. As a worst case assumption, each flare was modeled as if the flares were operating continuously at maximum capacity (180 MM BTU/hour for A-51 and A-60 combined), even though the flares will only be permitted to operate at a combined annual average heat input rate of 126 MM BTU/hour.

The District conducted this HRSA using the ISCST3 air dispersion model. Rural dispersion coefficients, Screen3 meteorological data, and Petaluma River terrain data were used in the dispersion model to determine 1-hour ground level concentrations. Detailed calculation procedures for the ISCST3 input factors are presented in the attached HRSA. Maximum health impacts for the secondary TAC emissions from A-51 and A-60 are presented in Table 7.

Table 7. Health Impacts Due to Secondary TACs from A-51 and A-60 Flares

Health Impact Type	Receptor Type	Max. Impact Due to A-51	Max. Impact Due to A-60	Max. Project Impacts Due to A-51 and A-60
Cancer Risk (In a Million)	Resident	0.09	0.11	0.19
Cancer Risk (In a Million)	Worker	0.02	0.02	0.04
Chronic HI	Resident	0.04	0.05	0.09
Chronic HI	Worker	0.01	0.01	0.02
Acute HI	Resident or Worker	0.004	0.005	0.01

Since the health risks from A-51 and A-60 were each less than the TBACT trigger levels of 1 in a million cancer risk and 0.2 chronic HI, TBACT is not required for the secondary emissions from A-51 or A-60. 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.

Regulation 2, Rule 6 (Major Facility Review):

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 carbon monoxide. 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.

The District issued the initial MFR Permit for this facility (Site # A1179) on November 10, 2003. This MFR Permit was last revised October 24, 2007. Redwood Landfill has submitted Application # 16609 for the MFR permit changes associated with the flare replacement project. These MFR permit revisions will be discussed in the Statement of Basis for Application # 16609.

Regulation 6, Rule 1 (General Requirements):

Particulate matter emissions from the A-60 Landfill Gas Flare are subject to Regulation 6. Section 6-310 limits PM emissions to 0.15 grains/dscf of exhaust. At the expected PM₁₀ emission rate of 0.0171 lbs/MM BTU, the PM₁₀ grain loading in the exhaust will be 0.0124 grains/sdcf at 0% O₂. This expected PM₁₀ emission rate is far below the Regulation 6-310 grain-loading limit.

Regulation 8, Rule 34 (Solid Waste Disposal Sites):

Landfill gas flares are required to meet the requirements of Regulation 8, Rule 34. Regulation 8-34-301.3 requires the use on enclosed ground flares that have either a destruction efficiency of 98% by weight for NMOC or that emit no more than 30 ppmv of NMOC (as methane at 3% O₂, dry basis) from the flare. The manufacturer indicated that A-60 will comply with these NMOC destruction efficiency and outlet concentration limits. Continuous temperature monitoring (pursuant to Regulation 8-34-507) will ensure that this flare complies with 8-34-301.3 on an on-going basis. Temperature will be monitored in each stack zone (Zone A for LFG flow rates greater than 400 scf and Zone B for LFG flow rates less than 400 scfm). The flare will also be equipped with a data recording system that will maintain all records required pursuant to Sections 501.2 and 501.3.

Regulation 9, Rule 1 (Sulfur Dioxide):

For gaseous combustion operations, Regulation 9-1-302 limits the SO₂ concentration in an exhaust stream to 300 ppmv (dry basis). At the revised peak inlet total reduced sulfur content of 600 ppmv (expressed as H₂S), the outlet SO₂ concentration will be 125 ppmv of SO₂ at 0% O₂. Therefore, this permit condition will ensure compliance with the Regulation 9-1-302 limit. To date, weekly monitoring of the landfill gas has demonstrated compliance with this inlet TRS concentration limit.

Federal Requirements:

Redwood 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). These federal requirements are similar to the Regulation 8, Rule 34 requirements discussed above, except that the federal requirements allow a higher outlet NMOC concentration limit (20 ppmv as hexane, which equals 120 ppmv as methane at 3% O₂, dry basis). In this case, compliance with Regulation 8, Rule 34 ensures compliance with all applicable requirements of the NSPS and NESHAPs. All applicable requirements are cited in detail in the MFR Permit for Site # A1179.

D. PERMIT CONDITIONS

The current permit conditions for the S-5 Redwood Landfill and Flares will be revised by replacing A-59 with A-60. For A-60, temperature monitoring and recording and source testing will be required for both operating scenarios (Stack Zone A at standard flow rates of 400-3000 scfm of LFG and Stack Zone B at low flow rates of 150-400 scfm of LFG) to ensure that this flare can achieve compliance with all applicable limits over the entire operating range. Text was added to Parts 22 and 30 to clarify these additional monitoring and testing requirements. All emission limits will remain unchanged. The flare destruction efficiency requirement in Part 24 is being deleted because it unnecessary. As the HRSA demonstrates, the health impacts resulting from flare emissions are far below the project risk limits. The changes to each part are identified below in strike through and underline formatting.

Condition # 19867

FOR: S-5 REDWOOD LANDFILL WITH GAS COLLECTION SYSTEM; A-18 WATER SPRAYS; A-51 LANDFILL GAS FLARE; AND ~~A-59 A-60~~ LANDFILL GAS FLARE

1. The maximum design capacity of the landfill (total volume of all wastes and cover materials placed in the landfill, excluding final cover) shall not exceed 19.1 million cubic yards, unless the Permit Holder can demonstrate that an increase of this design capacity limit will not result in any increases in the maximum permitted emission rates for the S-5 Redwood Landfill, A-51 Landfill Gas Flare, and ~~A-59 A-60~~ Landfill Gas Flare, which are described in Application #~~1660819098~~. (Basis: Regulation 2-1-301)
2. The total cumulative amount of all decomposable materials placed in the landfill (total weight of all decomposable wastes and decomposable cover materials placed in the landfill, excluding final cover) shall not exceed 17.1 million tons, unless the Permit Holder can demonstrate that an increase of this limit will not result in an increase in waste decomposition related emissions. The maximum permitted fugitive precursor organic compound (POC) emission rate is 20.397 tons/year of POC from the S-5 Redwood Landfill. The maximum permitted residual POC emission rate is 7.716 tons/year from the flares (A-51 and ~~A-59 A-60~~). Any changes in waste acceptance rates, types of waste accepted, or other practices that will result in an increase in the maximum permitted POC, NPOC, or toxic air contaminant emission rates for S-5 or A-51 or ~~A-59 A-60~~, which are described in Application #~~1660819098~~, shall be considered a modification of S-5, A-51, or ~~A-59 A-60~~ pursuant to Regulation 2-1-234. (Basis: Regulation 2-1-301)
3. The total amount of all waste materials (including sewage sludge) accepted at the landfill shall not exceed 2300 tons per day (except during temporary emergency situations approved by the Local Enforcement Agency) and shall not exceed 450,000 tons per calendar year. The total amount of sewage sludge accepted at the landfill shall not exceed 1000 wet tons per day (except during temporary emergency situations approved by the Local Enforcement Agency) and shall not exceed 200,750 wet tons per calendar year. (Basis: Regulation 2-1-301)
4. The total amount of all cover materials (excluding final cover) placed in the landfill shall not exceed 1160 tons per day and shall not exceed 105,500 tons per calendar year. (Basis: Regulation 2-1-301)

5. In order to demonstrate compliance with Parts 1-4 above, the Permit Holder shall maintain the following records in an APCO approved log book:
 - a. Record on a daily basis the type and amount of all materials received at the landfill.
 - b. For each type of material received at the landfill, clearly identify how the material will be used at this site (i.e. disposed of in the landfill directly, used as daily cover material, used as intermediate cover material, used in composting operations, sent to yard and green waste recycling operations, sent to other recycling operations, used for on-site road construction or surfacing, used for other construction purposes, sent to on-site stockpiles for later use, etc.). For material types that may be used for multiple purposes at this site, identify the amount of material used for each purpose.
 - c. For each type of material received at the landfill, clearly identify whether the material is decomposable or inert. Inert materials are defined by Regulation 8-34-203. For the purposes of this condition, soils containing more than 50 ppm by weight of volatile organic compounds (VOC) or "contaminated soil" as defined in Regulation 8-40-205 are decomposable materials. Soils containing 50 ppm by weight VOC or less are inert materials.
 - d. If cover materials are taken from on-site stockpiles, record on a daily basis the amount of material removed from the stockpiles and used as cover material (for each type of material).
 - e. Summarize on a monthly basis: the total amount of all wastes accepted, the total amount of sewage sludge accepted, the total amount of accepted materials that were directly used as cover material, the amount of cover materials that were removed from on-site stockpiles, the total amount of materials used for cover, the total amount of decomposable cover materials, the total amount of decomposable wastes placed in the landfill, the total amount of non-decomposable wastes disposed of in the landfill, the total amount of decomposable materials placed in the landfill, and the total amount of all materials placed in the landfill.

The Permit Holder shall begin maintaining the above records by no later than December 1, 2002. These records shall be kept at site for at least 5 years from the date the data is entered and shall be made available to the District staff for inspection. (Basis: Regulations 2-1-301, 8-34-501, and 40 CFR 60.758)

6. The mean vehicle fleet weight for all off-site vehicles (excluding vehicles that are not transporting waste, recyclables, or construction related materials such as employee, contractor, or visitor vehicles) shall not exceed 15.4 tons. (Basis: Regulation 2-1-301)
7. The mean vehicle fleet weight for all on-site landfilling and construction related vehicles (bulldozers, scrapers, back hoes, compactors, road graders, loaders, dump trucks, soil trucks, water trucks, fuel trucks, or maintenance vehicles, etc.) shall not exceed 28.4 tons. (Basis: Regulation 2-1-301)

8. The total vehicle miles traveled (VMT) by the off-site vehicle fleet shall not exceed the following limits:
 - a. 875 VMT per day on gravel roads
 - b. 438 VMT per day on dirt roads
 - c. 50 VMT per day on paved roads
 - d. 273,000 VMT per calendar year on gravel roads
 - e. 136,500 VMT per calendar year on dirt roads
 - f. 15,600 VMT per calendar year on paved roads(Basis: Regulation 2-1-301)

9. The total vehicle miles traveled (VMT) by the on-site vehicle fleet shall not exceed the following limits:
 - a. 62 VMT per day (essentially all travel is assumed to occur on dirt roads)
 - b. 19,145 VMT per calendar year (essentially all travel is assumed to occur on dirt roads)(Basis: Regulation 2-1-301)

10. In order to demonstrate compliance with Parts 6-9, the Permit Holder shall maintain the following records in an APCO approved log book:
 - a. For each type of vehicle fleet (off-site vehicles and on-site construction equipment) maintain a list of all the types of vehicles in the fleet. For each vehicle type, record the empty vehicle weight, maximum load weight, and average vehicle weight (average of full and empty weights). This list shall be reviewed annually and updated whenever necessary to ensure that the list accurately reflects the types of vehicles that may be present at the landfill during any calendar year.
 - b. For the off-site vehicle fleet, record on a daily basis and summarize on a monthly basis: the number of vehicle trips (round trips to/from the landfill) for each type of vehicle in the fleet.
 - c. For the on-site vehicle fleet, record on a daily basis and summarize on a monthly basis: the number of vehicle trips for each type of vehicle in the fleet. For construction vehicles like bulldozers or compactors that have no set travel route but instead make many small trips across the active face, the number of vehicle trips can be estimated from operating times and procedures or odometer readings and the maximum round trip travel distance (see subpart f. below). If no data is available for estimating vehicle trips, the vehicle trips shall be recorded as 1 vehicle trip per day per vehicle used during that day.
 - d. At least once per calendar year, the Permit Holder shall calculate and record the mean vehicle fleet weight for each type of vehicle fleet. For each vehicle fleet, the mean vehicle fleet weight shall be calculated using the vehicle trip data for: (i) the day with the highest number of vehicle trips during the previous calendar year; and (ii) the day with the highest total amount of waste accepted during the previous calendar year. Mean vehicle fleet weights shall also be recalculated whenever new vehicle types are added to a vehicle fleet. The mean vehicle fleet weight (MVFW) is a

weighted average calculated by multiplying the average vehicle weight for each vehicle type (AVWi) times the number of vehicle trips per day for that vehicle type (DVTi), summing AVWi*DVTi for all vehicle types, and dividing the resulting sum by the total number of vehicle trips for that day (DVT).

- e. For the off-site vehicle fleet, the Permit Holder shall determine (using odometer measurements, maps, or other appropriate means) the maximum round trip distance traveled on-site by each vehicle type in the fleet on gravel roads, dirt roads, and paved roads (VMT per round trip per vehicle type per road type). Alternatively, the Permit Holder may determine a maximum round trip distance per road type for one or more groups of vehicle types, if all vehicle types in the group travel essentially the same roads and distances. This distance shall be determined at least once per calendar year and whenever significant changes to on-site travel routes have occurred.
- f. For the on-site vehicle fleet, the Permit Holder shall determine (using odometer measurements, maps, or other appropriate means) the maximum round trip distance traveled by each vehicle type in the fleet on dirt roads (VMT per round trip per vehicle type). Alternatively, the Permit Holder may determine a maximum round trip distance per road type for one or more groups of vehicle types, if all vehicle types in the group travel essentially the same roads and distances. This distance shall be determined at least once per calendar year and whenever significant changes to travel routes have occurred.
- g. For each vehicle fleet type, the Permit Holder shall calculate and record the total vehicle miles traveled (VMT) per day on each type of road (dirt, gravel, and paved for off-site vehicles and dirt only for on-site vehicles) using the data recorded pursuant to subparts b., c., d., and f. The daily VMT per road type shall be summarized for each calendar month and for each calendar year.

The Permit Holder shall begin maintaining the above records by no later than December 1, 2002. These records shall be kept at site for at least 5 years from the date the data is entered and shall be made available to the District staff for inspection. (Basis: Regulations 2-1-301, 8-34-501, and 40 CFR 60.758)

- 11. Particulate emissions from any operation of the landfill shall be abated by A-18 Water Sprays in such a manner that visible dust emissions 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. The Permit Holder shall meet the following minimum watering requirements:
 - a. On any dry operating days, water shall be applied to unpaved roads and parking areas at a rate of 0.5 gallons per square yard or more.
 - b. On any dry operating days, water shall be applied to unpaved roads at a frequency of at least once every three hours of operation.

- c. On any dry operating days, water shall be applied to unpaved parking areas or infrequently traveled unpaved roads at least twice per day or at least once per every 150 vehicle trips (whichever is more frequent).
- d. On any dry operating days, water shall be applied to the active landfill face, the active area of stockpiles, composting operations, or other dust prone areas at least twice per day.
- e. On any operating day when rain fall is not sufficient to prevent visible emissions, additional water shall be applied to any road, parking area, active face, stockpile, or dusty area as frequently as necessary to prevent visible emissions that persist for longer than 3 minutes in an hour.

In order to demonstrate compliance with this requirement, the Permit Holder shall maintain the following information in an APCO approved log book:

- f. Accurate maps of the facility showing the locations of all roads and parking areas at the facility (dirt, gravel, and paved roads shall be clearly distinguished), stockpiles, and active filling areas. The current travel routes for both off-site and on-site vehicle traffic and the water spray trucks shall be clearly indicated on the maps.
- g. Record the frequency of water spray applications (on gravel roads, dirt roads, stockpiles, the active face, and any other dust prone areas) for each operating day.

(Basis: Regulations 1-301, 2-1-301, and 6-301)

- *12. If the plant receives two or more violation notices from the District for "Public Nuisance" in any consecutive 12 month period, the Permit Holder shall implement the following control measures, as applicable, or any other measures that the District deems necessary and/or appropriate, within the time period specified by the District. If requested by the District, the Permit Holder shall submit to the District a permit application to modify the Permit to Operate and/or these permit conditions, within 30 days of notification. (Basis: Regulation 1-301)
 - a. Pave main haul roads and parking areas associated with the nuisance operation such as roads for landfilling, composting, recycling, or sludge handling operations.
 - b. Add gravel or other aggregate based surfacing to dirt roads and parking areas that are associated with the nuisance operation.
 - c. Use chemical suppressants on unpaved roads and unpaved parking areas that are associated with the nuisance operation.
 - d. Increase the frequency of water application on unpaved roads, parking areas, the active face of the landfill, stockpiles, or any other dust prone areas that are associated with the nuisance operation.
 - e. Use frequent sweeping and/or water flushing, during the dry season, on paved areas that are associated with the nuisance operation.
- *13. The Permit Holder may use non-hazardous contaminated materials containing no more than 50 ppm by weight of Volatile Organic Compounds (VOC) as daily or interim cover material, provided that these materials are properly handled and disposed of in accordance with this part and any other applicable requirements.

- a. Any metal laden materials (materials that have been contaminated with arsenic, asbestos, beryllium, cadmium, hexavalent chromium, nickel, copper, lead, mercury, selenium, or zinc) shall be properly handled at all times and shall be abated by appropriate dust mitigation measures including: the use of covers during on-site transport, the use of frequent water sprays during active handling (loading, unloading, spreading, etc.) of these materials, and the use of water sprays, covers, or chemical dust suppressants on inactive storage areas.
- b. If metal laden materials are used as interim cover, the metal laden material shall be covered with a non-contaminated material such as clean soil or compacted green waste prior to subjecting the area to frequent vehicle or construction equipment traffic.
- c. Metal laden materials shall not be used in the construction of unpaved roadways or parking lots.

(Basis: Toxic Risk Management Policy)

14. This part applies to the acceptance, handling, storage, and on-site reuse of VOC-laden soil. VOC-laden soil is any soil that contains volatile organic compounds, as defined in Regulation 8-40-213, other than contaminated soil. As defined in Regulation 8-40-205, contaminated soil contains more than 50 ppmw of VOC or has a surface concentration greater than 50 ppmv of VOC as C1, and contaminated soil is subject to Part 15 below instead of this part. Materials containing only non-volatile hydrocarbons and materials meeting the requirements of Regulation 8-40-113 are not subject to this part. For each lot of VOC-laden soil accepted at this site, the Permit Holder shall comply with the daily limits identified in either subpart a or subpart b below and shall comply with the annual emissions limit identified in subpart c below. To demonstrate compliance with the daily and annual emission limits, the Permit Holder shall comply with the monitoring procedures listed in subpart a(i-v). If the Permit Holder opts to comply with the daily concentration limit in subpart b rather than the daily emission limit in subpart a, then the Permit Holder shall also comply with the soil screening procedures listed in subpart b(i-v).

- a. Unless the Permit Holder demonstrates compliance with Regulation 8-2-301 in accordance with subpart b below, the Permit Holder shall limit the quantity of VOC laden soil handled per day such that no more than 15 pounds of total carbon could be emitted to the atmosphere per day. In order to demonstrate compliance with this subpart and the annual emissions limit specified in subpart c, the Permit Holder shall maintain the following records in a District approved log for all VOC-laden soil accepted at the landfill.
 - i. Record on a daily basis the amount of VOC laden soil accepted for each truckload or each soil lot, as appropriate. This amount (in units of pounds per day) is Q in the equation in subpart a(iii) below.
 - ii. Record on a daily basis the VOC content for each truckload or each soil lot, as appropriate. This VOC Content (C in the equation

- below) should be expressed as parts per million by weight as total carbon (or C1).
- iii. Calculate and record on a daily basis the VOC Emission Rate (E) using the following equation: $E = Q * C / 1E6$
This equation may be applied to each truckload or to each soil lot received per day depending on the amount of soil that is represented by the VOC Content data. If the equation is applied to multiple loads per day, the VOC Emission Rate shall be totaled for all loads received each day.
 - iv. Summarize all daily emission rates on a monthly and calendar year basis.
 - v. All records shall be maintained on site or shall be made readily available to District staff upon request for at least 5 years from the date of entry.

- b. Unless the Permit Holder demonstrates compliance with Regulation 8-2-301 in accordance with subpart a above, the Permit Holder shall screen each lot of VOC laden soil accepted per day for VOC surface emissions to show that each lot of VOC laden soil is not contaminated soil.
 - i. The Permit Holder shall use the testing procedures outlined in Regulation 8-40-604.
 - ii. The screening test shall be representative of the entire lot of VOC-laden soil. The soil surface shall be disturbed prior to screening to ensure that the screening is representative of the entire load.
 - iii. The Permit Holder shall maintain records of all testing conducted to satisfy this subpart and shall record the amount of VOC-laden soil accepted and the highest surface concentration measured pursuant to this subpart. These records shall be maintained for each truckload or each soil lot accepted, as appropriate, provided that the records are made or summarized on at least a daily basis.
 - iv. Summarize the daily waste acceptance rates and the weighted average of the surface concentration records on a monthly basis and for each calendar year.
 - v. All records shall be maintained on site or shall be made readily available to District staff upon request for at least 5 years from the date of entry.
- c. The Permit Holder shall limit the quantity of VOC laden soil handled per year such that annual VOC emissions due to on-site handling, storage, disposal, or reuse of VOC laden soil shall not exceed 10,530 pounds per calendar year. The Permit Hold shall comply with the monitoring procedures in subpart a(i-v) above to demonstrate compliance with this annual emissions limit.

(Basis: Offsets and Regulation 8-2-301)

- 15. Handling Procedures for Soil Containing Volatile Organic Compounds:
 - a. The procedures listed below in subparts b-l do not apply if the following criteria are satisfied. However, the record keeping requirements in subpart m below are applicable.
 - i. The Permit Holder has appropriate documentation demonstrating that either the organic content of the soil or the organic concentration above the soil is below the "contaminated" level (as defined in Regulation 8, Rule 40, Sections 205, 207, and 211). The handling of soil containing VOCs in concentrations below the "contaminated" level is subject to Part 14 above.
 - ii. The Permit Holder has no documentation to prove that soil is not contaminated, but source of the soil is known and there is no reason to suspect that the soil might contain organic compounds.
 - b. The Permit Holder shall provide notification to the Compliance and Enforcement Division of the Permit Holder's intention to accept contaminated soil at the facility at least 24 hours in advance of receiving the contaminated soil. The Permit Holder shall provide an estimate of the

amount of contaminated soil to be received, the degree of contamination (range and average VOC Content), and the type or source of contamination.

- c. Any soil received at the facility that is known or suspected to contain volatile organic compounds (VOCs) shall be handled as if the soil were contaminated, unless the Permit Holder receives test results proving that the soil is not contaminated. To prove that the soil is not contaminated, the Permit Holder shall collect soil samples in accordance with Regulation 8-40-601 within 24 hours of receipt of the soil by the facility. The organic content of the collected soil samples shall be determined in accordance with Regulation 8-40-602.
 - i. If these test results indicate that the soil is still contaminated or if the soil was not sampled within 24 hours of receipt by the facility, the Permit Holder must continue to handle the soil in accordance with the procedures subparts d-1 below, until the soil has completed treatment or has been placed in a final disposal location and adequately covered. Storing soil in a temporary stockpile or pit is not considered treatment. Co-mingling, blending, or mixing of soil lots is not considered treatment.
 - ii. If these test results indicate that the soil - as received at the facility - has an organic content of 50 ppmw or less, then the soil may be considered to be not contaminated and need not be handled in accordance with the procedures listed in subparts d-1 below, but shall be handled in accordance with Part 14 above.
- d. Any contaminated soil received at the facility shall be clearly identified as contaminated soil, shall be handled in accordance with subparts e-1 below, and shall be segregated from non-contaminated soil. Contaminated soil lots may not be co-mingled, blended, or otherwise mixed with non-contaminated soil lots prior to treatment, reuse, or disposal. Mixing soil lots in an attempt to reduce the overall concentration of the contaminated soil or to circumvent any requirements or limits is strictly prohibited.

- e. On-site handling of contaminated soil shall be limited to no more than 2 on-site transfers per soil lot. For instance, unloading soil from off-site transport vehicles into a temporary storage pile is considered one transfer. Moving soil from a temporary storage to a staging area is considered one transfer. Moving soil from a temporary storage pile to a final disposal site is one transfer. Moving soil from a staging area to a final disposal site is one transfer. Therefore, unloading soil from off-site transport into a temporary storage pile and then moving the soil from that temporary storage pile to the final disposal site is allowed. Unloading soil from off-site transport into a staging area and then moving the soil from that staging area to the final disposal site is allowed. However, unloading soil from off-site transport to a temporary storage pile, moving this soil to a staging area, and then moving the soil again to a final disposal site is 3 on-site transfers and is not allowed.
- f. All contaminated soil shall be either treated, deposited in a final disposal site, or transported off-site for treatment, within 90 days of receipt at the facility.
- g. The total amount of contaminated soil disposed of at this site shall not exceed 6240 tons during any calendar year. The Permit Holder shall apply for a change of conditions before accepting any soil containing more than 100 ppm by weight of VOC. (Basis: Offsets)
- h. All active storage piles shall meet the requirements of Regulation 8-40-304 by using water sprays, vapor suppressants or approved coverings to minimize emissions. The exposed surface area of any active storage pile (including the active face at a landfill) shall be limited to 6000 ft². The types of storage piles that may become subject to these provisions include (but are not limited to) truck unloading areas, staging areas, temporary stockpiles, soil on conveyors, bulldozers or trucks, the active face of a landfill, or other permanent storage pile at the final disposal location.
- i. All inactive storage piles shall meet the requirements of Regulation 8-40-305 including the requirement to cover contaminated soil during periods of inactivity longer than one hour. The types of storage piles that may become subject to these provisions include (but are not limited to) soil on trucks or other on-site equipment, staging areas, temporary stockpiles, and the permanent storage pile at the final disposal location. District approved coverings for inactive storage piles include continuous heavy-duty plastic sheeting (in good condition, joined at the seams, and securely anchored) or encapsulating vapor suppressants (with re-treatment as necessary to prevent emissions).

- j. The Permit Holder must:
 - i. Keep contaminated soil covered with continuous heavy-duty plastic sheeting (in good condition, joined at the seams, and securely anchored) whenever soil is to be stored in temporary stockpiles or during on-site transport in trucks. Soil in trucks shall not be left uncovered for more than 1 hour.
 - ii. Establish a tipping area for contaminated soils near the active face that is isolated from the tipping area for other wastes.
 - iii. Spray contaminated soil with water or vapor suppressant immediately after dumping the soil from a truck at the tipping area.
 - iv. Ensure that all contaminated soil is transferred from the tipping area to the active face immediately after spraying with water or vapor suppressant.
 - v. Ensure that contaminated soil in the tipping area is not disturbed by subsequent trucks. Trucks shall not drive over contaminated soil in the tipping area or track contaminated soil out of the tipping area on their wheels.
 - vi. Spray contaminated soil on the active face with water or vapor suppressant (to keep the soil visibly moist) until the soil can be covered with an approved covering.
 - vii. Limit the area of exposed soil on the active face to no more than 6000 ft².
 - viii. Ensure that contaminated soil spread on the active face is completely covered on all sides with one of the following approved coverings: at least 6 inches of clean compacted soil, at least 12 inches of compacted garbage, or at least 12 inches of compacted green waste.
 - ix. Ensure that covering of soil on the active face is completed within one hour of the time that the soil was first dumped from a truck at the tipping area.
- k. Contaminated soil shall not be used as daily, intermediate, or final cover material for landfill waste operations unless the requirements of Regulation 8, Rule 40, Sections 116 or 117 have been satisfied.
- l. Contaminated soil is considered to be a decomposable solid waste pursuant to Regulation 8, Rule 34. All contaminated soil disposed of at a site shall be included in any calculations of the amount of decomposable waste in place for annual reporting requirements or for purposes of Regulation 8-34-111 or 8-34-304.
- m. The Permit Holder shall keep the following records for each lot of soil received, in order to demonstrate on-going compliance with the applicable provisions of Regulation 8, Rule 40 and this part.
 - i. For all soil received by the facility (including soil with no known contamination), record the arrival date at the facility, the soil lot number, the amount of soil in the lot, the organic content or organic concentration of the lot (if known), the type of contamination (if any), and keep copies of any test data or other

information that documents whether the soil is contaminated (as defined in 8-40-205) or not contaminated, with what, and by how much.

- ii. If the soil is tested for organic content after receipt by the facility, a report with the sampling date, test results, and the date results were received.
- iii. For all on-site handling of contaminated soil, use a checklist or other approved method to demonstrate that appropriate procedures were followed during all on-site handling activities. One checklist shall be completed for each day and for each soil lot (if multiple lots are handled per day).
- iv. For soil aerated in accordance with 8-40-116 or 117 record the soil lot number, the amount of soil in the lot, the organic content, the final placement date, the final placement location, and describe how the soil was handled or used on-site.
- v. For final disposal at a landfill, record on a daily basis the soil lot number, the amount of soil placed in the landfill, the disposal date, and the disposal location.
- vi. Summarize the total amount of contaminated soil disposed of at this site on a monthly and calendar year basis to demonstrate compliance with subpart g.

All records shall be retained for at least 5 years from the date of entry and shall be made available for District inspection upon request.

(Basis: Offsets and Regulation 8-40-301, 8-40-304 and 8-40-305)

16. During all times that the landfill gas collection system is operating, all collected landfill gas shall be vented to one of the following control system configurations: A-51 Landfill Gas Flare operating alone, A-60 Landfill Gas Flare operating alone, or A-51 and A-59 Landfill Gas Flare-A-60 operating concurrently ~~or A-59 operating alone.~~ In order to assure compliance with this condition, A-51 and A-60 shall be equipped with local and remote alarms and auto restart capabilities. (Basis: 8-34-301.1, 8-34-301.3, and 40 CFR 60.752(b)(2)(iii))

17. The landfill gas collection system described in subpart a below shall be operated continuously as defined in Regulation 8-34-219. Wells, collectors, and adjustment valves shall not be shut off, disconnected, or removed from operation without written authorization from the District, unless the Permit Holder complies with all applicable requirements of Regulation 8, Rule 34, Sections 113, 116, 117, and 118. The Permit Holder shall apply for and receive an Authority to Construct before modifying the landfill gas collection system described in subpart a below. Increasing or decreasing the number of wells or collectors, or significantly changing the length of collectors or the locations of wells or collectors are modifications that are subject to the Authority to Construct requirement. Adding or modifying risers, laterals, or header pipes are not subject to this Authority to Construct requirement. The authorized number of landfill gas collection system components is the baseline count listed below plus any components added and minus any components decommissioned pursuant to Part 17b as evidenced by start-up/shut-down notification letters submitted to the District.

a. The Permit Holder has been issued a Permit to Operate for the landfill gas collection system components listed below, which includes all start-up/shut-down notifications submitted through October 11, 2007. Well and collector locations, depths, and lengths are as described in detail in Permit Application # 13027.

	Required Components
Total Number of Vertical Wells:	76
Total Number of Horizontal Collectors:	9

b. The Permit Holder has been issued an Authority to Construct for the landfill gas collection system components listed below. Specific well and collector locations, depths, and lengths of associated piping are as described in detail in Permit Application # 13027.

	Minimum	Maximum
Install New Vertical Wells:	0	30
Decommission Vertical Wells:	0	8
Install New Horizontal Collectors	0	9
Decommission Horizontal Collectors	0	4
Replace Vertical Wells *	0	15

* one-for-one well replacement at new optimal locations

Wells installed or shutdown pursuant to subpart b shall be added to or removed from subpart a in accordance with the procedures identified in Regulations 2-6-414 or 2-6-415. The Permit Holder shall maintain records of the decommissioning date for each well that is shut down and the initial operation date for each new well.

(Basis: Regulations 2-1-301, 8-34-301.1, 8-34-304, 8-34-305, and 2-6-413)

18. If a gas characterization test indicates that this site's landfill gas contains organic compounds in excess of any of the concentrations listed in Parts 18a or 18b below, then the Permit Holder shall submit an application for a Change of Permit Conditions, within no later than 30 days from receipt of the test results.

a. Total Non-Methane Organic Compounds: 360 ppmv

(calculated as hexane equivalent)

(Basis: Cumulative Increase)

*b. For toxic air contaminants (TACs):

<u>Compound</u>	<u>Concentration</u>
Acrylonitrile	280 ppbv
Benzene	340 ppbv
Carbon Tetrachloride	70 ppbv
Chloroform	70 ppbv
1,4 Dichlorobenzene	400 ppbv
1,1 Dichloroethane	150 ppbv
Ethylene Dibromide	70 ppbv
Ethylene Dichloride	70 ppbv
Methylene Chloride	320 ppbv
Perchloroethylene	450 ppbv
1,1,2,2 Tetrachloroethane	70 ppbv
Trichloroethylene	250 ppbv
Vinyl Chloride	880 ppbv

(Basis: Toxic Risk Management Policy)

c. The concentration of total reduced sulfur compounds (TRS) in collected landfill gas shall not exceed a peak of 600 ppmv (calculated as H₂S) and shall not exceed an annual average of 350 ppmv (calculated as H₂S). The peak and annual average TRS concentrations shall be measured and calculated in accordance with Parts 31a and 31b. (Basis: Cumulative Increase, RACT, and Regulation 9-1-302)

19. The A-51 and ~~A-59-A-60~~ Landfill Gas Flares shall be fired on landfill gas. (Basis: RACT and Regulation 2-2-112)
20. The throughput of landfill gas (with an HHV of 500 BTU/scf) to the A-51 Landfill Gas Flare shall not exceed shall not exceed 4,320,000 scf during any one day. The throughput of landfill gas (with an HHV of 500 BTU/scf) to the ~~A-59 A-60~~ Landfill Gas Flare shall not exceed ~~5,760,000~~ 4,320,000 scf during any one day. The total throughput of landfill gas (with an HHV of 500 BTU/scf) to the A-51 and ~~A-59-A-60~~ Flares combined shall not exceed 2,207,520,000 scf during any consecutive 12 month period. In order to demonstrate compliance with this condition, the A-51 and ~~A-59-A-60~~ Flares shall each be equipped with one or more properly operating continuous gas flow meters. (Basis: Cumulative Increase, 40 CFR 60.756(b)(2)(i))
21. [deleted]
22. The temperature in the combustion zone of each flare shall be maintained at the minimum temperature listed below, averaged over any 3-hour period. In order to demonstrate compliance with this condition, A-51 and ~~A-59-A-60~~ shall each be equipped with a continuous temperature monitor and recorder. The A-60 Flare shall be equipped with a continuous temperature monitor in each operating zone

of the stack (Zone A and Zone B). The temperature recorder for A-60 shall continuously record either the Zone A or the Zone B temperature, compatible with the zone the flare is operating in. If a source test demonstrates compliance with all applicable requirements at a different temperature, the APCO may revise these temperature limits, in accordance with the procedures identified in Regulation 2-6-414 or 2-6-415, based on the following criteria. The minimum combustion zone temperature for the flare shall be equal to the average combustion zone temperature determined during the most recent complying source test minus 50 degrees F, provided that the minimum combustion zone temperature is not less than 1400 degrees F. (Basis: Regulations 2-5-302, 8-34-301.3 and 8-34-501.3, and 40 CFR 60.756(b)(1))

- a. The minimum combustion zone temperature for A-51 is 1400 degrees F, averaged over any 3-hour period.
- b. The minimum combustion zone temperature for each stack zone at A-59 A-60 is 1400 degrees F, averaged over any 3-hour period. If necessary, separate stack zone temperature limits may be established for A-60.

23. The A-51 and ~~A-59~~ A-60 Landfill Gas Flares shall comply with the NMOC emission limit in Regulation 8-34-301.3. (Basis: Cumulative Increase, 8-34-301.3, and 40 CFR 60.752(b)(2)(iii)(B))

~~*24. The A-51 and A-59 Landfill Gas Flares shall each achieve a minimum destruction efficiency of 83% by weight for any EPA Hazardous Air Pollutants or any District toxic compounds that are determined to be present in the landfill gas. (Basis: Regulation 2-5-302)[deleted]~~

25. Nitrogen oxides (NO_x) emissions from each enclosed flare (A-51 and ~~A-59~~ A-60) shall not exceed 0.06 pounds of NO_x, calculated as NO₂, per million BTU. Compliance with this emission limit may be demonstrated by not exceeding the following flue gas concentration limit: 15 ppmv of NO_x, corrected to 15% oxygen, dry basis. (Basis: RACT and Offsets)

26. Carbon monoxide (CO) emissions from each enclosed flare (A-51 and ~~A-59~~ A-60) shall not exceed 0.20 pounds of CO per million BTU. Compliance with these emission limits may be demonstrated by not exceeding the following flue gas concentration limits: 82 ppmv of CO, corrected to 15% oxygen, dry basis. (Basis: RACT and Cumulative Increase)

27. [deleted]

28. [deleted]

29. The Permit Holder shall maintain records of all planned and unanticipated shut downs of the A-51 and ~~A-59~~ A-60 Flares and of any temperature excursions. The records shall include the date, time, duration, and reason for any shut down or excursion. Any unanticipated shut downs or temperature excursions shall be

reported to the Enforcement Division immediately. All inspection and maintenance records, records of shut downs and excursions, gas flow records, temperature records, analytical results, source test results, and any other records required to demonstrate compliance with the above permit conditions, Regulation 8 Rule 34, or 40 CFR Part 60 Subpart WWW shall be retained on site for a minimum of five years and shall be made available to District staff upon request. (Basis: 2-6-501, 8-34-501, 40 CFR 60.758)

30. In order to demonstrate compliance with Parts 23, 25, and 26 above, Regulation 8, Rule 34, Sections 301.3 and 412, and 40 CFR 60.8 and 60.752(b)(2)(iii)(B), the Permit Holder shall ensure that a District approved source test is conducted annually on the A-51 Landfill Gas Flare and the ~~A-59-A-60~~ Landfill Gas Flare. Each annual source test shall determine the following:
- a. landfill gas flow rate to the flare (dry basis);
 - b. concentrations (dry basis) of carbon dioxide (CO₂), nitrogen (N₂), oxygen (O₂), total hydrocarbons (THC), methane (CH₄), and total non-methane organic compounds (NMOC) in the landfill gas;
 - c. stack gas flow rate from the flare (dry basis);
 - d. concentrations (dry basis) of NO_x, CO, NMOC, and O₂ in the flare stack gas;
 - e. NMOC destruction efficiency achieved by the flare;
 - f. NO_x and CO emission rates from the flare in units of pounds per MM BTU,
 - g. average combustion zone temperature in the flare during the test period.

The first source test for A-51 shall be conducted no later than 60 days after the initial start-up date for A-51. The first source test for ~~A-59~~ A-60 shall be conducted no later than ~~60~~ 90 days after the initial start-up date for ~~A-59~~ A-60. Each subsequent annual source test shall be conducted no later than 12 months after the previous test. For A-60, an initial compliance demonstration test shall be conducted for each of the two operating scenarios for this flare: Zone A with all burners operating and a landfill gas flow rate between 400 scfm and 3000 scfm and Zone B with only four burners operating and a landfill gas flow rate between 150 scfm and 400 scfm. For the subsequent annual source tests at A-60, the source test may be conducted on A-60 while it is operating in either zone. Only one operating scenario needs to be tested in each subsequent year, provided that each operating zone is tested at least once every five years. The Source Test Section of the District shall be contacted to obtain approval of the source test procedures at least 14 days in advance of each source test. The Source Test Section shall be notified of the scheduled test date at least 7 days in advance of each source test. The source test report shall be submitted to the Compliance and Enforcement Division and the Source Test Section within 60 days of the test date. (Basis: Cumulative Increase, Toxic Risk Management Policy, RACT, Offsets, Regulations 8-34-301.3, 8-34-412, 40 CFR 60.8 and 40 CFR 60.752(b)(2)(iii)(B))

31. Landfill Gas Testing:

- a. The Permit Holder shall conduct a characterization of the landfill gas on a quarterly basis with one test concurrent with one of the annual source tests required by Part 30 above. The landfill gas sample shall be drawn from the main landfill gas header. Each quarterly landfill gas sample shall be analyzed for the sulfur compounds listed below. Once per year (concurrent with a Part 30 annual source test) the landfill gas shall be analyzed for all the organic and sulfur compounds listed below. All concentrations shall be reported on a dry basis. The laboratory analysis report for the annual organic and sulfur compound gas characterization test shall be included with the Part 30 source test report and shall be submitted to the Compliance and Enforcement Division and the Source Test Section within 60 days of the test date. (Basis: Toxic Risk Management Policy and Regulations 8-34-412 and 9-1-302)

Organic Compounds

acrylonitrile
benzene
carbon tetrachloride
chlorobenzene
chlorodifluoromethane
chloroethane
chloroform
1,1 dichloroethane
1,1 dichlorethene
1,2 dichlorethane
1,4 dichlorbenzene
dichlorodifluoromethane
dichlorofluoromethane
ethylbenzene
ethylene dibromide
fluorotrichloromethane
hexane
isopropyl alcohol
methyl ethyl ketone
methylene chloride
perchloroethylene
toluene
1,1,1 trichloroethane
1,1,2,2 tetrachloroethane
trichloroethylene
vinyl chloride
xylenes

Sulfur Compounds

carbon disulfide
carbonyl sulfide
dimethyl sulfide
ethyl mercaptan
hydrogen sulfide
methyl mercaptan

- b. Once per week, beginning no later than March 31, 2005, the Permit Holder shall analyze the landfill gas for hydrogen sulfide (H₂S) concentration using a Draeger tube to further demonstrate compliance with Part 18c and Regulation 9-1-302. The landfill gas sample shall be drawn from the main landfill gas header. The Permit Holder shall follow the manufacturer's procedures for using the Draeger tube and interpreting the results. The total reduced sulfur (TRS) content of the landfill gas shall be calculated using the average ratio of TRS/H₂S for this site according to the following equation: $TRS = 1.015 * H_2S$ measured by Draeger tube. The Permit Holder shall maintain records of all Draeger tube test dates and test results and shall summarize the average H₂S concentrations and the calculated TRS content of the landfill gas on a quarterly basis. Each Draeger tube test result (after conversion to TRS content) and the quarterly laboratory analysis in Part 31a shall be compared to the Peak TRS Limit in Part 18c. On a rolling quarterly basis, the Permit Holder shall determine the annual average TRS content for comparison to the Annual Average TRS Limit in Part 18c. (Basis: Cumulative Increase, RACT, and Regulation 9-1-302).

32. The annual report required by BAAQMD Regulation 8-34-411 shall be submitted in two semi-annual increments. The reporting period for the first increment of the Regulation 8-34-411 annual report that is submitted subsequent to the issuance of the MFR Permit for this site shall be from December 1, 2003 through April 30, 2004. This first increment report shall be submitted by May 31, 2004. The reporting periods and report submittal due dates for all subsequent increments of the Regulation 8-34-411 report shall be synchronized with the reporting periods and report submittal due dates for the semi-annual MFR Permit monitoring reports that are required by Section I.F of the MFR Permit for this site. A single report may be submitted to satisfy the requirements of Section I.F, Regulation 8-34-411, and 40 CFR Part 63.1980(a), provided that all items required by each applicable reporting requirement are included in the single report. (Basis: Regulation 8-34-411 and 40 CFR Part 63.1980(a))

E. RECOMMENDATION

Issue an Authority to Construct for the following abatement equipment subject to Condition # 19867.

A-60 Landfill Gas Flare; Perennial Energy, Inc., FL-144-40-E, 90 MM BTU/hour; abating S-5 Redwood Landfill.

Issue a Change of Permit Conditions for the following equipment, subject to Condition # 19867.

S-5 Redwood Landfill; abated by A-51 and A-60 Landfill Gas Flares.

By: signed by Carol S. Allen
Carol S. Allen
Senior Air Quality Engineer

January 9, 2009
Date

Permit to Operate Report for Application # 19098

Redwood Landfill Company; PLANT # 1179

A. BACKGROUND

On January 14, 2009, the District issued Redwood Landfill an Authority to Construct for the A-60 90 MM BTU/hour Landfill Gas Flare. This enclosed flare has two operating zones: Zone A is the full capacity mode with all burners operating and the full stack utilized, while Zone B includes an isolated stack (within the main stack), operation of only 4 burners, and a maximum capacity of 12 MM BTU/hour. Operating in Zone B allows the flare to achieve an extremely low turndown ratio of 20:1 with a minimum heat input capacity of 4.5 MM BTU/hour (150 scfm of LFG).

Redwood Landfill reported that the A-60 Landfill Gas Flare began operating on April 1, 2009. Initial compliance demonstration source tests have been completed and the District is ready to issue the final Permit to Operate for A-60.

B. SOURCE TEST RESULTS

Source testing was conducted on the new A-60 Flare (during both operating modes – A and B) and on the existing A-51 Flare on April 21, 2009 and again on April 5-6, 2010. The results from the two source test dates are presented in Table 1 on the following page.

As shown in Table 1, both flares were operating in compliance with all applicable emission limits during both the 2009 and 2010 source tests. On average, NO_x emissions were about 80% of the NO_x limit, while CO emissions were less than 50% of the CO limit.

In accordance with Regulation 8-34-301.3, compliance with the NMOC emission limits may be demonstrated either by meeting the minimum destruction efficiency requirement (98% NMOC destruction by weight) or by emitting complying with the outlet concentration limit (no more than 30 ppmv of NMOC expressed as methane at 3% O₂, dry basis). The average NMOC concentration in the landfill gas was 756 ppmv, expressed as methane (35% of the maximum expected inlet concentration). In most cases, outlet NMOC emissions from the flares were not detected. Due to the low inlet NMOC concentrations and outlet NMOC detection issues, the NMOC destruction efficiencies could not be determined with sufficient accuracy to demonstrate compliance with the destruction efficiency limit. Therefore, compliance was demonstrated for the outlet NMOC concentration limit only. The highest detected outlet NMOC concentration was 10 ppmv at 3% O₂ (about a third of the limit). For all other tests, the outlet NMOC was less than the detection limit, which was less than 22% of the NMOC outlet concentration limit.

APPENDIX E: Permit to Operate Report for Application # 19098

Table 1. 2009 and 2010 Source Test Results for A-51 and A-60 Landfill Gas Flare

Inlet	Units	A-51		A-60 Zone A		A-60 Zone B		Limit
		2009	2010	2009	2010	2009	2010	
CH ₄	% by volume	47.6%	51.6%	49.8%	50.7%	49.9%	51.3%	
NMOC	ppmv as CH ₄	733	801	691	759	756	797	2160
TRS	ppmv as H ₂ S	338	374	338	371	338	389	600
Fuel Flow	dscfm	2909	2806	2532	2495	357	293	
Heat Input	MM BTU/hr	82.5	86.4	75.2	75.4	10.6	9.0	90
Outlet								
Temp.	°F	1453	1447	1549	1450	1654	1462	
NO _x	ppmv @ 15% O ₂	11.5	13.2	12.0	12.1	10.9	10.7	15
NO _x	lbs/MM BTU	0.05	0.05	0.05	0.05	0.04	0.04	0.06
CO	ppmv @ 15% O ₂	18.1	11.8	37.3	35.5	6.7	35.4	82
CO	lbs/MM BTU	0.04	0.03	0.09	0.09	0.02	0.09	0.20
NMOC	ppmv @ 3% O ₂	10.3	<5.7	<4.9	<5.7	<4.2	<6.5	30
NMOC, DE	% by weight	>92.6%	>96.0%	>96.0%	>95.8	>97.0%	>95.4	98%

The test results in Table 1 also indicate that the flares will comply with the outlet NMOC concentration limit over a range of operating temperatures. The lowest operating temperatures at which NMOC compliance was demonstrated are:

- 1447 °F for A-51,
- 1450 °F for A-60 Zone A, and
- 1462 °F for A-60 Zone B.

In accordance with Condition # 19867, Part 22, the minimum flare operating temperature shall be equal to these average combustion temperatures minus 50 °F, which are:

- 1397 °F for A-51,
- 1400 °F for A-60 Zone A, and
- 1412 °F for A-60 Zone B.

However, the minimum operating temperature should not be less than 1400 °F. Consequently, the current operating temperature limit of 1400 °F for A-51 is acceptable.

For A-60, the test results demonstrate that the emission rates for the low flow rate operating mode (Zone B) are not significantly different from the emission rates detected for Zone A. No NMOC concentrations were detected in the outlet of either zone during any of the twelve test runs conducted at A-60, and the compliance margin with the NMOC outlet concentration limit is at least 4:1. For Zone B, one run demonstrated compliance with the NMOC outlet concentration limit at an operating temperature of less than 1450 °F. Therefore, Zone B should continue to comply with the NMOC outlet concentration limit at a minimum operating temperature of 1400 °F, and it is not necessary to establish separate operating temperature limits for Zone A and B at A-60. Consequently, a single operating temperature limit of 1400 °F is acceptable for both zones at A-60.

C. PERMIT CONDITIONS

The District is proposing to make a few editorial revisions to Condition # 19867, Parts 22 and 30, to clarify the operating temperature limits for A-60 and to indicate that the initial compliance demonstration tests for A-51 and A-60 have been completed. The condition revisions are shown below in strike-out and underline formatting.

Condition # 19867

FOR: S-5 REDWOOD LANDFILL WITH GAS COLLECTION SYSTEM; A-18 WATER SPRAYS; A-51 LANDFILL GAS FLARE; AND A-60 LANDFILL GAS FLARE

No changes to Parts 1-21.

22. The temperature in the combustion zone of each flare shall be maintained at the minimum temperature listed below, averaged over any 3-hour period. In order to demonstrate compliance with this condition, A-51 and A-60 shall each be equipped with a continuous temperature monitor and recorder. The A-60 Flare shall be equipped with a continuous temperature monitor in each operating zone of the stack (Zone A and Zone B). The temperature recorder for A-60 shall continuously record either the Zone A or the Zone B temperature, compatible with the zone the flare is operating in. If a source test demonstrates compliance with all applicable requirements at a different temperature, the APCO may revise these temperature limits, in accordance with the procedures identified in Regulation 2-6-414 or 2-6-415, based on the following criteria. The minimum combustion zone temperature for the flare shall be equal to the average combustion zone temperature determined during the most recent complying source test minus 50 degrees F, provided that the minimum combustion zone temperature is not less than 1400 degrees F. (Basis: Regulations 2-5-302, 8-34-301.3 and 8-34-501.3, and 40 CFR 60.756(b)(1))
- a. The minimum combustion zone temperature for A-51 is 1400 degrees F, averaged over any 3-hour period.
 - b. The minimum combustion zone temperature for each stack zone at A-60 (Zone A and Zone B) is 1400 degrees F, averaged over any 3-hour period. ~~If necessary, separate stack zone temperature limits may be established for A-60.~~

No changes to Parts 23-29.

30. In order to demonstrate compliance with Parts 22, 23, 25, and 26 above, Regulation 8, Rule 34, Sections 301.3 and 412, and 40 CFR 60.8 and 60.752(b)(2)(iii)(B), the Permit Holder shall ensure that a District approved source test is conducted annually on the A-51 Landfill Gas Flare and the A-60 Landfill Gas Flare. Each annual source test shall determine the following:
- a. landfill gas flow rate to the flare (dry basis);
 - b. concentrations (dry basis) of carbon dioxide (CO₂), nitrogen (N₂), oxygen (O₂), total hydrocarbons (THC), methane (CH₄), and total non-methane organic compounds (NMOC) in the landfill gas;
 - c. stack gas flow rate from the flare (dry basis);
 - d. concentrations (dry basis) of NO_x, CO, NMOC, and O₂ in the flare stack gas;
 - e. NMOC destruction efficiency achieved by the flare;
 - f. NO_x and CO emission rates from the flare in units of pounds per MM BTU,
 - g. average combustion zone temperature in the flare during the test period.

~~The first source test for A-51 shall be conducted no later than 60 days after the initial start-up date for A-51. The first source test for A-60 shall be conducted no later than 90 days after the initial start-up date for A-60. Each subsequent~~
Annual source tests shall be conducted no later than 12 months after the previous test. ~~For A-60, an initial compliance demonstration test shall be conducted for each of the two operating scenarios for this flare: Zone A with all burners operating and a landfill gas flow rate between 400 scfm and 3000 scfm and Zone B with only four burners operating and a landfill gas flow rate between 150 scfm and 400 scfm. For t~~The subsequent annual source tests at A-60, ~~the source test~~ may be conducted ~~on A-60~~ while it is operating in either zone. ~~Only one operating scenario needs to be tested in each subsequent year,~~ provided that each operating zone is tested at least once every five years. The Source Test Section of the District shall be contacted to obtain approval of the source test procedures at least 14 days in advance of each source test. The Source Test Section shall be notified of the scheduled test date at least 7 days in advance of each source test. The source test report shall be submitted to the Compliance and Enforcement Division and the Source Test Section within 60 days of the test date. (Basis: Cumulative Increase, ~~Toxic Risk Management Policy,~~ RACT, Offsets, Regulations 2-5-501, 8-34-301.3, 8-34-412, 40 CFR 60.8 and 40 CFR 60.752(b)(2)(iii)(B))

No changes to Parts 31-32.

D. RECOMMENDATION

Issue a Permit to Operate for the following abatement device subject to Condition # 19867 with the changes noted above:

A-60 Landfill Gas Flare; Perennial Energy, Inc., FL-144-40-E, 90 MM BTU/hour; abating S-5 Redwood Landfill.

By: signed by Carol S. Allen
Carol S. Allen
Supervising Air Quality Engineer

June 28, 2010
Date

ENGINEERING EVALUATION

APPLICATION # 16608

Redwood Landfill, Inc.; Site # A1179

A. BACKGROUND

Landfill Application History:

Redwood Landfill, Inc. owns and operates an active MSW landfill in Novato, CA. The landfill first accepted waste in 1958. The Solid Waste Facility Permit and Conditional Use Permit for this landfill, which establishes design capacity, refuse footprint, refuse height, and waste acceptance rate limits for the landfill, underwent modifications in 1978 and in 1995. Redwood Landfill is currently under going CEQA review for another landfill expansion that will increase the design capacity of the site by changing the contours (reducing bench widths and increasing slope angles) of the existing permitted landfill.

On 8-29-2002, the District approved the most recent modification of the landfill source (S-5) pursuant to Application # 17752 and the July 1995 Solid Waste Facility Permit. Application # 17552 included the 1995 landfill height expansion and several other new and modified sources as well as numerous permit conditions changes to update and clarify site and source descriptions. At that time, the District imposed a limit of 17.1 million tons on the cumulative amount of decomposable materials that could be placed in the landfill. Based on annual waste acceptance rate data provided by the applicant, the EPA LANDGEM program, site-specific landfill gas speciation data, and an assumed gas collection system capture efficiency of 75% the District determined the maximum expected gas generation rate for the landfill and established maximum permitted POC and toxic emission rates for the landfill. The POC limit was set to ensure that the site would not exceed 50 tons/year of POC (the SFBA qualifying criteria), and the District provided POC ERCs for this landfill expansion from the SFBA. An HRSA was conducted based on toxic emission increases for the landfill. The baseline for the toxic emission increases was the maximum projected landfill gas generation rate and associated fugitive toxic emissions for the landfill as permitted pursuant to the 1978 Solid Waste Facility Permit, which was estimated to allow a maximum cumulative waste-in-place of 5.5 million tons. Maximum projected gas generation rates, maximum permitted criteria pollutant emission rates (fugitives due to waste decomposition), and the maximum expected fugitive toxic emission rates for the most significant TACs are presented in Tables 1 and 2 below.

Table 1. Maximum Gas Generation Rate and NMOC Content for S-5 per App. # 17552

Max. Cumulative Amount of Decomposable Waste in Place	17.1 million tons
Annual Average Waste Acceptance Rate (1958-2001)	191,952 tons/year
Projected Annual Waste Acceptance Rate (2002-2039)	201,333 tons/year
Max. Projected Landfill Gas Generation Rate for S-5	2763 scfm (at 50% CH ₄)
Equivalent Heat Rate for Max. Gas Generation Rate	82.4 MM BTU/hour
Max. Permitted NMOC Content in LFG	750 ppmv (as hexane)

Table 2. Maximum Permitted Emissions for S-5 per App. # 17552

	Waste Decompo sition	VOC-Laden & Contamina ted Soil Handling	Total for S-5
	Tons/Year	Tons/Year	Tons/Year
Fugitive POC Emissions	20,424	2.905	23.329
Fugitive NPOC Emissions	12.421	0.039	12.460
	Lbs/Year	Lbs/Year	Lbs/Year
Acrylonitrile	13.44		13.4
Benzene	24.17	55.8	80.0
Carbon Tetrachloride	9.67	55.8	65.5
Chloroform	7.50	669.2	676.7
p-Dichlorobenzene	53.50	836.6	890.1
1,4 Dioxane	22.32		22.3
Ethylene Dibromide	11.81		11.8
Ethylene Dichloride	6.22	55.8	62.0
Ethylidene Dichloride	13.00		13.0
Hydrogen Sulfide	4244.98		4245.0
Methylene Chloride	24.37		24.4
Perchloroethylene	67.90	78.1	84.3
1,1,2,2 Tetrachloroethane	10.55		10.6
1,1,2 Trichloroethane	8.38		8.4
Trichloroethylene	29.58	55.8	85.4
Vinyl Chloride	50.04	22.3	72.3

During the evaluation of Application # 17552, the District determined that the existing permitted flare (A-50 at 75 MM BTU/hr) and an existing permitted landfill gas fired leachate vaporator (S-50 at 5 MM BTU/hr) would provide sufficient control capacity for the landfill (97.1% of the maximum projected gas generation rate for the landfill), and that no modifications to these devices were necessary. A-50 and S-50 were initially permitted in 1997 and 1998 per Applications #17639 and #18034. Since then, S-50 has been permanently shut down, and A-50 was modified per Applications #8501 in 2004, #12003 in 2005, and #11371 in 2007. In addition, a new flare (A-51) was permitted in 2007 pursuant to Application #11371. A-50 and A-51 are currently the only permitted control devices for the S-5 landfill and the current maximum permitted residual and secondary emissions from these flares are described in Application #11371. The current maximum permitted flare capacities and maximum residual and secondary toxic emissions for A-50 and A-51 are summarized in Table 3.

Table 3. Maximum Capacities and Permitted Emissions for A-50 and A-51 Flares

APPENDIX E: Engineering Evaluation for Application # 16608

Current Limits Per Application # 11371	A-50	A-51	Total	Units
Max. Permitted Landfill Gas Flow Rate	1207	3018	4226	Scfm
Max. Equivalent Heat Input Rate	36.0	90.0	126.0	MM BTU/hour
Max. Permitted Secondary CO Emissions	47.304	78.840	126.144	tons/year
Max. Permitted Secondary SO ₂ Emissions	22.321	55.803	78.125	tons/year
Max. Permitted Secondary NO _x Emissions	9.461	23.652	33.113	tons/year
Max. Permitted Secondary PM ₁₀ Emissions	2.697	6.743	9.440	tons/year
Max. Permitted Residual POC Emissions	2.197	5.492	7.689	tons/year
Max. Permitted Residual NPOC Emissions	0.007	0.019	0.026	tons/year
Acrylonitrile	4.14	10.35	14.49	pounds/year
Benzene	7.40	18.51	25.91	pounds/year
1,3 Butadiene	4.20	10.49	14.69	pounds/year
Carbon Tetrachloride	3.00	7.50	10.50	pounds/year
Chloroform	2.33	5.82	8.15	pounds/year
p-Dichlorobenzene	16.39	40.98	57.37	pounds/year
1,4 Dioxane	6.84	17.09	23.93	pounds/year
Ethylene Dibromide	3.66	9.16	12.82	pounds/year
Ethylene Dichloride	1.93	4.83	6.76	pounds/year
Ethylidene Dichloride	4.14	10.34	14.48	pounds/year
Hydrogen Sulfide (Hourly)	1.41	3.52	4.93	pounds/hour
Hydrogen Sulfide (Annual)	4037	10093	14130	pounds/year
Methylene Chloride	7.58	18.94	26.52	pounds/year
Perchloroethylene	20.80	52.01	72.81	pounds/year
1,1,2,2 Tetrachloroethane	3.28	8.19	11.47	pounds/year
1,1,2 Trichloroethane	2.57	6.42	8.99	pounds/year
Trichloroethylene	9.16	22.89	32.05	pounds/year
Vinyl Chloride	15.33	38.33	53.66	pounds/year
Formaldehyde	114.23	285.57	399.80	pounds/year
Hydrogen Bromide	663.40	1658.5	2321.9	pounds/year
Hydrogen Chloride	1195.8	2989.4	4185.2	pounds/year
Hydrogen Fluoride	65.61	164.03	229.64	pounds/year

The maximum permitted POC emission rates for waste decomposition related emissions from the landfill and flares are: 20.424 ton/year of fugitive POC from S-5, 2.197 tons/year of residual POC from A-50, and 5.492 tons/year of residual POC from A-51. The total maximum permitted POC emissions for S-5, A-50, and A-51 are: 28.113 tons/year due to waste decomposition and 2.905 tons/year due handling contaminated soils.

Likewise, the maximum permitted NPOC emission rates for waste decomposition related emissions from the landfill and flares are: 12.421 ton/year of fugitive NPOC from S-5, 0.007 tons/year of residual NPOC from A-50, and 0.019 tons/year of residual NPOC from A-51. The total maximum permitted NPOC emissions for S-5, A-50, and A-51 are: 12.447 tons/year due to waste decomposition and 0.039 tons/year due handling contaminated soils.

Initial Application # 16608

SCS Engineers, on behalf of Redwood Landfill, submitted Application # 16608 to request an Authority to Construct and Permit to Operate for a new flare (A-59 at 120 MM BTU/hr capacity) that would replace the current flare (A-50 with a current maximum permitted throughput rate of 36 MM BTU/hr capacity). SCS Engineers stated that the gas collection rate was approaching the A-51 Flare's maximum capacity, and that A-50 is currently inoperable and non-repairable. SCS Engineers is proposing to increase the maximum permitted flaring capacity for the site by 67% from 126 MM BTU/hour to 210 MM BTU/hr. Since the capacity of the A-51 Flare operating alone should have provided sufficient control capacity for the site, and the site was not expected to reach its maximum gas generation rate until the year 2039, District staff reviewed the S-5 Landfill to determine why SCS Engineers was requesting an additional 84 MM BTU of flare capacity for this site.

As explained in more detail below, the District has concluded that erroneous waste disposal projections were provided to the District for Application # 17552. As a result of this erroneous data, the District under-predicted the maximum landfill gas generation rate for Redwood Landfill in the Engineering Evaluation for Application # 17552. However, the landfill gas NMOC concentration limit that was issued under Application # 17552 (750 ppmv as C6) was much higher than necessary. Based on the current average landfill gas NMOC concentration data, corrected historical waste placement data, and updated waste placement projections, the District has determined that the Redwood Landfill's waste decomposition related emissions are currently less than 5 tons/year of POC (less than 20% of the current 28.1 tons/year limit).

Recent waste disposal rates (an average 404,000 tons/year over the last ten years) are twice as high as the Application # 17752 projected average waste disposal rate for 2002 and beyond. The District has developed a new estimate of the maximum projected landfill gas generation rate for Redwood Landfill using corrected historical waste placement data for 1958-2007, updated waste placement projections for 2008-2023, and the LANDGEM program with the following input data: $k = 0.04$, $L_0 = 100$, methane = 50%. The maximum landfill gas generation rate is now projected to be 3820 scfm of landfill gas in the year 2022 (with an equivalent heat rate of 113.9 MM BTU/hr). This change in the projected annual average waste acceptance rate has shortened the expected life of the landfill and has vastly increased the maximum expected gas generation rate compared to the previously predicted maximum of 2763 scfm.

While the new projected gas flow rate (114 MM BTU/hr) justifies the need for more flaring capacity than A-51 alone can provide (90 MM BTU/hr), it is still far less the requested total capacity of 210 MM BTU/hr. As a worst case scenario, the District evaluated the gas generation rate for the maximum permitted waste acceptance rate of 474,500 tons/year (1300 tons/day at 365 days/year). The maximum gas generation for this worst case scenario was 4054 scfm of landfill gas (121 MM BTU/hour). The applicant determined landfill emissions using a k value of 0.06 instead of 0.04, but the applicant did not determine this k value in accordance with EPA Method 2E. The District has rejected using a k value of 0.06, because it was not determined using Method 2E, the Applicant did not provide sufficient justification for using this k value, and the actual gas collection rates reported to the District during the last ten years correlate more closely to the projected gas generation rates determined using a k value of 0.04. Even though the District does not accept the use of 0.06 for k , the District evaluated this case for comparison purposes. The peak gas generation rate determined using $k=0.06$ is 4351 scfm (129.7 MM BTU/hr), which is still far less than the Applicant's requested flaring capacity of 210 Mm BTU/hr. While the new flare may be necessary to provide some additional capacity, to improve operational flexibility, and to provide back-up for A-51, the full combined capacity of both flares (210 MM BTU/hr) is not justifiable for the current landfill. Permit conditions will be added to ensure that this excess flare

capacity is not used in conjunction with the future planned expansion of the landfill, unless the applicant fully offsets both the primary and secondary emissions associated with this future expansion.

Based on data submitted by the Applicant for the 2007 annual information update request, the site is currently collecting an average of 2664 scfm of landfill gas. The average methane concentration measured during the 2007 source tests was 44.3%; and the average NMOC concentration was 86.8 ppmv as hexane. Assuming these source test averages are representative of the entire year, the gas collection rate for 2007 at 50% methane is 2360 scfm and the NMOC collection rate is 13.532 tons/year. If the gas collection system is achieving 75% control, the current landfill gas generation rate is estimated to be 3147 scfm of landfill gas of LFG at 50% CH₄, which is higher than the maximum permitted capacity of A-51. The estimated NMOC generation rate is $(13.532 \text{ tons/year}/0.75) = 18.043 \text{ tons/year}$. If 25% of this NMOC generation rate is not captured and is emitted as fugitives from the landfill surface and the flare achieves 98% control of captured NMOC, the total NMOC emissions are:
 $[18.043*0.25 + 13.532*(1.0-0.98)] = 4.781 \text{ tons/year of NMOC}$.

Based on the updated maximum gas generation rate of 3820 scfm of landfill gas and a revised maximum NMOC concentration limit of 360 ppmv as hexane, the new maximum projected NMOC generation rate is 80.711 ton/year of NMOC per LANDGEM. Assuming 25% of this total generation rate is emitted as fugitive gas from S-5 and 100% of the NMOC is POC, the maximum expected fugitive emission rate from S-5 is 20.178 tons/year of POC, expressed as hexane. Thus, the new maximum projected fugitive POC emission rate is less than the current limit of 20.424 tons/year of POC.

Revised Application # 16608

In the May 7, 2008 office meeting, Redwood Landfill requested that the District expedite the issuance of the Authority to Construct for the A-59 Flare to ensure that the site has sufficient control capacity to maintain compliance with Regulation 8, Rule 34. Redwood Landfill disputed the validity of the current POC emission limit and stated that they would supply documentation to support their claim that the 1995 solid waste facility permit was not an expansion of the landfill and that the landfill should have been given a higher baseline limit per the 1978 solid waste facility permit. The District agreed to investigate alternative permit limits for the flares that would allow the District to issue the Authority to Construct for A-59, while the District and Redwood analyze the previous solid waste facility permits and the appropriate baseline limits for Redwood Landfill prior to 1978 and as of 1995. While the District is continuing to investigate Redwood Landfill's claims in their July 2008 letter concerning the status of project permitted under Application # 17552, this Engineering Evaluation was prepared to accommodate Redwood Landfill's request to expedite the Authority to Construct for A-59.

The District is proposing to permit the A-59 Flare at full capacity on a daily basis but is proposing to limit the combined annual average throughput for the A-51 and A-59 Flares to the equivalent of the current permitted flaring capacity of 126 MM BTU/hr. This combined annual average flaring capacity limit exceeds the updated gas generation rate projection for the landfill (114 MM BTU/hr), and will provide enough additional flaring capacity to accommodate the worst-case fill rate scenario, a higher than expected methane generation rate constant (k), or other uncertainties involved with this updated gas generation rate projection. The District is also proposing to reduce the NMOC concentration limit for the landfill gas such that the maximum projected residual emissions from A-51 and A-59 plus the maximum projected fugitive emissions from S-5 do not exceed the current waste decomposition emission limits of 28.113 tons/year of POC and 12.447 tons/year of NPOC. As long as the landfill and flare emissions do not exceed the currently permitted emission levels, then Application # 16608 will not constitute a modification of the landfill. Language will be added to ensure that A-59 cannot be used to control emissions for any future landfill expansion unless the applicant provides the necessary offsets for the

residual POC and secondary NO_x emissions associated with the landfill expansion. In the September 23, 2008 letter from SCS Engineers, the applicant agreed to accept this proposed flaring capacity limit.

This project will result in secondary pollutant emission increases due to the new flare; however, the applicant will qualify for offset relief for this project pursuant to H&S Code 42301.2, because the landfill design capacity and maximum waste acceptance rates are not being modified under Application # 16608. In accordance with direction from Brian Bateman, Director of Engineering Division, the District will supply the necessary offsets for this project on the applicant's behalf. The offset credits will be transferred from the small facility banking account to a new account, which is being created to specifically track these types of abatement projects that qualify for offset relief pursuant to H&S Code 42301.2. If the District later determines that Redwood Landfill will undergo an increase in capacity after the effective date of H&S Code 42301.2, then Redwood Landfill will be required to reimburse the District for any POC and NO_x credits provided by the District for POC and NO_x emissions from A-59 that are caused by the combustion of landfill gas above and beyond the current maximum projected landfill gas generation rate of 3820 scfm.

The District is also using Application # 16608 to correct and revise the projected emission rates for the landfill. The new maximum projected fugitive waste decomposition emission rates are: 20.178 tons/year of POC and 0.202 tons/year of NPOC from the landfill alone. The landfill gas NMOC concentration limit of 360 ppmv as hexane will ensure that fugitive POC emissions from the landfill do not exceed the current limit of 20.424 tons/year of POC. However, the increase in the maximum projected gas generation rate for the landfill combined with the current toxic air contaminant (TAC) concentration limits will result in higher fugitive toxic emissions for the landfill. Improved destruction efficiency assumptions for the flares result in lower residual emissions from the flares for most compounds. However, secondary toxic compound emissions from the flares are higher than the previous permitted levels. An updated HRSA for the landfill and flares will be necessary to fully evaluate and document these changes.

B. EMISSIONS

Proposed Criteria Pollutant Emissions:

The District is proposing to permit the new A-59 Flare for the full capacity of 120 MM BTU/hour for 24 hours/day. However, the District is proposing to limit annual usage for A-59 and A-51 combined to the total of the current throughput limits for A-50 and A-51, which is equivalent to 126 MM BTU/hour for 24 hours/day and 365 days/year.

The NO_x and CO emission factors for A-59 are equal to the current RACT requirements for enclosed landfill gas flares: 0.06 pounds of NO_x per MM BTU and 0.20 pounds of CO per MM BTU. A-51 is currently subject to these same RACT emission limits.

The PM₁₀ emission factor for A-51 and A-59 is derived from the AP-42 emission factor of 17 lbs PM₁₀/MM dscf of CH₄ burned. The Redwood Landfill gas is assumed to contain 50% methane with a heat content of 496.943 BTU/dscf. The PM₁₀ factor is calculated below:

$$(17 \text{ lbs PM}_{10}/1\text{E}6 \text{ dscf CH}_4) * (0.5 \text{ dscf CH}_4/1.0 \text{ dscf LFG}) / (496.943 \text{ BTU/dscf LFG}) * (1\text{E}6 \text{ BTU/MM BTU}) = 0.017105 \text{ lbs PM}_{10}/\text{MM BTU}$$

The District is proposing to reduce the landfill gas sulfur limits in Condition # 19867, Part 18 to ensure that this application will not result in sulfur dioxide emission increases of more than 40 tons/year, which

would have triggered a public notice requirement. Based on the weekly H₂S monitoring data that has been collected at this site since 2005, the current peak limit of 1300 ppmv of TRS and the current annual average limit of 425 ppmv of TRS are unnecessarily high. Since March 2005, the highest hydrogen sulfide level detected was 410 ppmv H₂S during the first quarter of 2006. Sulfur concentrations appear to be on a downward trend. Based on a statistical analysis of the results, the peak TRS concentration is not ever expected to exceed 600 ppmv. Since March 2005, the annual average TRS content ranged from 197 to 289 ppmv of TRS, with an average of 241 ppmv of TRS. Based on a statistical analysis of this sulfur data, the proposed new limit is an annual average landfill gas TRS content of 350 ppmv. Assuming all of the TRS in the landfill gas is converted to sulfur dioxide (SO₂), the proposed TRS limits are equivalent to the SO₂ emission factors derived below:

Daily SO₂ Emission Factor:

$$\begin{aligned} & (600 \text{ scf H}_2\text{S}/1\text{E}6 \text{ scf LFG}) * (1 \text{ scf SO}_2/1 \text{ scf H}_2\text{S}) / (387.006 \text{ scf SO}_2/\text{lbmol SO}_2) * \\ & (64.059 \text{ lbs SO}_2/\text{lbmol}) / (496.943 \text{ BTU}/\text{scf LFG}) * (1\text{E}6 \text{ BTU}/\text{MM BTU}) \\ & = 0.199851 \text{ lbs SO}_2/\text{MM BTU} \end{aligned}$$

Annual SO₂ Emission Factor:

$$\begin{aligned} & (350 \text{ scf H}_2\text{S}/1\text{E}6 \text{ scf LFG}) * (1 \text{ scf SO}_2/1 \text{ scf H}_2\text{S}) / (387.006 \text{ scf SO}_2/\text{lbmol SO}_2) * \\ & (64.059 \text{ lbs SO}_2/\text{lbmol}) / (496.943 \text{ BTU}/\text{scf LFG}) * (1\text{E}6 \text{ BTU}/\text{MM BTU}) \\ & = 0.116580 \text{ lbs SO}_2/\text{MM BTU} \end{aligned}$$

The POC and NPOC emission factors for the flares are derived from the Regulation 8-34-301.3 outlet NMOC concentration limit of 30 ppmv of NMOC as methane at 3% oxygen. This NMOC outlet concentration limit results in higher emissions than organic emissions calculated using the proposed NMOC inlet concentration limit (360 ppmv of NMOC as hexane in landfill gas) and 98% destruction efficiency. The POC emission rate is assumed to be 100% of the NMOC emission rate, while the NPOC emission rate is assumed to be no more than 1% of the total NMOCs, based on site-specific NPOC concentration data. Detailed calculations are available in the attached spreadsheets. The derived organic emission factors for the flares are:

0.006948 lbs POC/MM BTU and
0.000069 lbs NPOC/MM BTU.

The proposed maximum daily emissions from each flare are presented in Table 4. The proposed maximum annual emissions for the two flares combined are presented in Table 5. As shown in Table 5, POC and NPOC are the only pollutants that will have increases in the maximum permitted emission levels from the flares.

Table 4. Proposed Maximum Daily Emissions for Redwood Landfill's Flares

	Emission Factors Lbs/MM BTU	A-51 at 2160 MM BTU/day Pounds/Day	A-59 at 2880 MM BTU/day Pounds/Day	A-51 and A-59 at 5040 MM BTU/day Pounds/Day
NO _x	0.060000	129.60	172.80	302.40
CO	0.200000	432.00	576.00	1008.00
PM ₁₀	0.017105	36.95	49.26	86.21
SO ₂	0.199851	431.68	575.57	1007.25
POC	0.006948	30.20	40.26	70.46
NPOC	0.000069	0.30	0.40	0.70

Table 5. Proposed Maximum Annual Criteria Pollutant Emissions for Redwood Landfill's Flares

	Emission Factors (A-51 & A-59) Lbs/MM BTU	A-51 and A-59 Combined Limit: 1,103,760 MM BTU/Yr Tons/Year	A-50 and A-51 Current Total Limit Tons/Year	Proposed Limit minus Current Limit Tons/Year
NO _x	0.060000	33.113	33.113	0.000
CO	0.200000	110.376	126.144	- 15.768
PM ₁₀	0.017105	9.440	9.440	0.000
SO ₂	0.116580	64.338	78.124	-13.786
POC	0.006948	7.716	7.689	0.027
NPOC	0.000069	0.077	0.026	0.051

Current Actual Emissions:

The baseline period for A-50 and A-51 is 2005 through 2007. Redwood Landfill provided throughput data for each flare during these three calendar years. Actual emission factors for each flare and each year were determined from the annual source tests at each flare. The emission factors, throughput data, and actual emission rates for A-50 and A-51 are presented in Tables 6 and 7, respectively.

APPENDIX E: Engineering Evaluation for Application # 16608

Table 6. Actual Emissions from A-50 Landfill Gas Flare

	Source Test Data for A-50			Average lbs/MM BTU
	6/29/2005 lbs/MM BTU	6/7/2006 lbs/MM BTU	5/31/2007 lbs/MM BTU	
NO _x	0.041	0.043	0.041	0.042
CO	0.071	0.081	0.130	0.094
NMOC	0.003	0.002	0.004	0.003
SO ₂ ^a	0.130	0.099	0.073	0.100
PM10	(AP-42 Emission Factor)			0.017
A-50 Throughput	1/05 thru 12/05	1/06 thru 12/06	1/07 thru 12/07	Ann. Avg.
M scf / Year ^b	383397	76933	134990	198440
BTU/scf	497	497	497	497
MM BTU/Year	190527	38231	67082	98614
A-50 Emissions	Tons/Year	Tons/Year	Tons/Year	Tons/Year
NO _x	3.906	0.822	1.375	2.034
CO	6.764	1.548	4.360	4.224
NMOC	0.295	0.034	0.125	0.152
SO ₂	12.356	1.888	2.441	5.562
PM10	1.629	0.327	0.574	0.843

a. Actual SO₂ emission factors were calculated using quarterly averages of H₂S monitoring data as well as any available source test data.

b. The throughput data reported by Redwood Landfill was corrected to 50% methane.

Table 7. Actual Emissions from A-51 Landfill Gas Flare

	Source Test Data for A-51			Average lbs/MM BTU
	7/28/2005 lbs/MM BTU	6/8/2006 lbs/MM BTU	5/30/2007 lbs/MM BTU	
NO _x	0.043	0.048	0.039	0.043
CO	0.037	0.028	0.052	0.039
NMOC	0.001	0.003	0.002	0.002
SO ₂ ^a	0.110	0.114	0.072	0.099
PM10	(AP-42 Emission Factor)			0.017
A-51 Throughput	1/05 thru 12/05	1/06 thru 12/06	1/07 thru 12/07	Ann. Avg.
M scf / Year ^b	708485	1312599	1321593	1114226
BTU/scf	497	497	497	497
MM BTU/Year	352077	652287	656757	553707
A-51 Emissions	Tons/Year	Tons/Year	Tons/Year	Tons/Year
NO _x	7.570	15.655	12.807	12.010
CO	6.513	9.132	17.076	10.907
NMOC	0.200	0.974	0.637	0.604
SO ₂	19.447	37.317	23.505	26.756
PM10	3.011	5.579	5.617	4.735

a. Actual SO₂ emission factors were calculated using quarterly averages of H₂S monitoring data as well as any available source test data.

b. The throughput data reported by Redwood Landfill was corrected to 50% methane.

Cumulative Emission Increases:

The proposed permit conditions will allow the two flares (A-51 and A-59) to operate at various annual throughput combinations. Under Scenario A, the landfill gas throughput to A-59 is maximized (1,051,200 MM BTU/year), and the throughput at A-51 would be reduced from an actual annual average of 553,707 MM BTU/year to 52,560 MM BTU/year. Under Scenario B, the landfill gas throughput to A-51 is maximized (788,400 MM BTU/year, which is also the current limit for A-51), and the throughput to A-59 would be limited to 315,360 MM BTU/year. Scenario C considers the proposed emissions for the two flares combined versus the total actual emissions for the two existing flares. The largest changes in emissions occur under Scenarios A and C. The emission changes for these two scenarios are the same and are summarized in Table 8.

Table 8. Flare Emission Increases for Application # 16608

	Proposed Flare Emissions from A-51 & A-59 Tons/Year	Actual Flare Emissions from A-50 & A-51 Tons/Year	Flare Emission Increases Tons/Year
CO	110.376	15.131	95.245
SO ₂	64.338	32.318	32.020
NO _x	33.113	14.045	19.068
PM ₁₀	9.440	5.579	3.861
POC	7.716	0.756	6.960
NPOC	0.077	0.000	0.077

For secondary pollutants, the emission increases in Table 8 are also the cumulative emission increases for this project. The POC and NPOC residual emissions are attributed to the S-5 landfill. At the revised NMOC limit for Redwood's landfill gas, fugitive emissions are: 20.178 tons/year of POC and 0.202 tons/year of NPOC. Including the residual flare emissions in Table 8, the total emissions due to waste decomposition are now projected to be: 27.894 tons/year of POC and 0.279 tons/year of NPOC. Since these emission rates do not exceed the currently permitted waste decomposition emission rates (28.113 tons/year of POC and 12.477 tons/year of NPOC), this application does not result in any cumulative emission increases of POC or NPOC.

Project Definition and Proposed Toxic Emissions

For the purposes of Regulation 2, Rule 5, the project shall include all emission increases from new or modified sources and related projects that were permitted within the last two years. At landfill facilities, the landfill and its flares are generally considered to be related projects, because the flares are an integral part of the control system for the landfill. For this site, the S-5 Redwood Landfill, the existing A-51 Landfill Gas Flare, and the proposed A-59 Landfill Gas Flare are related devices. Proposed TAC emissions will be compared to the currently permitted emission levels below.

The current TAC emissions listed below are the emission levels that were evaluated during the most recent HRSA for that operation or device. For the flares, the toxic destruction efficiency was assumed to be 83% for most individual toxic compounds, which is considerably lower than the current expected control efficiency for new modern flares.

Table 9. Current Permitted Waste Decomposition Related TAC Emissions from the Landfill and Flares

APPENDIX E: Engineering Evaluation for Application # 16608

	S-5 at 82.4 MM BTU/hr of LFG generated	A-50 at 36 MM BTU/hr	A-51 at 90 MM BTU/hr	Total Permitted Emissions Pounds/Year
Acrylonitrile	13.44	4.14	10.35	27.93
Benzene	24.17	7.40	18.51	50.08
1,3 Butadiene		4.20	10.49	14.69
Carbon Tetrachloride	9.67	3.00	7.50	20.17
Chloroform	7.50	2.33	5.82	15.65
p-Dichlorobenzene	53.50	16.39	40.98	110.87
1,4 Dioxane	22.32	6.84	17.09	46.25
Ethylene Dibromide	11.81	3.66	9.16	24.63
Ethylene Dichloride	6.22	1.93	4.83	12.98
Ethylidene Dichloride	13.00	4.14	10.34	27.48
Hydrogen Sulfide	4244.98	4037.00	10093.00	18374.98
Methylene Chloride	24.37	7.58	18.94	50.89
Perchloroethylene	67.90	20.80	52.01	140.71
1,1,2,2 Tetrachloroethane	10.55	3.28	8.19	22.02
1,1,2 Trichloroethane	8.38	2.57	6.42	17.37
Trichloroethylene	29.58	9.16	22.89	61.63
Vinyl Chloride	50.04	15.33	38.33	103.70
Formaldehyde		114.23	285.57	400.00
Hydrogen Bromide		663.40	1658.46	2321.90
Hydrogen Chloride		1195.80	2989.40	4185.20
Hydrogen Fluoride		65.61	164.03	228.64

For proposed TAC emissions in Table 10, the fugitive landfill emissions were determined based on the new maximum projected gas generation rate for S-5, the current TAC concentration limits for this site's landfill gas, and the standard 25% fugitive emission rate. Residual and secondary emissions from the flares are based on the current landfill gas TAC concentration limits, the maximum proposed landfill gas throughput rate for the devices, and an assumed destruction efficiency for each individual TAC of 98%. Flares operating at 1400 °F are expected to achieve 98% destruction for individual compounds.

Table 10. Proposed versus Current Waste Decomposition Related TAC Emissions from the Landfill and Flares Operating at the Current Permitted Capacity

	S-5 at 113.9 MM BTU/hr of LFG generated	A-51 and A-59 Combined at 126 MM BTU/hr	Total Proposed Lbs/Year	Current Permitted Lbs/Year
Acrylonitrile	20.65	1.83	22.48	27.93
Benzene	101.33	8.97	110.30	50.08
1,3 Butadiene	21.05	1.86	22.91	14.69
Carbon Tetrachloride	19.95	1.77	21.72	20.17
Chloroform	15.49	1.37	16.86	15.65
p-Dichlorobenzene	76.27	6.75	83.02	110.87
1,4 Dioxane	34.29	3.03	87.32	46.25
Ethylene Dibromide	24.37	2.16	26.53	24.63
Ethylene Dichloride	12.84	1.14	13.98	12.98
Ethylidene Dichloride	25.67	2.27	27.94	27.48
Hydrogen Sulfide	15470.63	1368.97	16839.60	18374.98
Methylene Chloride	771.20	68.24	839.44	50.89
Perchloroethylene	107.56	9.52	117.08	140.71
1,1,2,2 Tetrachloroethane	21.77	1.93	23.70	22.02
1,1,2 Trichloroethane	17.30	1.53	18.83	17.37
Trichloroethylene	51.13	4.52	55.65	61.63
Vinyl Chloride	81.07	7.17	88.24	103.70
Formaldehyde		399.80	399.80	400.00
Hydrogen Bromide		2121.84	2121.84	2321.90
Hydrogen Chloride		8370.24	8370.24	4185.20
Hydrogen Fluoride		459.28	459.28	228.64

The landfill waste decomposition related emissions include the fugitive emissions emanating from S-5 plus the residual TACs emitted from the flares. The updated emission calculation for the landfill results in higher than previously predicted emission rates for all of the TACs emitted from S-5. However, the residual TACs from the flares are expected to be lower than previously predicted. As shown in Table 10, the net result of the changes in emission calculation procedures for the landfill and flares is that the maximum proposed emission rate has increased for some individual TACs (i.e. benzene and methylene chloride) but has decreased for other TACs (i.e. hydrogen sulfide and vinyl chloride). Since the TAC emission increases at S-5 (fugitive TACs plus residual TACs only; secondary TAC emissions from A-51 and A-59 are discussed in the following paragraph) are due to an emission calculation procedure change and not due to a physical or operation change at the landfill (the higher than expected daily waste disposal rates were allowed by the current permit), these TAC emission increases will not be deemed a toxic NSR modification of the landfill. The HRSA for the landfill and residual flare emissions that was conducted more than two years ago for Application # 17552 needs to be updated based on the current projected site emissions data, but this updated HRSA is not part of this current application for a flare replacement. The updated HRSA will be conducted at a later date and will be referenced in both Applications # 17552 and #16608 when it is complete.

Application # 16608 is for a new flare (A-59) to replace the existing A-50 flare. The combined total flaring capacity will not change. This flare replacement project includes a new source of secondary TAC emissions (A-59). Since A-51 was permitted less than two years ago, this project shall include the proposed secondary emissions from both A-51 and A-59. The emission factors for the secondary TACs are summarized in Table 11. The basis for each TAC emission factor is discussed below.

Secondary formaldehyde emissions from new landfill gas flares are expected to be similar to the formaldehyde emissions measured for landfill gas fired turbines. From the CATEF database, the mean formaldehyde emission factor for landfill gas fired turbines is 0.18 lbs/MM scf of LFG burned.

The secondary emission factors for acid gases (HCl, HF, and HBr) are based on the following maximum expected landfill gas concentrations: 40,000 ppbv of chlorine, 4000 ppbv of fluorine, and 5000 ppbv of bromine. These ion concentration levels were derived from on-site test data or concentration limits for individual halogenated compounds.

Table 11. Emission Factors for Secondary TACs Emitted From A-51 and A-59 Flares

Secondary TACs	Halogen Ion Concentration in LFG, PPBV	Abated Emission Factor Pounds / M scf	Abated Emission Factor Pounds / MM BTU
Formaldehyde		1.800E-04	3.622E-04
Hydrogen Chloride	40000	3.769E-03	7.583E-03
Hydrogen Fluoride	4000	2.068E-04	4.161E-04
Hydrogen Bromide	5000	1.045E-03	2.104E-03

Both A-51 and A-59 will be permitted to operate simultaneously at full capacity (90 MM BTU/hour for A-51 and 120 MM BTU/hour for A-59) on an hourly or daily basis. Maximum hourly secondary emissions for each flare and for both flares combined are summarized in Table 12. Since none of the hourly emissions of secondary toxic pollutants will exceed the acute risk screen trigger level, an acute risk screen is not required for this project.

Table 12. Maximum Hourly Secondary TAC Emission Rates From A-51 and A-59 Flares

Secondary TACs	Emissions From A-51 at 90 MM BTU/hr Pounds/Hour	Emissions From A-59 at 120 MM BTU/hr Pounds/Hour	Emissions From A-51 and A-59 Combined Pounds/Hour	Acute Risk Screen Trigger Level Pounds/Hour
Formaldehyde	0.033	0.043	0.076	0.210
Hydrogen Chloride	0.683	0.910	1.593	4.600
Hydrogen Fluoride	0.037	0.050	0.087	0.530
Hydrogen Bromide	0.189	0.252	0.442	NA

On an annual basis, either the A-51 Flare or the A-59 Flare could operate at full capacity, but the total annual throughput to the two flares combined will be limited to the current total heat input limit of 1,103,760 MM BTU/year (which is equivalent to an annual average heat input rate of 126 MM BTU/hour). Maximum permitted secondary emissions for each flare and the two flares combined are summarized in Table 13. Since formaldehyde, hydrogen chloride, and hydrogen bromide emissions will exceed the chronic trigger levels, a risk screen is required for this project.

Table 13. Maximum Annual Secondary TAC Emission Rates From A-51 and A-59 Flares

Secondary TACs	Emissions	Emissions	Total Emissions	Chronic
----------------	-----------	-----------	-----------------	---------

APPENDIX E: Engineering Evaluation for Application # 16608

	From A-51 at 788,400 MM BTU/year Pounds/Year	From A-59 at 1,051,200 MM BTU/year Pounds/Year	A-51 & A-59 at 1,103,760 MM BTU/year Pounds/Year	Risk Screen Trigger Level Pounds/Year
Formaldehyde	285.6	380.8	399.8	30
Hydrogen Chloride	5978.7	7971.7	8370.2	350
Hydrogen Fluoride	328.1	437.4	459.3	540
Hydrogen Bromide	1658.5	2211.3	2321.8	930

Facility-Wide Potential to Emit:

A facility-wide potential to emit evaluation was conducted to determine the applicability of various District and federal requirements. The results of this potential to emit evaluation are summarized in Table 14.

Since the total facility-wide emissions of each pollutant are less than 250 tons/year, this site is not a PSD facility.

Since this site will emit more than 100 tons/year of CO, Redwood Landfill is a major facility for CO.

Although PM₁₀ emissions will also exceed 100 tons/year, Redwood Landfill is not considered a major facility of PM₁₀ emissions, because the major facility emission thresholds exclude fugitive emissions, and Redwood Landfill will only emit 23.6 tons/year of non-fugitive PM₁₀.

Redwood Landfill is not a major facility for SO₂ emissions, because facility wide SO₂ emissions are less than 100 tons/year.

NO_x and POC emissions are also less than 100 tons/year but are greater than the District's small facility banking account threshold of 35 tons/year.

Table 14. Facility Wide Potential to Emit for Plant # 1179, October 2008

Device #	Source Description	Maximum Annual Emissions (tons/year)					
		NO _x	CO	POC	NPOC	PM10	SO ₂
S-2	Sewage Sludge Storage, Main Pond			0.106		0.106	
S-5	Redwood Landfill, waste decomposition			20.424	0.208		
S-5	Redwood Landfill, waste disposal			0.000		212.030	
S-5	Redwood Landfill, contaminated soil disposal			0.312			
S-5	Redwood Landfill, VOC-laden soil as daily cover			2.638			
S-34	Compost and Co-Compost Operations (pre-mixing, windrows, curing piles, product storage pile)			22.500		1.055	
S-39	Trommell Screening Processes					0.009	
S-41	Temporary Stockpiles for Yard and Green Waste Shredding Operations					2.430	
S-42	Soil Stockpiles (including VOC-laden soil)			2.638		0.026	
S-46	Diesel Engine (Tipper)	3.094	0.276	0.183		0.258	0.043
S-47	Diesel Engine (Pump)	2.707	0.682	0.110		0.220	0.035
S-48	Diesel Engine (Screen)	1.903	0.098	0.087		0.025	0.046
S-49	Diesel Engine (BUG)	0.021	0.003	0.001		0.000	0.000
S-55	Gasoline Dispensing Facility G# 8573			0.987			
S-58	Aerated Leachate Pond			0.084	0.050		
A-51 & A-59	Landfill Gas Flares at 126 MM BTU/hr	33.113	110.376	7.716	0.077	9.440	64.338
Total	All Permitted Sources and Abatement Devices	40.837	111.435	57.784	0.335	235.599	64.463

C. STATEMENT OF COMPLIANCE

Regulation 2, Rule 1 (CEQA and Public Notification Requirements):

This application involves the permitting of an abatement device with no modification of the landfill source and no increase in the total capacity of the control devices for this landfill. This project will have no significant impact of biological resources, water quality, dust, smoke, odors, noise, or the need for municipal services. Since this application involves a permit for an abatement device only and there is no possibility that this device will have any significant adverse environmental impact, this application is categorically exempt from CEQA review pursuant to Regulation 2-1-312.2. No further CEQA review is required.

This site is a major facility, because CO emissions have the potential to exceed 100 tons/year of CO, but this application is not for a new major facility. The landfill and flares are subject to source-specific MACT requirements instead of the Regulation 2-2-317 MACT requirement. As shown in Table 8, the cumulative emission increases for this application are less than the Regulation 2-2-221 major modification levels (40 tons/year of POC, NO_x, or SO₂, 15 tons/year of PM₁₀, and 100 tons/year of CO). Therefore, this application will not be subject to the Regulation 2-2-405 publication and public comment requirements.

The project is over 1000 feet from the nearest school and is therefore not subject to the public school notification requirements of Regulation 2-1-412.

Regulation 2, Rule 2 (New Source Review: BACT/RACT)

Regulation 8, Rule 34 requires that Redwood Landfill collect and control landfill gas in landfill gas flares or energy recovery devices in order to reduce POC emissions caused by waste decomposition in the landfill (S-5). The A-51 and A-59 Landfill Gas Flares are necessary to meet these BARCT requirements of Regulation 8, Rule 34. Pursuant to Regulation 2-2-112, the secondary emissions from A-51 and A-59 (NO_x, CO, SO₂, and PM₁₀) are exempt from the BACT requirements of Regulation 2-2-301, because A-51 and A-59 are complying with BARCT for POC emissions. Regulation 2-2-112 requires that NO_x, CO, SO₂, and PM₁₀ emissions from A-51 and A-59 comply with RACT instead of BACT. As discussed in more detail below, A-51 and A-59 will comply with RACT for each of these pollutants.

RACT for NO_x: The District's BACT/TBACT Workbook (Document # 80.1 12/16/91), the RACT limit for NO_x emissions from a landfill gas flare is 0.06 pounds NO_x/MM BTU. The District has permitted numerous other new landfill gas fired flares at this emission limit. While it may be feasible to achieve a lower NO_x emission level, the proposed NO_x limit allows a reasonable compliance margin and is accepted as RACT for landfill gas fired flares. Permit conditions will require that both the existing A-51 Flare and the new A-59 Flare meet this NO_x RACT limit. Redwood Landfill will demonstrate compliance with this limit by conducting an annual source test. Annual source testing is a standard method of demonstrating compliance with NO_x RACT limits.

RACT for CO: RACT for CO is the same as the BACT requirements for POC and includes the use of an enclosed ground flare with (1) a minimum retention time of 0.6 seconds, (2) a minimum combustion zone temperature of 1400 °F, and (3) automatic controls for combustion air, gas shut-off, and flare restart. The existing A-51 Flare and the new A-59 Flare are enclosed ground flares that meet the three design criteria identified above. Therefore, A-51 and A-59 satisfy the RACT requirements for CO emissions. To ensure adequate POC destruction, permit conditions will require that the new A-59 Flare be maintained

at a minimum combustion zone temperature of at least 1400 °F and will require Redwood Landfill to demonstrate compliance with this temperature limit by continuously monitoring and recording the combustion zone temperature. The District typically issues a CO limit of 0.20 pounds CO/MM BTU for new landfill gas flares. Permit conditions will require the A-51 and A-59 Flares to meet this CO RACT limit. Redwood Landfill will demonstrate compliance with this limit by conducting an annual source test. Annual source testing is a standard method of demonstrating compliance with CO RACT limits.

RACT for PM₁₀: PM₁₀ emissions from landfill gas flares are low with emission rates that are similar to natural gas combustion. The use of fuel pretreatment systems to remove large particles and excess water are considered RACT for PM₁₀ emissions from landfill gas fired flares. Since A-59 will be equipped with a fuel pretreatment system, it will comply with RACT for PM₁₀ emissions. PM₁₀ emissions monitoring is not justified for these flares, because the emissions are low (less than 10 tons/year for the two flares combined) and the expected grain loading rate of 0.0124 gr/dscf (see discussion for Regulation 6, Rule 1 below for calculations) is less than 10% of the limit (0.15 gr/dscf).

RACT for SO₂: Application # 10874 contains a detailed discussion of the SO₂ RACT determination for the A-50 Landfill Gas Flare. The District determined that landfill gas sulfur treatment systems do not constitute a “reasonably” available control measure. Instead, RACT for SO₂ emissions from landfill gas combustion operations was determined to be compliance with reasonable landfill gas sulfur content limits. Initially, the Regulation 9-1-302 limit was used to establish a reasonable peak landfill gas sulfur content limit of 1300 ppmv as H₂S. An annual average landfill gas sulfur content limit of 425 ppmv (expressed as H₂S) was determined to be a reasonable RACT limit for the existing flare based on the limited landfill gas sulfur content test data that was available at that time. Since these sulfur content limits were established, Redwood Landfill has been monitoring the landfill gas for hydrogen sulfide content on a weekly basis. The weekly H₂S data is exhibiting a slight downward trend since mid 2006. Measured values ranged from 131-410 ppmv with an average of 229 ppmv and a standard deviation (□) of 33 ppmv. The maximum H₂S plus 3□ is 578 ppmv. The annual average sulfur content (average of 52 rolling weeks) ranged from 197-289 ppmv of TRS, with an average of 241 ppmv of TRS and a standard deviation (□) of 33 ppmv. The average TRS plus 3□ is 340 ppmv. The District has determined that a peak TRS limit of 600 ppmv and an annual average TRS limit of 350 ppmv are reasonable limits considering this weekly sulfur content data. The District recommends that sulfur testing continue at the weekly frequency.

Regulation 2, Rule 2 (New Source Review: Offsets)

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. If facility-wide emissions are greater than 35 tons/year of NO_x or POC, the facility must usually provide their own offsets. However, H&S Code 42301.2 supercedes this District requirement, if the emission increases are due to secondary emissions from abatement devices, and if the capacity of the source being abated is not increasing.

- 42301.2. A district shall not require emission offsets for any emission increase at a source that results from the installation, operation, or other implementation of any emission control device or technique used to comply with a district, state, or federal emission control requirement, including, but not limited to, requirements for the use of reasonably available control technology or best available retrofit control technology, unless there is a modification that results in an increase in capacity of the unit being controlled.

Since this application does not involve any increases to the landfill and the A-51 and A-59 flares are necessary for compliance with BARCT requirements, H&S Code 42301.2 applies to the emission

increases from the flares in this application. Per Brian Bateman’s direction and to ensure that no net increase requirements are fully satisfied, the District will provide the necessary emission reduction credits from an account created for projects subject to this H&S Code and funded from the small facility banking account.

From Table 8, this application will result in net cumulative increases of 19.068 tons/year of NO_x. The offset ratio is 1.15 to 1.0. Therefore, this application requires 21.928 tons/year of NO_x offsets from the H&S Code 42301.2 account. If the S-5 Redwood Landfill is modified in the future, any emission increases associated with this modification, including secondary emissions from the flare may be subject to reimbursement.

Regulation 2-2-303 requires offsets for SO₂ and PM₁₀ emission increases if (a) the site is a major facility and (b) facility-wide emissions of SO₂ or PM₁₀ are greater than 100 tons/year. Since this site is not a major facility of SO₂ or PM₁₀ emissions, SO₂ and PM₁₀ offsets are not required.

Regulation 2, Rule 5 (NSR of Toxic Air Contaminants):

Regulation 2, Rule 5 applies to projects as defined in Regulation 2-5-216. As discussed in detail in the Toxic Emissions Section above, this project includes all secondary emissions from the A-51 and A-59 Landfill Gas Flares. As shown in Table 12, annual project emissions will exceed several risk screen trigger levels. Therefore, a risk screening analysis was required for secondary TAC emissions from the flares.

The District conducted an HRSA using the ISCST3 air dispersion model. Rural dispersion coefficients, Screen3 meteorological data, and Petaluma River terrain data were used in the dispersion model to determine 1-hour ground level concentrations. Detailed calculation procedures for the ISCST3 input factors are presented in the attached HRSA. Maximum health impacts for the secondary TAC emissions from A-51 and A-59 are presented in Table 15.

Table 15. Health Impacts Due to Secondary TACs from A-51 and A-59 Flares

Health Impact Type	Receptor Type	Max. Impact Due to A-51	Max. Impact Due to A-59	Max. Project Impacts Due to A-51 and A-59
Cancer Risk (In a Million)	Resident	0.09	0.12	0.21
Cancer Risk (In a Million)	Worker	0.02	0.02	0.04
Chronic HI	Resident	0.04	0.06	0.10
Chronic HI	Worker	0.01	0.01	0.02
Acute HI	Resident or Worker	0.004	0.005	0.01

Since the health risks from A-51 and A-59 were each less than the TBACT trigger levels of 1 in a million cancer risk and 0.2 chronic HI, TBACT is not required for the secondary emissions from A-51 or A-59. 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.

Regulation 2, Rule 6 (Major Facility Review):

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 carbon monoxide. 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.

The District issued the initial MFR Permit for this facility (Site # A1179) on November 10, 2003. This MFR Permit was last revised October 24, 2007. Redwood Landfill has submitted Application # 16609 for the MFR permit changes associated with Application # 16608. These MFR permit revisions will be discussed in the Statement of Basis for Application # 16609.

Regulation 6, Rule 1 (General Requirements):

Particulate matter emissions from the A-59 Landfill Gas Flare are subject to Regulation 6. Section 6-310 limits PM emissions to 0.15 grains/dscf of exhaust. At the expected PM₁₀ emission rate of 0.0171 lbs/MM BTU, the PM₁₀ grain loading in the exhaust will be 0.0124 grains/sdcf at 0% O₂. This expected PM₁₀ emission rate is far below the Regulation 6-310 grain-loading limit.

Regulation 8, Rule 34 (Solid Waste Disposal Sites):

Landfill gas flares are required to meet the requirements of Regulation 8, Rule 34. Regulation 8-34-301.3 requires the use on enclosed ground flares that have either a destruction efficiency of 98% by weight for NMOC or that emit no more than 30 ppmv of NMOC (as methane at 3% O₂, dry basis) from the flare. The manufacturer indicated that A-59 will comply with these NMOC destruction efficiency and outlet concentration limits. Continuous temperature monitoring (pursuant to Regulation 8-34-507) will ensure that this flare complies with 8-34-301.3 on an on-going basis. The flare will also be equipped with a data recording system that will maintain all records required pursuant to Sections 501.2 and 501.3.

Regulation 9, Rule 1 (Sulfur Dioxide):

For gaseous combustion operations, Regulation 9-1-302 limits the SO₂ concentration in an exhaust stream to 300 ppmv (dry basis). At the revised peak inlet total reduced sulfur content of 600 ppmv (expressed as H₂S), the outlet SO₂ concentration will be 125 ppmv of SO₂ at 0% O₂. Therefore, this permit condition will ensure compliance with the Regulation 9-1-302 limit. To date, weekly monitoring of the landfill gas has demonstrated compliance with this inlet TRS concentration limit.

Federal Requirements:

Redwood 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). These federal requirements are similar to the Regulation 8, Rule 34 requirements discussed above, except that the federal requirements allow a higher outlet NMOC concentration limit (20 ppmv as hexane, which equals 120 ppmv as methane at 3% O₂, dry basis). In this case, compliance with Regulation 8, Rule 34 ensures compliance with all applicable requirements of the NSPS and NESHAPs. All applicable requirements are cited in detail in the MFR Permit for Site # A1179.

D. PERMIT CONDITIONS

For this application, the District is proposing to allow the shutdown of the A-50 Landfill Gas Flare by removing abatement requirements for A-50 from Condition # 19867. Abatement requirements for the new A-59 Landfill Gas Flare will be added to Condition # 19867. The landfill gas NMOC content and sulfur content limits will be revised in Part 18. The NMOC content revision is necessary to ensure that fugitive POC emissions will not exceed the currently permitted level at the higher landfill gas generation rate that is now predicted for this landfill. The sulfur content revisions are based on Redwood's weekly monitoring data and will ensure that this application does not exceed the major modification thresholds due to SO₂ emission increases at the flares. The A-51 and A-59 flares will be issued a combined annual heat input limit in Part 20. The changes to each part are identified below in strike through and underline formatting.

Condition # 19867

FOR: S-5 REDWOOD LANDFILL WITH GAS COLLECTION SYSTEM; A-18 WATER SPRAYS; ~~A-50 LANDFILL GAS FLARE; AND A-51 LANDFILL GAS FLARE; AND A-59 LANDFILL GAS FLARE~~

1. The maximum design capacity of the landfill (total volume of all wastes and cover materials placed in the landfill, excluding final cover) shall not exceed 19.1 million cubic yards, unless the Permit Holder can demonstrate that an increase of this design capacity limit will not result in any increases in the maximum permitted emission rates for the S-5 Redwood Landfill, ~~and A-50 Landfill Gas Flare~~ A-51 Landfill Gas Flare, and A-59 Landfill Gas Flare, which are described in Application # ~~1755216608~~. (Basis: Regulation 2-1-301)
2. The total cumulative amount of all decomposable materials placed in the landfill (total weight of all decomposable wastes and decomposable cover materials placed in the landfill, excluding final cover) shall not exceed 17.1 million tons, unless the Permit Holder can demonstrate that an increase of this limit will not result in an increase in waste decomposition related emissions. ~~†~~The maximum permitted fugitive precursor organic compound (POC) emission rate ~~of is~~ 20.42420.397 tons/year of POC from the S-5 Redwood Landfill ~~due to waste decomposition.~~ The maximum permitted residual POC emission rate is 7.716 tons/year from the flares (A-51 and A-59). Any changes in waste acceptance rates, types of waste accepted, or other practices that will result in an increase in the maximum permitted POC, NPOC, or toxic air contaminant emission rates for ~~S-5 or A-50 or A-51 or A-59~~, which are described in Application # ~~1755216608~~, shall be considered a modification of ~~S-5 or A-50, A-51, or A-59~~ pursuant to Regulation 2-1-234. (Basis: Regulation 2-1-301)
3. The total amount of all waste materials (including sewage sludge) accepted at the landfill shall not exceed 2300 tons per day (except during temporary emergency situations approved by the Local Enforcement Agency) and shall not exceed 450,000 tons per calendar year. The total amount of sewage sludge accepted at the landfill shall not exceed 1000 wet tons per day (except during temporary

emergency situations approved by the Local Enforcement Agency) and shall not exceed 200,750 wet tons per calendar year. (Basis: Regulation 2-1-301)

4. The total amount of all cover materials (excluding final cover) placed in the landfill shall not exceed 1160 tons per day and shall not exceed 105,500 tons per calendar year. (Basis: Regulation 2-1-301)
5. In order to demonstrate compliance with Parts 1-4 above, the Permit Holder shall maintain the following records in an APCO approved log book:
 - a. Record on a daily basis the type and amount of all materials received at the landfill.
 - b. For each type of material received at the landfill, clearly identify how the material will be used at this site (i.e. disposed of in the landfill directly, used as daily cover material, used as intermediate cover material, used in composting operations, sent to yard and green waste recycling operations, sent to other recycling operations, used for on-site road construction or surfacing, used for other construction purposes, sent to on-site stockpiles for later use, etc.). For material types that may be used for multiple purposes at this site, identify the amount of material used for each purpose.
 - c. For each type of material received at the landfill, clearly identify whether the material is decomposable or inert. Inert materials are defined by Regulation 8-34-203. For the purposes of this condition, soils containing more than 50 ppm by weight of volatile organic compounds (VOC) or "contaminated soil" as defined in Regulation 8-40-205 are decomposable materials. Soils containing 50 ppm by weight VOC or less are inert materials.
 - d. If cover materials are taken from on-site stockpiles, record on a daily basis the amount of material removed from the stockpiles and used as cover material (for each type of material).
 - e. Summarize on a monthly basis: the total amount of all wastes accepted, the total amount of sewage sludge accepted, the total amount of accepted materials that were directly used as cover material, the amount of cover materials that were removed from on-site stockpiles, the total amount of materials used for cover, the total amount of decomposable cover materials, the total amount of decomposable wastes placed in the landfill, the total amount of non-decomposable wastes disposed of in the landfill, the total amount of decomposable materials placed in the landfill, and the total amount of all materials placed in the landfill.

The Permit Holder shall begin maintaining the above records by no later than December 1, 2002. These records shall be kept at site for at least 5 years from the date the data is entered and shall be made available to the District staff for inspection. (Basis: Regulations 2-1-301, 8-34-501, and 40 CFR 60.758)

6. The mean vehicle fleet weight for all off-site vehicles (excluding vehicles that are not transporting waste, recyclables, or construction related materials such as

employee, contractor, or visitor vehicles) shall not exceed 15.4 tons. (Basis: Regulation 2-1-301)

7. The mean vehicle fleet weight for all on-site landfilling and construction related vehicles (bulldozers, scrapers, back hoes, compactors, road graders, loaders, dump trucks, soil trucks, water trucks, fuel trucks, or maintenance vehicles, etc.) shall not exceed 28.4 tons. (Basis: Regulation 2-1-301)
8. The total vehicle miles traveled (VMT) by the off-site vehicle fleet shall not exceed the following limits:
 - a. 875 VMT per day on gravel roads
 - b. 438 VMT per day on dirt roads
 - c. 50 VMT per day on paved roads
 - d. 273,000 VMT per calendar year on gravel roads
 - e. 136,500 VMT per calendar year on dirt roads
 - f. 15,600 VMT per calendar year on paved roads(Basis: Regulation 2-1-301)
9. The total vehicle miles traveled (VMT) by the on-site vehicle fleet shall not exceed the following limits:
 - a. 62 VMT per day (essentially all travel is assumed to occur on dirt roads)
 - b. 19,145 VMT per calendar year (essentially all travel is assumed to occur on dirt roads)(Basis: Regulation 2-1-301)
10. In order to demonstrate compliance with Parts 6-9, the Permit Holder shall maintain the following records in an APCO approved log book:
 - a. For each type of vehicle fleet (off-site vehicles and on-site construction equipment) maintain a list of all the types of vehicles in the fleet. For each vehicle type, record the empty vehicle weight, maximum load weight, and average vehicle weight (average of full and empty weights). This list shall be reviewed annually and updated whenever necessary to ensure that the list accurately reflects the types of vehicles that may be present at the landfill during any calendar year.
 - b. For the off-site vehicle fleet, record on a daily basis and summarize on a monthly basis: the number of vehicle trips (round trips to/from the landfill) for each type of vehicle in the fleet.
 - c. For the on-site vehicle fleet, record on a daily basis and summarize on a monthly basis: the number of vehicle trips for each type of vehicle in the fleet. For construction vehicles like bulldozers or compactors that have no set travel route but instead make many small trips across the active face, the number of vehicle trips can be estimated from operating times and procedures or odometer readings and the maximum round trip travel distance (see subpart f. below). If no data is available for estimating vehicle trips, the vehicle trips shall be recorded as 1 vehicle trip per day per vehicle used during that day.

- d. At least once per calendar year, the Permit Holder shall calculate and record the mean vehicle fleet weight for each type of vehicle fleet. For each vehicle fleet, the mean vehicle fleet weight shall be calculated using the vehicle trip data for: (i) the day with the highest number of vehicle trips during the previous calendar year; and (ii) the day with the highest total amount of waste accepted during the previous calendar year. Mean vehicle fleet weights shall also be recalculated whenever new vehicle types are added to a vehicle fleet. The mean vehicle fleet weight (MVFW) is a weighted average calculated by multiplying the average vehicle weight for each vehicle type (AVWi) times the number of vehicle trips per day for that vehicle type (DVTi), summing AVWi*DVTi for all vehicle types, and dividing the resulting sum by the total number of vehicle trips for that day (DVT).
- e. For the off-site vehicle fleet, the Permit Holder shall determine (using odometer measurements, maps, or other appropriate means) the maximum round trip distance traveled on-site by each vehicle type in the fleet on gravel roads, dirt roads, and paved roads (VMT per round trip per vehicle type per road type). Alternatively, the Permit Holder may determine a maximum round trip distance per road type for one or more groups of vehicle types, if all vehicle types in the group travel essentially the same roads and distances. This distance shall be determined at least once per calendar year and whenever significant changes to on-site travel routes have occurred.
- f. For the on-site vehicle fleet, the Permit Holder shall determine (using odometer measurements, maps, or other appropriate means) the maximum round trip distance traveled by each vehicle type in the fleet on dirt roads (VMT per round trip per vehicle type). Alternatively, the Permit Holder may determine a maximum round trip distance per road type for one or more groups of vehicle types, if all vehicle types in the group travel essentially the same roads and distances. This distance shall be determined at least once per calendar year and whenever significant changes to travel routes have occurred.
- g. For each vehicle fleet type, the Permit Holder shall calculate and record the total vehicle miles traveled (VMT) per day on each type of road (dirt, gravel, and paved for off-site vehicles and dirt only for on-site vehicles) using the data recorded pursuant to subparts b., c., d., and f. The daily VMT per road type shall be summarized for each calendar month and for each calendar year.

The Permit Holder shall begin maintaining the above records by no later than December 1, 2002. These records shall be kept at site for at least 5 years from the date the data is entered and shall be made available to the District staff for inspection. (Basis: Regulations 2-1-301, 8-34-501, and 40 CFR 60.758)

- 11. Particulate emissions from any operation of the landfill shall be abated by A-18 Water Sprays in such a manner that visible dust emissions 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. The Permit Holder shall meet the following minimum watering requirements:

- a. On any dry operating days, water shall be applied to unpaved roads and parking areas at a rate of 0.5 gallons per square yard or more.
- b. On any dry operating days, water shall be applied to unpaved roads at a frequency of at least once every three hours of operation.
- c. On any dry operating days, water shall be applied to unpaved parking areas or infrequently traveled unpaved roads at least twice per day or at least once per every 150 vehicle trips (whichever is more frequent).
- d. On any dry operating days, water shall be applied to the active landfill face, the active area of stockpiles, composting operations, or other dust prone areas at least twice per day.
- e. On any operating day when rain fall is not sufficient to prevent visible emissions, additional water shall be applied to any road, parking area, active face, stockpile, or dusty area as frequently as necessary to prevent visible emissions that persist for longer than 3 minutes in an hour.

In order to demonstrate compliance with this requirement, the Permit Holder shall maintain the following information in an APCO approved log book:

- f. Accurate maps of the facility showing the locations of all roads and parking areas at the facility (dirt, gravel, and paved roads shall be clearly distinguished), stockpiles, and active filling areas. The current travel routes for both off-site and on-site vehicle traffic and the water spray trucks shall be clearly indicated on the maps.
- g. Record the frequency of water spray applications (on gravel roads, dirt roads, stockpiles, the active face, and any other dust prone areas) for each operating day.

(Basis: Regulations 1-301, 2-1-301, and 6-301)

- *12. If the plant receives two or more violation notices from the District for "Public Nuisance" in any consecutive 12 month period, the Permit Holder shall implement the following control measures, as applicable, or any other measures that the District deems necessary and/or appropriate, within the time period specified by the District. If requested by the District, the Permit Holder shall submit to the District a permit application to modify the Permit to Operate and/or these permit conditions, within 30 days of notification. (Basis: Regulation 1-301)
- a. Pave main haul roads and parking areas associated with the nuisance operation such as roads for landfilling, composting, recycling, or sludge handling operations.
 - b. Add gravel or other aggregate based surfacing to dirt roads and parking areas that are associated with the nuisance operation.
 - c. Use chemical suppressants on unpaved roads and unpaved parking areas that are associated with the nuisance operation.
 - d. Increase the frequency of water application on unpaved roads, parking areas, the active face of the landfill, stockpiles, or any other dust prone areas that are associated with the nuisance operation.

- e. Use frequent sweeping and/or water flushing, during the dry season, on paved areas that are associated with the nuisance operation.
- *13. The Permit Holder may use non-hazardous contaminated materials containing no more than 50 ppm by weight of Volatile Organic Compounds (VOC) as daily or interim cover material, provided that these materials are properly handled and disposed of in accordance with this part and any other applicable requirements.
- a. Any metal laden materials (materials that have been contaminated with arsenic, asbestos, beryllium, cadmium, hexavalent chromium, nickel, copper, lead, mercury, selenium, or zinc) shall be properly handled at all times and shall be abated by appropriate dust mitigation measures including: the use of covers during on-site transport, the use of frequent water sprays during active handling (loading, unloading, spreading, etc.) of these materials, and the use of water sprays, covers, or chemical dust suppressants on inactive storage areas.
 - b. If metal laden materials are used as interim cover, the metal laden material shall be covered with a non-contaminated material such as clean soil or compacted green waste prior to subjecting the area to frequent vehicle or construction equipment traffic.
 - c. Metal laden materials shall not be used in the construction of unpaved roadways or parking lots.
- (Basis: Toxic Risk Management Policy)

14. This part applies to the acceptance, handling, storage, and on-site reuse of VOC-laden soil. VOC-laden soil is any soil that contains volatile organic compounds, as defined in Regulation 8-40-213, other than contaminated soil. As defined in Regulation 8-40-205, contaminated soil contains more than 50 ppmw of VOC or has a surface concentration greater than 50 ppmv of VOC as C1, and contaminated soil is subject to Part 15 below instead of this part. Materials containing only non-volatile hydrocarbons and materials meeting the requirements of Regulation 8-40-113 are not subject to this part. For each lot of VOC-laden soil accepted at this site, the Permit Holder shall comply with the daily limits identified in either subpart a or subpart b below and shall comply with the annual emissions limit identified in subpart c below. To demonstrate compliance with the daily and annual emission limits, the Permit Holder shall comply with the monitoring procedures listed in subpart a(i-v). If the Permit Holder opts to comply with the daily concentration limit in subpart b rather than the daily emission limit in subpart a, then the Permit Holder shall also comply with the soil screening procedures listed in subpart b(i-v).
- a. Unless the Permit Holder demonstrates compliance with Regulation 8-2-301 in accordance with subpart b below, the Permit Holder shall limit the quantity of VOC laden soil handled per day such that no more than 15 pounds of total carbon could be emitted to the atmosphere per day. In order to demonstrate compliance with this subpart and the annual emissions limit specified in subpart c, the Permit Holder shall maintain the

- following records in a District approved log for all VOC-laden soil accepted at the landfill.
- i. Record on a daily basis the amount of VOC laden soil accepted for each truckload or each soil lot, as appropriate. This amount (in units of pounds per day) is Q in the equation in subpart a(iii) below.
 - ii. Record on a daily basis the VOC content for each truckload or each soil lot, as appropriate. This VOC Content (C in the equation below) should be expressed as parts per million by weight as total carbon (or C1).
 - iii. Calculate and record on a daily basis the VOC Emission Rate (E) using the following equation: $E = Q * C / 1E6$
This equation may be applied to each truckload or to each soil lot received per day depending on the amount of soil that is represented by the VOC Content data. If the equation is applied to multiple loads per day, the VOC Emission Rate shall be totaled for all loads received each day.
 - iv. Summarize all daily emission rates on a monthly and calendar year basis.
 - v. All records shall be maintained on site or shall be made readily available to District staff upon request for at least 5 years from the date of entry.
- b. Unless the Permit Holder demonstrates compliance with Regulation 8-2-301 in accordance with subpart a above, the Permit Holder shall screen each lot of VOC laden soil accepted per day for VOC surface emissions to show that each lot of VOC laden soil is not contaminated soil.
- i. The Permit Holder shall use the testing procedures outlined in Regulation 8-40-604.
 - ii. The screening test shall be representative of the entire lot of VOC-laden soil. The soil surface shall be disturbed prior to screening to ensure that the screening is representative of the entire load.
 - iii. The Permit Holder shall maintain records of all testing conducted to satisfy this subpart and shall record the amount of VOC-laden soil accepted and the highest surface concentration measured pursuant to this subpart. These records shall be maintained for each truckload or each soil lot accepted, as appropriate, provided that the records are made or summarized on at least a daily basis.
 - iv. Summarize the daily waste acceptance rates and the weighted average of the surface concentration records on a monthly basis and for each calendar year.
 - v. All records shall be maintained on site or shall be made readily available to District staff upon request for at least 5 years from the date of entry.
- c. The Permit Holder shall limit the quantity of VOC laden soil handled per year such that annual VOC emissions due to on-site handling, storage, disposal, or reuse of VOC laden soil shall not exceed 10,530 pounds per

calendar year. The Permit Hold shall comply with the monitoring procedures in subpart a(i-v) above to demonstrate compliance with this annual emissions limit.

(Basis: Offsets and Regulation 8-2-301)

15. Handling Procedures for Soil Containing Volatile Organic Compounds:
 - a. The procedures listed below in subparts b-l do not apply if the following criteria are satisfied. However, the record keeping requirements in subpart m below are applicable.
 - i. The Permit Holder has appropriate documentation demonstrating that either the organic content of the soil or the organic concentration above the soil is below the "contaminated" level (as defined in Regulation 8, Rule 40, Sections 205, 207, and 211). The handling of soil containing VOCs in concentrations below the "contaminated" level is subject to Part 14 above.
 - ii. The Permit Holder has no documentation to prove that soil is not contaminated, but source of the soil is known and there is no reason to suspect that the soil might contain organic compounds.
 - b. The Permit Holder shall provide notification to the Compliance and Enforcement Division of the Permit Holder's intention to accept contaminated soil at the facility at least 24 hours in advance of receiving the contaminated soil. The Permit Holder shall provide an estimate of the amount of contaminated soil to be received, the degree of contamination (range and average VOC Content), and the type or source of contamination.
 - c. Any soil received at the facility that is known or suspected to contain volatile organic compounds (VOCs) shall be handled as if the soil were contaminated, unless the Permit Holder receives test results proving that the soil is not contaminated. To prove that the soil is not contaminated, the Permit Holder shall collect soil samples in accordance with Regulation 8-40-601 within 24 hours of receipt of the soil by the facility. The organic content of the collected soil samples shall be determined in accordance with Regulation 8-40-602.
 - i. If these test results indicate that the soil is still contaminated or if the soil was not sampled within 24 hours of receipt by the facility, the Permit Holder must continue to handle the soil in accordance with the procedures subparts d-l below, until the soil has completed treatment or has been placed in a final disposal location and adequately covered. Storing soil in a temporary stockpile or pit is not considered treatment. Co-mingling, blending, or mixing of soil lots is not considered treatment.
 - ii. If these test results indicate that the soil - as received at the facility - has an organic content of 50 ppmw or less, then the soil may be considered to be not contaminated and need not be handled in accordance with the procedures listed in subparts d-l below, but shall be handled in accordance with Part 14 above.

- d. Any contaminated soil received at the facility shall be clearly identified as contaminated soil, shall be handled in accordance with subparts e-l below, and shall be segregated from non-contaminated soil. Contaminated soil lots may not be co-mingled, blended, or otherwise mixed with non-contaminated soil lots prior to treatment, reuse, or disposal. Mixing soil lots in an attempt to reduce the overall concentration of the contaminated soil or to circumvent any requirements or limits is strictly prohibited.
- e. On-site handling of contaminated soil shall be limited to no more than 2 on-site transfers per soil lot. For instance, unloading soil from off-site transport vehicles into a temporary storage pile is considered one transfer. Moving soil from a temporary storage to a staging area is considered one transfer. Moving soil from a temporary storage pile to a final disposal site is one transfer. Moving soil from a staging area to a final disposal site is one transfer. Therefore, unloading soil from off-site transport into a temporary storage pile and then moving the soil from that temporary storage pile to the final disposal site is allowed. Unloading soil from off-site transport into a staging area and then moving the soil from that staging area to the final disposal site is allowed. However, unloading soil from off-site transport to a temporary storage pile, moving this soil to a staging area, and then moving the soil again to a final disposal site is 3 on-site transfers and is not allowed.
- f. All contaminated soil shall be either treated, deposited in a final disposal site, or transported off-site for treatment, within 90 days of receipt at the facility.
- g. The total amount of contaminated soil disposed of at this site shall not exceed 6240 tons during any calendar year. The Permit Holder shall apply for a change of conditions before accepting any soil containing more than 100 ppm by weight of VOC. (Basis: Offsets)
- h. All active storage piles shall meet the requirements of Regulation 8-40-304 by using water sprays, vapor suppressants or approved coverings to minimize emissions. The exposed surface area of any active storage pile (including the active face at a landfill) shall be limited to 6000 ft². The types of storage piles that may become subject to these provisions include (but are not limited to) truck unloading areas, staging areas, temporary stockpiles, soil on conveyors, bulldozers or trucks, the active face of a landfill, or other permanent storage pile at the final disposal location.
- i. All inactive storage piles shall meet the requirements of Regulation 8-40-305 including the requirement to cover contaminated soil during periods of inactivity longer than one hour. The types of storage piles that may become subject to these provisions include (but are not limited to) soil on trucks or other on-site equipment, staging areas, temporary stockpiles, and the permanent storage pile at the final disposal location. District approved coverings for inactive storage piles include continuous heavy-duty plastic sheeting (in good condition, joined at the seams, and securely anchored) or encapsulating vapor suppressants (with re-treatment as necessary to prevent emissions).

- j. The Permit Holder must:
 - i. Keep contaminated soil covered with continuous heavy-duty plastic sheeting (in good condition, joined at the seams, and securely anchored) whenever soil is to be stored in temporary stockpiles or during on-site transport in trucks. Soil in trucks shall not be left uncovered for more than 1 hour.
 - ii. Establish a tipping area for contaminated soils near the active face that is isolated from the tipping area for other wastes.
 - iii. Spray contaminated soil with water or vapor suppressant immediately after dumping the soil from a truck at the tipping area.
 - iv. Ensure that all contaminated soil is transferred from the tipping area to the active face immediately after spraying with water or vapor suppressant.
 - v. Ensure that contaminated soil in the tipping area is not disturbed by subsequent trucks. Trucks shall not drive over contaminated soil in the tipping area or track contaminated soil out of the tipping area on their wheels.
 - vi. Spray contaminated soil on the active face with water or vapor suppressant (to keep the soil visibly moist) until the soil can be covered with an approved covering.
 - vii. Limit the area of exposed soil on the active face to no more than 6000 ft².
 - viii. Ensure that contaminated soil spread on the active face is completely covered on all sides with one of the following approved coverings: at least 6 inches of clean compacted soil, at least 12 inches of compacted garbage, or at least 12 inches of compacted green waste.
 - ix. Ensure that covering of soil on the active face is completed within one hour of the time that the soil was first dumped from a truck at the tipping area.
- k. Contaminated soil shall not be used as daily, intermediate, or final cover material for landfill waste operations unless the requirements of Regulation 8, Rule 40, Sections 116 or 117 have been satisfied.
- l. Contaminated soil is considered to be a decomposable solid waste pursuant to Regulation 8, Rule 34. All contaminated soil disposed of at a site shall be included in any calculations of the amount of decomposable waste in place for annual reporting requirements or for purposes of Regulation 8-34-111 or 8-34-304.
- m. The Permit Holder shall keep the following records for each lot of soil received, in order to demonstrate on-going compliance with the applicable provisions of Regulation 8, Rule 40 and this part.
 - i. For all soil received by the facility (including soil with no known contamination), record the arrival date at the facility, the soil lot number, the amount of soil in the lot, the organic content or organic concentration of the lot (if known), the type of contamination (if any), and keep copies of any test data or other

information that documents whether the soil is contaminated (as defined in 8-40-205) or not contaminated, with what, and by how much.

- ii. If the soil is tested for organic content after receipt by the facility, a report with the sampling date, test results, and the date results were received.
- iii. For all on-site handling of contaminated soil, use a checklist or other approved method to demonstrate that appropriate procedures were followed during all on-site handling activities. One checklist shall be completed for each day and for each soil lot (if multiple lots are handled per day).
- iv. For soil aerated in accordance with 8-40-116 or 117 record the soil lot number, the amount of soil in the lot, the organic content, the final placement date, the final placement location, and describe how the soil was handled or used on-site.
- v. For final disposal at a landfill, record on a daily basis the soil lot number, the amount of soil placed in the landfill, the disposal date, and the disposal location.
- vi. Summarize the total amount of contaminated soil disposed of at this site on a monthly and calendar year basis to demonstrate compliance with subpart g.

All records shall be retained for at least 5 years from the date of entry and shall be made available for District inspection upon request.

(Basis: Offsets and Regulation 8-40-301, 8-40-304 and 8-40-305)

- 16. During all times that the landfill gas collection system is operating, all collected landfill gas shall be vented to one of the following control system configurations: ~~A-50 Landfill Gas Flare and~~ A-51 Landfill Gas Flare ~~and A-59 Landfill Gas Flare~~ operating concurrently or ~~A-51 A-59 either flare~~ operating alone. In order to assure compliance with this condition, ~~A-50 and~~ A-51 ~~and A-59~~ shall be equipped with local and remote alarms and auto restart capabilities. (Basis: 8-34-301.1, 8-34-301.3, and 40 CFR 60.752(b)(2)(iii))
- 17. The landfill gas collection system described in subpart a below shall be operated continuously as defined in Regulation 8-34-219. Wells, collectors, and adjustment valves shall not be shut off, disconnected, or removed from operation without written authorization from the District, unless the Permit Holder complies with all applicable requirements of Regulation 8, Rule 34, Sections 113, 116, 117, and 118. The Permit Holder shall apply for and receive an Authority to Construct before modifying the landfill gas collection system described in subpart a below. Increasing or decreasing the number of wells or collectors, or significantly changing the length of collectors or the locations of wells or collectors are modifications that are subject to the Authority to Construct requirement. Adding or modifying risers, laterals, or header pipes are not subject to this Authority to Construct requirement. The authorized number of landfill gas collection system components is the baseline count listed below plus any components added and

minus any components decommissioned pursuant to Part 17b as evidenced by start-up/shut-down notification letters submitted to the District.

- a. The Permit Holder has been issued a Permit to Operate for the landfill gas collection system components listed below, which includes all start-up/shut-down notifications submitted through October 11, 2007. Well and collector locations, depths, and lengths are as described in detail in Permit Application # 13027.

	Required Components
Total Number of Vertical Wells:	76
Total Number of Horizontal Collectors:	9

- b. The Permit Holder has been issued an Authority to Construct for the landfill gas collection system components listed below. Specific well and collector locations, depths, and lengths of associated piping are as described in detail in Permit Application # 13027.

	Minimum	Maximum
Install New Vertical Wells:	0	30
Decommission Vertical Wells:	0	8
Install New Horizontal Collectors	0	9
Decommission Horizontal Collectors	0	4
Replace Vertical Wells *	0	15

* one-for-one well replacement at new optimal locations

Wells installed or shutdown pursuant to subpart b shall be added to or removed from subpart a in accordance with the procedures identified in Regulations 2-6-414 or 2-6-415. The Permit Holder shall maintain records of the decommissioning date for each well that is shut down and the initial operation date for each new well.

(Basis: Regulations 2-1-301, 8-34-301.1, 8-34-304, 8-34-305, and 2-6-413)

18. If a gas characterization test indicates that this site's landfill gas contains organic compounds in excess of any of the concentrations listed in Parts 18a or 18b below, then the Permit Holder shall submit an application for a Change of Permit Conditions, within no later than 30 days from receipt of the test results.

- a. Total Non-Methane Organic Compounds: ~~750~~ 360 ppmv
(calculated as hexane equivalent)
(Basis: Cumulative Increase)

- *b. For toxic air contaminants (TACs):

<u>Compound</u>	<u>Concentration</u>
Acrylonitrile	280 ppbv
Benzene	340 ppbv
Carbon Tetrachloride	70 ppbv
Chloroform	70 ppbv
1,4 Dichlorobenzene	400 ppbv
1,1 Dichloroethane	150 ppbv
Ethylene Dibromide	70 ppbv
Ethylene Dichloride	70 ppbv
Methylene Chloride	320 ppbv

Perchloroethylene	450 ppbv
1,1,2,2 Tetrachloroethane	70 ppbv
Trichloroethylene	250 ppbv
Vinyl Chloride	880 ppbv

(Basis: Toxic Risk Management Policy)

- c. The concentration of total reduced sulfur compounds (TRS) in collected landfill gas shall not exceed a peak of ~~1300-600~~ ppmv (calculated as H₂S) and shall not exceed an annual average of ~~425-350~~ ppmv (calculated as H₂S). The peak and annual average TRS concentrations shall be measured and calculated in accordance with Parts 31a and 31b. (Basis: Cumulative Increase, RACT, and Regulation 9-1-302)
19. The ~~A-50 and~~ A-51 and A-59 Landfill Gas Flares shall be fired on landfill gas. (Basis: RACT and Regulation 2-2-112)
 20. The throughput of landfill gas (with an HHV of 500 BTU/scf) to the ~~A-50 Landfill Gas Flare shall not exceed 630,720,000 scf during any consecutive 12-month period and shall not exceed 1,728,000 scf during any one day. The throughput of landfill gas (with an HHV of 500 BTU/scf) to the~~ A-51 Landfill Gas Flare shall not exceed ~~1,576,800,000 scf during any consecutive 12-month period and~~ shall not exceed 4,320,000 scf during any one day. The throughput of landfill gas (with an HHV of 500 BTU/scf) to the A-59 Landfill Gas Flare shall not exceed 5,760,000 scf during any one day. The total throughput of landfill gas (with an HHV of 500 BTU/scf) to the A-51 and A-59 Flares combined shall not exceed 2,207,520,000 scf during any consecutive 12 month period. In order to demonstrate compliance with this condition, the ~~A-50 and~~ A-51 and A-59 Flares shall each be equipped with ~~a~~ one or more properly operating continuous gas flow meters. (Basis: Cumulative Increase, 40 CFR 60.756(b)(2)(i))
 21. [deleted]
 22. The temperature in the combustion zone of each flare shall be maintained at the minimum temperature listed below, averaged over any 3-hour period. In order to demonstrate compliance with this condition, ~~A-50 and~~ A-51 and A-59 shall each be equipped with a continuous temperature monitor and recorder. If a source test demonstrates compliance with all applicable requirements at a different temperature, the APCO may revise these temperature limits, in accordance with the procedures identified in Regulation 2-6-414 or 2-6-415, based on the following criteria. The minimum combustion zone temperature for the flare shall be equal to the average combustion zone temperature determined during the most recent complying source test minus 50 degrees F, provided that the minimum combustion zone temperature is not less than 1400 degrees F. (Basis: Regulations 2-5-302, 8-34-301.3 and 8-34-501.3, and 40 CFR 60.756(b)(1))
 - a. ~~The minimum combustion zone temperature for A-50 is 1475 degrees F, averaged over any 3-hour period.~~

- ba. The minimum combustion zone temperature for A-51 is 1400 degrees F, averaged over any 3-hour period.
- b. The minimum combustion zone temperature for A-59 is 1400 degrees F, averaged over any 3-hour period.
23. The ~~A-50 and~~ A-51 and A-59 Landfill Gas Flares shall comply with the NMOC emission limit in Regulation 8-34-301.3. (Basis: Cumulative Increase, 8-34-301.3, and 40 CFR 60.752(b)(2)(iii)(B))
- *24. The ~~A-50 and~~ A-51 and A-59 Landfill Gas Flares shall each achieve a minimum destruction efficiency of 83% by weight for any EPA Hazardous Air Pollutants or any District toxic compounds that are determined to be present in the landfill gas. (Basis: Regulation 2-5-302)
25. Nitrogen oxides (NO_x) emissions from each enclosed flare (~~A-50 and~~ A-51 and A-59) shall not exceed 0.06 pounds of NO_x, calculated as NO₂, per million BTU. Compliance with this emission limit may be demonstrated by not exceeding the following flue gas concentration limit: 15 ppmv of NO_x, corrected to 15% oxygen, dry basis. (Basis: RACT and Offsets)
26. Carbon monoxide (CO) emissions from ~~A-50 each enclosed flare (A-51 and A-59)~~ shall not exceed ~~0.30 pounds of CO per million BTU. Carbon monoxide (CO) emissions from A-51 shall not exceed~~ 0.20 pounds of CO per million BTU. Compliance with these emission limits may be demonstrated by not exceeding the following flue gas concentration limits:
~~A-50: 123 ppmv of CO, corrected to 15% oxygen, dry basis or~~
~~A-51: 82 ppmv of CO, corrected to 15% oxygen, dry basis.~~
 (Basis: RACT and Cumulative Increase)
27. [deleted]
28. [deleted]
29. The Permit Holder shall maintain records of all planned and unanticipated shut downs of the ~~A-50 and~~ A-51 and A-59 Flares and of any temperature excursions. The records shall include the date, time, duration, and reason for any shut down or excursion. Any unanticipated shut downs or temperature excursions shall be reported to the Enforcement Division immediately. All inspection and maintenance records, records of shut downs and excursions, gas flow records, temperature records, analytical results, source test results, and any other records required to demonstrate compliance with the above permit conditions, Regulation 8 Rule 34, or 40 CFR Part 60 Subpart WWW shall be retained on site for a minimum of five years and shall be made available to District staff upon request. (Basis: 2-6-501, 8-34-501, 40 CFR 60.758)

30. In order to demonstrate compliance with Parts 23, 25, and 26 above, Regulation 8, Rule 34, Sections 301.3 and 412, and 40 CFR 60.8 and 60.752(b)(2)(iii)(B), the Permit Holder shall ensure that a District approved source test is conducted annually on the ~~A-50 Landfill Gas Flare and the~~ A-51 Landfill Gas Flare and the A-59 Landfill Gas Flare. Each annual source test shall determine the following:
- landfill gas flow rate to the flare (dry basis);
 - concentrations (dry basis) of carbon dioxide (CO₂), nitrogen (N₂), oxygen (O₂), total hydrocarbons (THC), methane (CH₄), and total non-methane organic compounds (NMOC) in the landfill gas;
 - stack gas flow rate from the flare (dry basis);
 - concentrations (dry basis) of NO_x, CO, NMOC, and O₂ in the flare stack gas;
 - NMOC destruction efficiency achieved by the flare;
 - NO_x and CO emission rates from the flare in units of pounds per MM BTU,
 - average combustion zone temperature in the flare during the test period.
- The first source test for A-51 shall be conducted no later than 60 days after the initial start-up date for A-51. The first source test for A-59 shall be conducted no later than 60 days after the initial start-up date for A-59. Each subsequent annual source test shall be conducted no later than 12 months after the previous test. Each annual source test shall be conducted no earlier than 9 months and no later than 12 months after the previous annual source test. Effective May 8, 2008, the annual source test requirement for the A-50 Flare is suspended, while this flare remains shut down. If A-50 is restarted for any reason, a source test shall be conducted within 60 days of restarting A-50. The Source Test Section of the District shall be contacted to obtain approval of the source test procedures at least 14 days in advance of each source test. The Source Test Section shall be notified of the scheduled test date at least 7 days in advance of each source test. The source test report shall be submitted to the Compliance and Enforcement Division and the Source Test Section within 60 days of the test date. (Basis: Cumulative Increase, Toxic Risk Management Policy, RACT, Offsets, Regulations 8-34-301.3, 8-34-412, 40 CFR 60.8 and 40 CFR 60.752(b)(2)(iii)(B))
31. Landfill Gas Testing:
- The Permit Holder shall conduct a characterization of the landfill gas on a quarterly basis with one test concurrent with one of the annual source tests required by Part 30 above. The landfill gas sample shall be drawn from the main landfill gas header. Each quarterly landfill gas sample shall be analyzed for the sulfur compounds listed below. Once per year (concurrent with a Part 30 annual source test) the landfill gas shall be analyzed for all the organic and sulfur compounds listed below. All concentrations shall be reported on a dry basis. The laboratory analysis report for the annual organic and sulfur compound gas characterization test shall be included with the Part 30 source test report and shall be submitted to the Compliance and Enforcement Division and the Source Test Section

within 60 days of the test date. (Basis: Toxic Risk Management Policy and Regulations 8-34-412 and 9-1-302)

Organic Compounds

acrylonitrile
benzene
carbon tetrachloride
chlorobenzene
chlorodifluoromethane
chloroethane
chloroform
1,1 dichloroethane
1,1 dichlorethene
1,2 dichlorethane
1,4 dichlorbenzene
dichlorodifluoromethane
dichlorofluoromethane
ethylbenzene
ethylene dibromide
fluorotrichloromethane
hexane
isopropyl alcohol
methyl ethyl ketone
methylene chloride
perchloroethylene
toluene
1,1,1 trichloroethane
1,1,2,2 tetrachloroethane
trichloroethylene
vinyl chloride
xylenes

Sulfur Compounds

carbon disulfide
carbonyl sulfide
dimethyl sulfide
ethyl mercaptan
hydrogen sulfide
methyl mercaptan

- b. Once per week, beginning no later than March 31, 2005, the Permit Holder shall analyze the landfill gas for hydrogen sulfide (H₂S) concentration using a Draeger tube to further demonstrate compliance with Part 18c and Regulation 9-1-302. The landfill gas sample shall be drawn from the main landfill gas header. The Permit Holder shall follow the manufacturer's procedures for using the Draeger tube and interpreting the results. The total reduced sulfur (TRS) content of the landfill gas shall be calculated using the average ratio of TRS/H₂S for this site according to the following equation: $TRS = 1.015 * H_2S$ measured by Draeger tube. The Permit Holder shall maintain records of all Draeger tube test dates and test results and shall summarize the average H₂S concentrations and the calculated TRS content of the landfill gas on a quarterly basis. Each Draeger tube test result (after conversion to TRS content) and the quarterly laboratory analysis in Part 31a shall be compared to the Peak TRS Limit in Part 18c. On a rolling quarterly basis, the Permit Holder shall determine the annual average TRS content for comparison to the Annual Average TRS Limit in Part 18c. (Basis: Cumulative Increase, RACT, and Regulation 9-1-302).

32. The annual report required by BAAQMD Regulation 8-34-411 shall be submitted in two semi-annual increments. The reporting period for the first increment of the Regulation 8-34-411 annual report that is submitted subsequent to the issuance of the MFR Permit for this site shall be from December 1, 2003 through April 30, 2004. This first increment report shall be submitted by May 31, 2004. The reporting periods and report submittal due dates for all subsequent increments of the Regulation 8-34-411 report shall be synchronized with the reporting periods and report submittal due dates for the semi-annual MFR Permit monitoring reports that are required by Section I.F of the MFR Permit for this site. A single report may be submitted to satisfy the requirements of Section I.F, Regulation 8-34-411, and 40 CFR Part 63.1980(a), provided that all items required by each applicable reporting requirement are included in the single report. (Basis: Regulation 8-34-411 and 40 CFR Part 63.1980(a))

E. RECOMMENDATION

Issue a Change of Permit Conditions for the following equipment, subject to Condition # 19867.

S-5 Redwood Landfill; abated by A-51 and A-59 Landfill Gas Flares.

Issue an Authority to Construct for the following abatement equipment that will also be subject to Condition # 19867.

A-59 Landfill Gas Flare; Perennial Energy, Inc., FL-156-44-E, 120 MM BTU/hour; abating S-5 Redwood Landfill.

By: Carol S. Allen
Senior Air Quality Engineer

October 9, 2008
Date

APPENDIX F
REPORTS FOR PORTABLE ENGINES REPLACEMENT PROJECT
APPLICATION # 21287

ENGINEERING EVALUATION

for

Portable Diesel Engine Replacements

Redwood Landfill Company; PLANT # 1179

APPLICATION # 21287

A. BACKGROUND

Redwood Landfill Company operates the Redwood Landfill Facility in Novato, CA (Site # A1179). This site includes an active MSW landfill, landfill gas collection and control equipment, green waste processing operations, composting operations, and several stationary and portable diesel engines that provide primary or emergency power to auxiliary equipment and buildings.

Redwood Landfill submitted this application to request an Authority to Construct for two new portable diesel engines: S-61 Portable Diesel Engine for Waste Tipper and S-62 Portable Diesel Engine for Power Screen. These engines will replace the existing Tier 0 portable diesel engines that are powering the waste tipper (S-46) and the power screen (S-48). The CARB ATCM for Diesel PM from Portable Engines Rated at 50 hp and Greater prohibits the operation of prime Tier 0 engines after December 31, 2009. Redwood Landfill is proposing to replace the S-46 and S-48 portable diesel engines to comply with this CARB ATCM limitation.

G. EMISSIONS FROM NEW EQUIPMENT

The two proposed portable diesel engines (S-61 and S-62) are Model Year 2008, John Deere 4045HF285 engines. The capacity ratings are provided in Table 1. These engines are certified to comply with Tier 3 standards. In addition, these engines will each be equipped be Level 3 CARB verified diesel particulate filters that will achieve a minimum of 85% removal of diesel PM. The CARB certified emission factors are presented in Table 2. The equivalent grams per brake horsepower-hour (g/bhp-hr) emission rates are presented in Table 3. Maximum hourly emission rates are presented in Table 4.

Table 1. Descriptions and Rated Capacities of the New Portable Diesel Engines

Source Number	Source Description	Rated Capacity Bhp	Electrical Output kW	Maximum Fuel Use gallons / hour	Maximum Fire Rate MM BTU / hour
S-61	Portable Diesel Engine for Waste Tipper	125.0	93.2	6.76	0.926
S-62	Portable Diesel Engine for Power Screen	125.0	93.2	6.76	0.926

Table 2. CARB Certified Emission Factors (grams/kW-hour)

Source Number	NO _x + HC	CO	PM ₁₀	PM ₁₀ Control	Abated PM ₁₀
S-61	3.4	1.5	0.25	85%	0.038
S-62	3.4	1.5	0.25	85%	0.038

Table 3. Databank Emission Factors (grams/bhp-hour)

Source Number	NO _x	CO	POC	Abated PM ₁₀	SO ₂
S-61	2.409	1.119	0.127	0.028	0.005
S-62	2.409	1.119	0.127	0.028	0.005

Table 4. Maximum Hourly Emissions from S-61 and S-62 (Pounds/Hour)

Source Number	NO _x	CO	POC	PM ₁₀	SO ₂
S-61	0.6634	0.3082	0.0349	0.0077	0.0014
S-62	0.6634	0.3082	0.0349	0.0077	0.0014

Maximum daily emissions from the new engines are based on the maximum possible operating time of 24 hours/day. Proposed maximum daily emissions are presented in Table 5.

Table 5. Maximum Daily Emissions from S-61 and S-62 (Pounds/Day)

Source Number	Hours/Day	NO _x	CO	POC	PM ₁₀	SO ₂
S-61	24	15.93	7.40	0.84	0.18	0.03
S-62	24	15.93	7.40	0.84	0.18	0.03

Redwood Landfill Company requested a maximum operating time of 4992 hours/year for the two engines combined. Expected operating times for each engine are 8 hours/day, 6 days/week, and 52 weeks/year. Maximum annual emissions for this operating scenario are presented in Table 6. Redwood would like the flexibility to shift operating time between these engines, if necessary. Thus, each engine could potentially operate up to 4992 hours/year, if the other engine is not operated.

Table 6. Maximum Annual Emissions from S-61 and S-62 (Tons/Year)

Source Number	NO _x	CO	POC	PM ₁₀	SO ₂
S-61	0.828	0.385	0.044	0.010	0.002
S-62	0.828	0.385	0.044	0.010	0.002
Total	1.657	0.769	0.087	0.019	0.004

Diesel PM is a toxic air contaminant. All PM10 emissions from diesel fired IC engines are considered to be diesel PM. The total diesel PM emissions from the two engines combined will be 38.47 pounds/year, which exceeds the diesel PM risk screen trigger level of 0.58 pounds/year. Therefore, a health risk screening analysis is required for this application.

H. EMISSION REDUCTIONS FROM SHUT DOWN EQUIPMENT

As of December 31, 2009, Redwood Landfill will discontinue operation of two Tier 0 portable diesel-fueled engines: the S-46 Tipper Engine and the S-48 Retec Power Screens Engine. The capacity ratings for S-46 and S-48 are provided in Table 7.

Table 7. Descriptions and Rated Capacities for Existing Engines

Source Number	Source Description	Rated Capacity bhp	Electrical Output kW	Maximum Fuel Use gallons / hour	Maximum Fire Rate MM BTU / hour
S-46	Tipper Engine	94.0	70.1	4.80	0.658
S-48	Retec Power Screens Engine	102.0	76.1	5.20	0.712

These engines were initially permitted pursuant to a loss of exemption under Application # 1479. The original emission rate estimates for these engines are provided in Table 8.

Table 8. Databank Emission Factors for Existing Engines (grams/bhp-hour)

Source Number	NO _x	CO	POC	PM ₁₀	SO ₂
S-46	11.961	1.066	0.708	0.998	0.164
S-48	6.780	0.350	0.310	0.090	0.164

In accordance with Regulation 2-2-605.5, the baseline emission rates above must be adjusted downward to comply with the most stringent RACT, BARCT, or District rule that is in effect or that is contained in an adopted clean air plan. For NO_x emissions, the most stringent BARCT limit is the Regulation 9-8-304.1 NO_x emission limit of 180 ppmv of NO_x at 15% O₂, which will become effective as of January 1, 2012 for stationary engines with capacities of 50-175 bhp. Note that these on-site portable engines are considered to be District stationary internal combustion engines as defined in Regulation 9-8-204. For CO, the emission rate estimates in Table 8 are lower than both the new Tier 3 CO standards and the 9-8-304.1 limit. For POC, the lowest POC emission rate is the new Tier 3 standards (5% of the NMHC+NO_x standards), which are: 0.05*3.5 g/bhp-hr for S-46 and 0.05*3.0 g/bhp-hr for S-48. For PM₁₀ emissions, the new Tier 3 standard of 0.30 g/bhp-hr is lower than the emission rate estimate for S-46 in Table 8; for S-48 however, the Table 8 emission rate estimate is lowest. For SO₂ emissions, the current ultra low sulfur fuel content limit of 15 ppmw of total sulfur results in the most stringent RACT emission rate for SO₂ emissions from engines. All of these RACT/BARCT adjusted factors are converted into units of g/bhp-hr and summarized in Table 9.

Table 9. RACT/BARCT Adjusted Emission Factors (grams/bhp-hour)

Source Number	NO _x	CO	POC	PM ₁₀	SO ₂
S-46	2.220	1.066	0.175	0.300	0.005
S-48	2.217	0.350	0.150	0.090	0.005

In accordance with Regulation 2-2-605.2.1, the baseline throughput is the actual average throughput during the baseline period. Redwood Landfill reported that the actual annual average operating rates during the previous 36 months were: 459 hours/year for S-46 and 453 hours/year for S-48. Qualifying emission reduction credits are equal to these annual average operating rates multiplied by the applicable engine bhp and the Table 9 RACT/BARCT adjusted emission rates. Total qualifying emission reductions are shown in Table 10.

Table 10. RACT Adjusted Actual Emission Reductions from S-46 and S-48 (Tons/Year)

Source Number	NO _x	CO	POC	PM ₁₀	SO ₂
S-46	0.106	0.051	0.008	0.014	0.0002
S-48	0.113	0.018	0.008	0.005	0.0003
Total On-Site Credits	0.218	0.069	0.016	0.019	0.0005

I. CUMULATIVE EMISSION INCREASES

As shown in Table 11, this application results in a net increase in NO_x and POC emissions. Since the facility emits more than 35 tons/year of NO_x and more than 35

tons/year of POC, this facility will be required to offset the net increases in NO_x and POC emissions at a ratio of 1.15 ton 1.0. The total amount of offsets required are 1.736 tons/year of NO_x and POC combined.

Table 11. Cumulative Emission Increases for Application # 21287 (Tons/Year)

	NO _x	CO	POC	PM ₁₀	SO ₂
Emission Increases	1.657	0.769	0.087	0.019	0.004
On-Site Credits	0.218	0.069	0.016	0.019	0.001
Net Increases	1.438	0.701	0.071	0.000	0.003
Offset Ratio	1.15		1.15		
Offsets Required	1.654		0.082		

J. STATEMENT OF COMPLIANCE

Regulation 2, Rule 1:

The portable diesel fired IC engines in this application were evaluated in accordance with the objective measurements and standard procedures described in District Permit Handbook Chapter 2.3.3 Portable Diesel Engines. The engines are expected to comply with the standard BACT/TBACT requirements identified in the District's BACT/TBACT Workbook for compression ignition prime IC engines that are larger than 50 bhp (Document # 96.1.4, Revision 6). This application does not involve any discretionary decisions. Therefore, the issuance of an Authority to Construct and Permit to Operate for these engines is considered ministerial pursuant to Regulation 2-1-311. No further CEQA review is required.

The project is over 1000 feet from the nearest school and is therefore not subject to the public notification requirements of Regulation 2-1-412.

Regulation 2, Rule 2:

As shown in Table 5, NO_x emissions from each engine will exceed 10 pounds/day at the maximum possible operating rate of 24 hours/day. Therefore, BACT is triggered for NO_x. The standard BACT determinations for prime (non-agricultural) compression ignition engines (> 50 bhp) are presented in Document # 96.1.4, Revision 6, last revised April 13, 2009. For NO_x, BACT(2) is compliance with the current CARB/EPA tier standard for the engine and BACT(1) is 85% of this tier standard. BACT(1) is achieved by selective catalytic reduction, which is not feasible to install on these small portable prime engines. Therefore, the engines will be allowed satisfy BACT by complying with BACT(2). The current CARB/EPA tier standards for engines with output ratings of 100-175 bhp (effective for model years 2007-2011) is 3.0 g/bhp-hr for NMHC+NO_x. For NO_x alone, the BACT standard is 95% of the NMHC+NO_x tier standard, which is 2.85 g/bhp-hr of NO_x. From Table 3, S-61 and S-62 comply with this BACT(2) limitation by having certified NO_x emissions of 2.409 g/bhp-hour.

This facility is subject to the Regulation 2-2-302 offset requirements for NO_x and POC emission increases, because NO_x and POC emissions from this site each permitted to exceed 35 tons/year. Redwood has requested to defer providing these offsets until the next annual renewal period pursuant to Regulation 2-2-421. This deferral request was made because the total amount of offsets due for this application are low (1.737 tons/year of NO_x and POC combined). Furthermore, the District is currently reconsidering the procedures used to calculate emission increases for the last landfill modification, which may impact the amount of NO_x and POC emission reduction credits that this is liable for. This reimbursement review is expected to be resolved within the next year. As soon as this reimbursement issue is resolved, Redwood Landfill Company will provide emission reduction credits to reimburse the District for NO_x and POC credits granted from the Small Facility Banking Account and will provide additional credits to offset the net emission increases for Application # 21287.

Regulation 2-2-303 offset requirements for PM₁₀ and SO₂ emission increases only apply if the site is determined to be a major facility of either PM₁₀ or SO₂. From Regulation 2-1-204.1, fugitive emissions are only included for the source categories specified in 40 CFR 70.2. Since landfills are not one of these specified categories, the fugitive landfill emissions are excluded from the major facility determination. Total site-wide non-fugitive emissions are: 20 tons/year of PM₁₀ and 65 tons/year of SO₂ (see attached December 2009 summary of non-fugitive emission levels for Site # A1179). Since these non-fugitive site-wide emission rates do not exceed 100 tons/year, this site is not a major facility of PM₁₀ or SO₂, and offsets are not required for these pollutants.

This site is not a PSD facility, because the total site-wide potential to emit for each pollutant is less than 250 tons/year of non-fugitive emissions. Since this site is not a PSD facility, the PSD requirements do not apply.

New Source Review for Toxic Air Contaminants:

The two new portable diesel engines will emit a total of 38.47 pounds/year of diesel PM, which exceeds the diesel PM risk screen trigger level of 0.58 pounds/year. Therefore, this application triggers a health risk screening analysis (HRSA). As discussed in the HRSA report for this application, the project will include the two proposed diesel engines (S-61 and S-62) and the two existing landfill gas flares (A-51 and A-60), because one of these flares was permitted within the last two years and these flares and the proposed engines and existing flares are all related to a landfill expansion project that is under evaluation at this time. The HRSA for Application # 21287 will include several possible operating scenarios for the diesel engines as well multiple possible operating locations for these portable engines.

The HRSA was conducted in accordance with BAAQMD HRSA Guidelines using the ISCST3 air dispersion model with rural dispersion coefficients and complex terrain (using Petaluma River terrain data). SCREEN3 meteorological data was used, because there are not yet any District approved site-specific met-data sets for this facility.

However, the District is working with the applicant's consultant to review several potentially applicable met-data sets that may be used for future HRSAs at this site.

The maximum impacts for each source and for the whole project are summarized below in Table 12. The impacts reported below represent the maximum impact determined for any of the possible engine operating scenarios and possible engine locations that were considered.

Table 12. Maximum Health Impacts Resulting from A-51, A-60, S-61 and S-62

Health Impact Type	Receptor Type	Source Risks for A-51	Source Risks for A-60	Source Risks For S-61	Source Risks for S-62	Maximum Project Impacts
Acute HI	Resident or Worker	0.03	0.03	Not Applicable	Not Applicable	0.06
Chronic HI	Worker	0.01	0.01	0.001	0.001	0.02
Chronic HI	Resident	0.05	0.06	0.001	0.001	0.11
Cancer Risk in a million	Worker	0.03	0.04	1.76	2.02	2.33
Cancer Risk in a million	Resident	0.18	0.22	2.06	2.31	3.59

As shown above, the source risks for S-61 and S-62 will each exceed the Regulation 2-5-301 TBACT threshold of 1.0 in a million increased cancer risk. From the District's BACT/TBACT Guidelines, Document # 96.1.4 (last revised April 13, 2009), TBACT for diesel PM is compliance with a PM₁₀ emission limit of 0.01 g/bhp-hour or "equivalent technology." In the case of on-site portable engines that are subject to the CARB ATCM for portable engines rather than the CARB ATCM for stationary engines, equivalent TBACT technology is deemed to be: an engine that has a CARB certified diesel PM emission rate that is less than or equal to the applicable PM10 tier standard for a new engine and that is equipped with a Level-3 CARB-Verified diesel PM filter certified to achieve at least 85% control of diesel PM and approved for use with the specific proposed engine. For new on-site portable engines, the CARB ATCM for portable engines requires that the engine meet the tier standard in effect at the time the engine is permitted. Current and future diesel PM tier standards are summarized in Table 13.

Table 13. Applicable PM10 Tier Standard Limits for Diesel Fueled IC Engines

Engine Output Rating (bhp)	Current Tier Std. for PM10 (g/bhp-hr)	Effective Dates	Future Tier Std. for PM10 (g/bhp-hr)
$50 \leq \text{bhp} < 75$	0.22	2008-2012	0.020 as of 1/1/13
$75 \leq \text{bhp} < 100$	0.30	2008-2011	0.015 as of 1/1/12
$100 \leq \text{bhp} < 175$	0.22	2007-2011	0.015 as of 1/1/12
$175 \leq \text{bhp} < 750$	0.15	2006-2010	0.015 as of 1/1/11
750 and greater	0.15	2006-2010	0.070 as of 1/1/11

The proposed S-61 and S-62 engines are 125 bhp engines with a certified PM10 emission rate of 0.25 g/kW-hr (0.186 g/bhp-hr) per engine. Thus, these engines comply with the current Tier 3 standard of 0.22 g/bhp-hr for 100-175 bhp engines. Redwood Landfill has proposed to install CARB-Verified Level-3 diesel PM filters on each of these engines. These filters are certified to achieve at least 85% control of diesel PM emissions. After control, the S-61 and S-62 engines will each emit 0.028 g/bhp-hr of PM₁₀. Although the post-control emission rate from these engines is not less than the TBACT standard of 0.01 g/bhp-hr, the engines meet the equivalent technology criteria discussed above. Therefore, S-61 and S-62 (when equipped with CARB-verified Level-3 diesel PM filters) satisfy District TBACT requirements for prime on-site portable compression ignition engines.

As shown in Table 12, maximum project risks are: an increased cancer risk of 3.6 in a million, a chronic hazard index of 0.1, and an acute hazard index (due to flare emissions only) of 0.06. These total project health impacts are less than the project risk limits in Regulation 2-5-302 (<10 in a million cancer risk, <1.0 chronic HI, and <1.0 acute HI); therefore, this project complies with the District's toxic NSR project risk limits.

Regulation 2, Rule 6:

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act (40 CFR, Part 70) and BAAQMD Regulation 2, Rule 6, Major Facility Review (MFR), because it is a major facility for CO emissions and also because it is a designated facility (Redwood Landfill was subject to NSPS requirements due to a 1995 height increases at the landfill). Therefore, this facility is required to have an MFR permit pursuant to Regulations 2-6-301 and 2-6-304.

The MFR Permit for this facility was initially issued on November 10, 2003 and was last revised on October 24, 2007. This application to add 2 new sources to this facility and to remove 2 sources from this facility will require a minor revision of the Title V permit. This Title V permit revision will be handled pursuant to Application # 21288.

Regulation 6, Rule 1:

The two new diesel-fired engines are subject to Regulation 6, Rule 1. Regulation 6-1-301 limits the visible emissions from each of these sources to Ringelmann 1.0. No visible particulate emissions are expected from properly operating diesel engines equipped with particulate filters.

Regulation 6-1-310 limits the exhaust point emission rate to 0.15 grains/dscf. After installation of the particulate filters, S-61 and S-62 will emit 0.00634 grains/sdcf at 0% O₂. These engines comply with Regulation 6-1-310 by a margin of at least 23:1. Since there is a high margin of compliance with this grain loading limit and the particulate emission rate has been certified by CARB, it is not necessary to conduct any additional compliance demonstration monitoring for this limit.

Regulation 8, Rule 2:

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 Table 5, maximum daily emissions are 0.84 pounds/day of POC per engine. The POC emission rate is also equivalent to 99 ppmv of total carbon at 0% oxygen from each engine. Therefore, S-61 and S-62 will comply with Regulation 8-2-301. The compliance margin is at least 3:1. Additional monitoring to verify compliance with a CARB certified emission rate is not necessary.

Regulation 9, Rule 1:

The portable diesel engines are 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 sdcf of flue gas (0% O₂) per MM BTU of diesel oil, the maximum possible concentration in the exhaust gas is 1 ppmv of SO₂. Since this maximum possible concentration is far less than the 300 ppmv SO₂ concentration limit with a compliance margin of 300:1, additional compliance demonstration monitoring is not necessary.

Regulation 9-1-304 limits the sulfur content of liquid fuels to 0.5% by weight. In accordance with the ATCM for portable diesel engines, these engines may only use CARB certified diesel oil. CARB diesel oil has a maximum sulfur content of 0.0015% sulfur by weight. The compliance margin for CARB diesel oil versus the 9-1-304 limit is 333:1. Since non-compliant diesel oil cannot be purchased in the state of California, it is not necessary to conduct additional monitoring to verify compliance with this limit.

Regulation 9, Rule 8:

Regulation 9, Rule 8 now applies to diesel fueled internal combustion engines; however, these engines are exempt from limits and monitoring requirements until January 1, 2012 pursuant to exemptions in Regulation 9-8-110.1 and 110.3. As of January 1, 2012, the portable diesel engines (S-61 and S-62) will be subject to Regulation 9-8-304, unless the engine is operated less than 100 hours/year (9-8-111.3) or the operator opts for the

Regulation 9-8-305 delayed compliance provision and complies with the Regulation 9-8-402 notification requirements.

For 51-175 hp engines, Regulation 9-8-304 limits the exhaust gas concentrations (corrected to 15% O₂, dry basis) to: 180 ppmv of NO_x and 440 ppmv of CO as of 1/1/2012. Based on CARB certified emission factors and the diesel fuel F-factor, S-61 and S-62 will emit (corrected to 15% O₂): 184 ppmv of NO_x and 141 ppmv of CO. Although the equivalent outlet concentration to the CARB certified NO_x emission rate from S-61 and S-62 is greater than the 9-8-304 limit, this equivalent outlet concentration is only 2% higher than the future limit. After considering emissions measurement tolerances, these engines will likely be able to demonstrate compliance with the future 9-8-304 limit. The Regulation 9-8-305 delayed compliance provision is also a compliance option for S-61 and S-62, if preliminary testing indicates that S-61 and S-62 will not be able to comply with Regulation 9-8-304.1.

State Requirements:

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 two new engines will comply with §93116.3(a) by using only CARB certified diesel fuel in these engines. 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
- b) the engine is used exclusively for emergencies or qualifies as a low-use engine (§93116.3(b)(2)(B)) and meets the §93116.3(b)(3) requirements, or
- c) the engine qualifies for one of three special exemption cases (§93116.3(b)(5-7)).

The most stringent standards currently in effect engines with capacities ranging from 100 bhp to 175 bhp are the Tier 3 standards, which are: 3.0 g/bhp-hr for NMHC+NO_x, 3.7 g/bhp-hr for CO, and 0.22 g/bhp-hr for PM₁₀. As shown in Table 3, S-61 and S-62 will comply with all of these Tier 3 limits.

In addition to these engine specific requirements, the entire fleet of portable engines at Plant # 1179 must comply with the future fleet emission limits in §93116.3(b). For engines < 175, the fleet average emission limit must be: 0.3 g/bhp-hr by 2013, 0.18 g/bhp-hour by 2017, and 0.04 g/bhp-hour by 2020. Each of the proposed new engines, when equipped with particulate filters, will emit less than the 2020 PM₁₀ fleet standard. Consequently, these proposed engines will not need any additional retrofits to meet the future fleet standards.

By 3/1/2011, the operator must report to CARB all items identified in §93116.4(e), including an inventory of all engines in the operator's fleet (ID, permit status, size, fuel type, and certified emission factors), the compliance status or intention for each engine (low-use, emergency-use, tier 4 replacement date, etc.), and the fleet weighted average PM₁₀ emission rate for the 2010 calendar year. Redwood Landfill is aware of these future reporting requirements.

Federal Requirements:

The engines in this application are not considered to be “stationary” engines by federal definitions, because they meet the requirements of nonroad engines, 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 these engines reside at this facility for more than 12 months, they do not reside at a single on-site location (as defined above) for more than 12 consecutive months.

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

The engines are 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-61 and S-62 engines (Model Year 2008, 125 bhp) are subject to Tier 3 emission standards, which limit emissions to: NMHC+NO_x = 4.0 g/kW-hr (3.0 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-61 and S-62 (8JDXL06.8105) has been certified to comply with these emission and opacity standards.

K. PERMIT CONDITIONS

The District is proposing Condition # 24527 for S-61 and S-62 to ensure compliance with District and State requirements.

Condition # 24527

FOR: S-61 PORTABLE DIESEL ENGINE FOR WASTE TIPPER AND S-62 PORTABLE DIESEL ENGINE FOR POWER SCREENS

1. The owner/operator of the S-61 and S-62 Portable Diesel Engines has been issued permits for portable sources (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 these portable source and nonroad engine determinations, these engines are 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 III), or the federal NESHAP requirements for stationary reciprocating internal combustion engines (40 CFR, Part 63, Subpart ZZZZ). To retain these portable source and nonroad engine determinations, the owner/operator shall not operate any of these engines in one on-site location for more than 12 consecutive months. Any backup or standby engine that replaces one of these engines 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 fire the S-61 and S-62 Portable Diesel Engines exclusively with CARB diesel fuel. (Basis: Cumulative Increase, TBACT, Regulation 2-5-302, and CCR §93116.3(a))
3. The total combined operating time for S-61 and S-62 shall not exceed 4,992 hours during any consecutive 12-month period. (Basis: Regulation 2-5-302, Cumulative Increase, and Offsets)
4. The owner/operator shall equip each engine (S-61 and S-62) with either a non-resettable totalizing meter that measures hours of operation for each engine or a non-resettable fuel usage meter that uses the maximum hourly fuel usage rate for each engine to convert fuel usage rate per engine into hours of operation per engine. (Basis: Cumulative Increase and Offsets)
5. To demonstrate compliance with the above conditions, 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, CCR §93116.2(a)(28), and 40 CFR 1068.30)

- a. On a monthly basis, record the hours of operation per calendar month for each engine and the total operating hours per calendar month for both engines.
- b. If the engines are using fuel usage meters instead of operating time meters, record the fuel usage rate per engine on a monthly basis in addition to the calculated hours of operation for subpart a.
- c. Summarize the total 12-month operating time for S-61 and S-62 after the first 12 consecutive months of operation. Thereafter, on a monthly basis, maintain a summary of the total 12-month operating time for the two engines combined for each subsequent consecutive rolling 12-month period.
- d. The owner/operator shall maintain annual records of engine operating locations, waste placement locations, power screen operating procedures, or other documentation, which demonstrates to the APCO's satisfaction that S-61 and S-62 have satisfied the portability criteria in Part 1.

L. RECOMMENDATION

Issue an Authority to Construct for the following sources subject to Condition # 24527:

- S-61 Portable Diesel Engine for Waste Tipper:** Model Year 2008, John Deere, Model 4045HF285, 125 bhp, 6.76 gallons/hour of CARB diesel oil; equipped with A-61, Diesel Particulate Filter (CARB Verified Level-3+ control), make and model TBD.
- S-62 Portable Diesel Engine for Power Screens:** Model Year 2008, John Deere, Model 4045HF285, 125 bhp, 6.76 gallons/hour of CARB diesel oil; equipped with A-62, Diesel Particulate Filter (CARB Verified Level-3+ control), make and model TBD.

By: signed by Carol S. Allen
Carol S. Allen
Principal Air Quality Engineer

January 5, 2010
Date

Permit to Operate Report for Application # 21287

Redwood Landfill Company; PLANT # 1179

A. BACKGROUND

On January 13, 2010, the District issued Redwood Landfill an Authority to Construct for two portable diesel fired IC engines (S-61 and S-62). Each engine was required to be equipped with a level 3 CARB verified diesel particulate filter that would remove at least 85% of the diesel PM.

Redwood Landfill reported that the S-61 Portable Diesel Engine for Waste Tipper would begin operating on February 6, 2010 and that the S-62 Portable Diesel Engine for Power Screen would begin operating on February 8, 2010. Redwood also reported that they installed CleanAIR PERMIT FDA126 diesel particulate filters (A-61 and A-62) on these engines.

E. STATEMENT OF COMPLIANCE

These engines are now operating and are performing as expected. As indicated in the attached documentation, CleanAIR PERMIT filters are authorized level 3 control devices for the S-61 and S-62 engines (2008, John Deere, Model 4045HF285, 125 bhp, engine family: 8JDXL06.8105) and satisfy the District's TBACT control requirements. In accordance with CARB EO DE-05-002-02, CleanAIR PERMIT filters will achieve at least 85% control of diesel PM when installed on verified engines and operated in accordance with this executive order.

Since these engines are CARB certified engines and are using CARB verified control technology, initial compliance demonstration tests were not deemed to be necessary. The District expects that Redwood Landfill will comply with all applicable record keeping requirements in Condition # 24527 and all future notification and reporting requirements in District Regulation 9, Rule 8 and in CARB's ATCM for portable diesel-fired engines.

F. PERMIT CONDITIONS

The permit conditions (Condition # 24527) that were issued with the Authority to Construct are satisfactory. The District is not proposing any changes to these conditions.

G. RECOMMENDATION

Issue the final Permit to Operate for the following sources subject to Condition # 24527:

S-61 Portable Diesel Engine for Waste Tipper: Model Year 2008, John Deere, Model 4045HF285, 125 bhp, 6.76 gallons/hour of CARB diesel oil; equipped with A-61, Diesel Particulate Filter, CleanAIR, PERMIT, FDA126.

S-62 Portable Diesel Engine for Power Screens: Model Year 2008, John Deere, Model 4045HF285, 125 bhp, 6.76 gallons/hour of CARB diesel oil; equipped with A-62, Diesel Particulate Filter, CleanAIR, PERMIT, FDA126.

By: signed by Carol S. Allen
Carol S. Allen
Principal Air Quality Engineer

March 1, 2010
Date

APPENDIX G
REPORTS FOR LANDFILL EXPANSION PROJECT
APPLICATION # 20607

ENGINEERING EVALUATION

Redwood Landfill, Inc.; PLANT # 1179

APPLICATION # 20607

for Modification of S-5 Redwood Landfill

A. BACKGROUND

Redwood Landfill, Inc. (Redwood) operates the Redwood Landfill Facility in Novato, CA. This facility includes an active MSW landfill (S-5 with about 12.1 million tons of decomposable materials in place), two landfill gas flares (A-51 and A-60), a sludge pond (S-2), composting operations (S-34), green waste processing sources (S-39, S-41, and S-56), soil stockpiles (S-42), a non-retail gasoline dispensing facility (S-55), an aerated leachate pond (S-58), and diesel engines that provide portable or standby power (S-49, S-57, S-61, and S-62). Trucks with water sprays (A-18) control the dust generated by land-filling activities, composting operations, green waste processing sources, and soil stockpiles.

The permit conditions for the S-5 Redwood Landfill were modified under various BAAQMD permit applications during 2002-2008. These modifications were intended to be consistent with the 1994 Environmental Impact Report (EIR) and the 1995 Solid Waste Facility Permit (SWFP) for this landfill that were approved by the County of Marin. On December 18, 2008, Redwood received a modification of the Solid Waste Facility Permit (SWFP) for the Redwood Landfill from Marin County. Redwood submitted this application, Application #20607, to obtain a Change of Permit Conditions that would make the BAAQMD permit consistent with this new 2008 SWFP. As discussed briefly below, this condition change request constitutes a modification of the S-5 Redwood Landfill, because it will result in increases of criteria and toxic pollutants from S-5.

Specifically, Redwood has requested to increase the design capacity and the cumulative decomposable materials placement limits for the S-5 Redwood Landfill. The design capacity limit for the landfill is used to establish the applicability of new source review requirements. In this case, increasing the design capacity limit for Redwood Landfill triggers an evaluation of the applicability of BAAQMD new source review requirements and of the applicability of federal new source performance standards (NSPS). Since the proposed increases in design capacity and material placement limits will require an increase of the maximum permitted precursor organic compound (POC) emission limit for the landfill, these changes constitute a modification of the S-5 Redwood Landfill and trigger BAAQMD NSR requirements such as BACT and Offsets (Regulation 2, Rule 2). Since the design capacity increase will be accomplished – in part – by a horizontal expansion of the landfill (disposal acreage will increase from 210 acres to 222.5 acres), this design capacity increase triggers the federal NSPS for municipal solid waste (MSW) landfills (40 CFR Part 60, Subpart WWW).

In addition to the POC emission increases discussed above, the material placement limit change will result in an increase of the peak landfill gas generation rate for the landfill, which will in turn cause emission increases for non-precursor organic compounds (NPOC), greenhouse gases (GHG), and

numerous toxic air contaminants (TAC¹) that may be present in the landfill gas emitted at this site. Redwood is concurrently requesting increases in the concentration limits for some TACs and the District has identified numerous additional TACs that have an impact on the health risks from the landfill. These permit condition changes and the resulting TAC emission increases trigger a new health risk assessment for the landfill and trigger BAAQMD toxic NSR requirements (Regulation 2, Rule 5).

Redwood has also requested to increase and clarify the daily and annual material acceptance limits for S-5 and to modify various vehicle fleet weight and vehicle miles traveled limits, which are all related to the maximum permitted particulate emission rates from the landfilling operations and from on-site vehicle travel associated with this active landfill. However, as discussed in the emissions section, these changes are not expected to result in particulate emission increases above the potential to emit levels allowed under the current permit.

B. EMISSIONS

Landfills are significant sources of air pollution. The largest emission categories for active landfill sites such as the S-5 Redwood Landfill are: waste decomposition, landfill gas control, material handling, and road dust. Waste decomposition emissions include precursor organic compounds (POC), non-precursor organic compounds (NPOC), greenhouse gases (GHG), hazardous air pollutants (HAP), and numerous toxic air contaminants (TAC). Emissions from control devices (such as the A-51 and A-60 Enclosed Flares at this site) include the residual POC, NPOC, GHG, HAP, and TAC emissions remaining after landfill gas is burned in the control device plus the secondary emissions generated by the landfill gas combustion process. Secondary landfill gas combustion emissions include: nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), fine particulate matter (PM₁₀ and PM_{2.5}), POC, GHG, HAP, and TACs. Material handling emissions include particulate matter (TSP, PM₁₀, and PM_{2.5}) resulting from the preparation of the waste disposal area, from the disposal, compaction, and covering of wastes, and from wind erosion at the active face. POC, NPOC, HAP, and TAC emissions may also result from the on-site handling of certain types of waste or cover materials. For example, the on-site handling of petroleum contaminated soils or use of low-VOC content soils as cover materials results in the aeration of the volatile organic compounds from these materials during the dumping or exposure of these materials to the air. Road dust emissions (TSP, PM₁₀, and PM_{2.5}) are generated by vehicles and off-road equipment traveling on paved and unpaved roads within the facility.

The current and proposed maximum potential to emit for each of the pollutants described above are summarized in Table 1 for S-5 Redwood Landfill and its associated control devices (A-51 and A-60). As shown in Table 1, this project will result in emission increases (above the currently permitted emission rate for pollutants that current are subject to limits, or above the current potential to emit for pollutants that are not subject to limits) for the following pollutants: POC, NPOC, GHG, and HAP. Although not explicitly identified in Table 1, this project will also result in emission increases for many individual TACs. All of these emission increases associated with waste decomposition emissions or landfill gas control equipment are predicted based on the proposed increases of the annual and cumulative decomposable material placement limits and by the proposed changes to the landfill gas TAC concentration limits. These concentration limit changes increase both the fugitive TAC emission rates from the landfill surface and well as the residual TAC emission rates from the landfill gas flares.

¹ Most of the toxic air contaminants commonly found in landfill gas are also identified by EPA as hazardous air pollutants (HAP). A few common exceptions include: hydrogen sulfide (H₂S), isopropyl alcohol (IPA), methyl ethyl ketone (MEK), and 1,1,1 trichloroethane (TCA). These four California TACs are not EPA HAPs.

Table 1. Current and Proposed PTE from Redwood Landfill and Associated Flares

	Current PTE from S-5, A-51, and A-60 (tons/year)							
	POC	NPOC	NO _x	CO	SO ₂	PM ₁₀	GHG ¹	HAP ²
Waste Decomposition	20.4	0.2					114,114	1.6
Landfill Gas Control	7.7	0.1	33.1	110.4	64.3	9.4	130,583	4.8
Material Handling	2.9	0.0				5.9		2.9
Road Dust						148.3		
Total	31.1	0.3	33.1	110.4	64.3	163.7	244,697	9.3
	Proposed PTE from S-5, A-51, and A-60 (tons/year)							
	POC	NPOC	NO _x	CO	SO ₂	PM ₁₀	GHG ¹	HAP ²
Waste Decomposition	26.4	0.3					149,190	13.1
Landfill Gas Control	7.7	0.1	33.1	110.4	64.3	9.4	130,583	5.5
Material Handling	2.9	0.0				5.9		2.9
Road Dust						148.3		
Total	37.0	0.3	33.1	110.4	64.3	163.7	279,773	21.5

1. GHG emissions from S-5, A-51, and A-60 include carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) and are expressed as the total carbon dioxide equivalent (CO₂e) emissions based on global warming potentials of 1.0 for CO₂, 21 for CH₄, and 310 for N₂O. Methane and nitrous oxide emissions from S-5, A-51 and A-60 are non-biogenic, while all carbon dioxide emissions from S-5, A-51, and A-60 are considered to be biogenic. The total GHG emissions reported above for the proposed project include about 52% biogenic CO₂. The site has <2000 tons/year of CO₂e emissions from all other non-vehicular sources. All GHG emissions from S-5 are fugitive, while all other GHG emissions are non-fugitive emissions. The new 100,000 tons/year of GHG emissions applicability threshold for PSD permitting does not apply to this site until July 1, 2011, but GHG emissions data was included in this evaluation for informational purposes. Although the non-fugitive GHG emissions from this site would exceed the future 100,000 ton/year PSD applicability threshold, the non-fugitive GHG emission increases for this project are less than the GHG significant increase trigger level of 75,000 tons/year. Consequently, the GHG emission increases for this project would not have triggered a PSD permit for this site if the future effective limits were applicable now.
2. For waste decomposition and landfill gas control emissions, HAP emissions are equal to sum of all of the maximum permitted TAC emission rates, excluding the maximum permitted emission rates for: H₂S, IPA, MEK, and TCA. These four compounds are California TACs but are not federal HAPs pursuant to EPA's most recent HAP list. For material handling emissions, maximum HAP emissions are equal to the maximum permitted VOC emission rate resulting from the handling of VOC contaminated soil and use of low VOC content soil as cover material.

This project will not result in any increases above the current maximum permitted emission levels for: NO_x, CO, SO₂, or particulate matter (TSP, PM₁₀, and PM_{2.5}). This project does not involve any throughput increases at the landfill gas control equipment nor any changes to the secondary pollutant emission limits from the flares. The proposed changes to cover material usage rates and vehicle trip related limits result in maximum potential PM emissions that are no greater than the current PM PTE for

these activities. Therefore, the current PM limits will be retained for material handling and road dust emissions.

For the pollutants with emission increases (POC, NPOC, GHG, and HAP) and for each permitted TAC, the baseline emissions (B), proposed emissions (P), and emission increases (I) are presented in Tables 2a and 2b. The assumptions and methodology used to calculate these emission increases are discussed in more detail after Table 2b.

Table 2a. Project Emission Increases for Regulated Air Pollutants

Emissions from Waste Decomposition and LFG Control ¹	S-5 (Waste Decomposition)			A-51 and A-60 (LFG Control)			Total Project Increases
	B	P	I	B	P	I	
	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	tons/year
POC ²	20.397	26.380	6.433	7.716	7.716	0.000	6.433
NPOC ³	0.083	0.264	0.181	0.077	0.077	0.000	0.181
HAP (combined) ⁴	1.617	13.078	11.461	4.787	5.498	0.711	12.172
HAP (methanol) ⁴	0.000	8.187	8.187	0.000	0.552	0.552	8.739
GHG (total) ⁵	104,336	149,190	44,854	70,195	130,583	60,388	105,242
GHG (non-fugitive) ⁵	0	0	0	70,195	130,583	60,388	60,388

1. The POC, NPOC, HAP, and GHG emissions in this table include only the emissions resulting from waste decomposition, and landfill gas control, because these are the only processes that have emission increases for this project. From Table 1, the material handling and road dust processes have no increases in potential to emit for this project, except as explained in Table 2b for TAC.
2. For POC emissions, the baseline emission rate is determined pursuant to Regulation 2-2-605.4. For S-5, the baseline POC emission rate is equal to the current permitted POC emission rate, because Redwood Landfill has provided POC offsets for the currently permitted POC emission levels. For the flares, the outlet POC emission limit will not be changed; therefore the flares will have no POC emission increases.
3. For NPOC emissions, the baseline emission rate is determined pursuant to Regulation 2-2-605.1-3. The baseline period is 2007-2009. For S-5, the baseline fugitive NPOC emission rate was determined using LANDGEM projections for the average gas generation rate during the baseline period, an assumed fugitive emission rate of 25%, and the average NPOC concentrations measured by laboratory analyses during the baseline period. The detected NPOCs were: chlorodifluoromethane, dichlorodifluoromethane, dichlorofluoromethane, fluorotrichloromethane, methylene chloride, and perchloroethylene. Since the maximum permitted NPOC emission rate from the flares will not be changed by this project, the flares will have no NPOC emission increases.
4. To determine the applicability of District MACT requirements (2-2-114 and 2-2-317), the District must determine the increase in potential to emit of all HAPs combined and the largest increase in potential to emit for any single HAP. Therefore, the baseline for HAP emission is the current potential to emit. In Redwood's case, permit conditions and TAC concentration limits establish the current permitted HAP emission levels. The HAP with the highest permitted emission rate is methanol, which was not previously estimated. Therefore, the baseline emission rate for methanol is 0.
5. Projected GHG emissions were calculated using the peak gas generation rate projected by LANDGEM (4995 scfm) and default LFG concentration assumptions (50% CO₂, 50% CH₄, 0.001% N₂O). The gas collection system is assumed to capture 75% of the gas. The soil cap is assumed to oxidize 10% of the non-captured CH₄ to CO₂. Projected flare GHG emissions are based on the maximum permitted landfill gas flow rate to A-51 and A-60, the default landfill gas concentration assumptions above, and the District's default flare control efficiencies (99.0% for CH₄ and 76.8% for N₂O). Baseline GHG emissions were determined using LFG concentration data (33.0% CO₂ and 51.3% CH₄) and flare emission rates (9.94E4 lbs CO₂/MM scf LFG and 2.12E1 lbs CH₄/MM scf LFG) measured at the site in 2010. The baseline N₂O concentration was assumed to be 0%. The 2010 landfill gas generation rate was estimated by dividing the actual 2010 gas collection rate (1.406 MM scf/year) by the expected gas capture rate of 75%. Soil oxidation is assumed to be 10% for methane (same as above for projected GHG emissions calculations). For PSD applicability, the fugitive GHG emission increases from S-5 are excluded prior to comparing the project's GHG emission increases to the 75,000 tons/year threshold.

Table 2b. Project Emission Increases for Toxic Air Contaminants

Emissions from WD, MH, and LFG Control	S-5				A-51 and A-60			Total Project Increases
	B	P (WD)	P (MH)	I	B	P	I	
TACs: ⁶	lbs/yr	lbs/yr	lbs/yr	lbs/yr	lbs/yr	lbs/yr	lbs/yr	lbs/year
Acrylonitrile	11.3	27.1		15.8	0.0	1.8	1.8	17.6
Benzene	19.6	199.6	55.6	235.6	0.0	13.5	13.5	249.1
Benzyl Chloride	0.0	107.8		107.8	0.0	7.3	7.3	115.1
Carbon Tetrachloride	6.5	52.4	0.3	46.2	0.0	3.5	3.5	49.7
Chlorobenzene	5.7	38.3	35.0	67.6	0.0	2.6	2.6	70.2
Chloroethane	8.9	54.9		46.0	0.0	3.7	3.7	49.7
Chloroform	5.0	40.7	3.6	39.3	0.0	2.7	2.7	42.0
1,4 Dichlorobenzene	36.2	250.4	4.5	218.7	0.0	16.9	16.9	235.6
Ethyl Benzene	149.2	723.3	22.2	596.3	0.0	48.8	48.8	645.1
Ethylene Dibromide	7.9	64.0		56.1	0.0	4.3	4.3	60.4
Ethylene Dichloride	5.2	33.7	0.3	28.8	0.0	2.3	2.3	31.1
Ethylidene Dichloride	6.7	84.3		77.6	0.0	5.7	5.7	83.3
Hexane	53.7	293.6	500.1	740.1	0.0	19.8	19.8	759.9
Hydrogen Sulfide	3562.3	20318. 8		16756. 5	0.0	1370.1	1370.1	18126.6
Isopropyl Alcohol	198.6	1023.6		825.1	0.0	69.0	69.0	894.1
Methyl Alcohol	0.0	16373. 7		16373. 7	0.0	1104.1	1104.1	17477.8
Methyl Ethyl Ketone	374.8	1842.3	5864.0	7331.5	0.0	124.2	124.2	7455.7
Methylene Chloride	16.7	144.7		128.0	0.0	9.8	9.8	137.8
Methyl tert-Butyl Ether	13.7	75.1		61.4	0.0	5.1	5.1	66.5
Perchloroethylene	52.2	282.5	0.4	230.7	0.0	19.0	19.0	249.7
1,1,2,2 Tetrachloroethane	6.5	57.2		50.7	0.0	3.9	3.9	54.6
Styrene	14.4	88.7		74.3	0.0	6.0	6.0	80.3
Toluene	672.5	3138.9	277.9	2744.3	0.0	211.7	211.7	2956.0
1,1,1 Trichloroethane	6.8	45.4		38.7	0.0	3.1	3.1	41.8
Trichloroethylene	21.3	111.9	0.3	90.9	0.0	7.5	7.5	98.4
Vinyl Chloride	35.8	212.9	0.1	177.2	0.0	14.4	14.4	191.6
Vinylidene Chloride	7.8	82.6	0.4	75.1	0.0	5.6	5.6	80.7
Xylenes (o, m, & p)	579.1	3616.7	222.3	3260.0	0.0	243.9	243.9	3503.9
Hydrogen Chloride					0.0	8375.5	8375.5	8375.5
Hydrogen Fluoride					0.0	459.6	459.6	459.6
Formaldehyde					0.0	398.3	398.3	398.3

6. For modified sources such as S-5, TAC emission increases for a project shall include all emission increases occurring since 1/1/1987 with the baseline determined pursuant to Regulation 2-5-602. S-5 was first modified after 1987 under App. #17552. Thus, the baseline TAC emissions for S-5 under App. #17552 is also the baseline TAC emissions for this current project. In addition to the new waste decomposition emission rates from S-5, the proposed TAC emissions from S-5 include all permitted TAC emissions due to the material handling processes, because these material handling TAC emissions were considered new emissions under App. #17552 (baseline of 0.0). Since both of the flares were permitted as new devices after 1987, all flare TAC emissions must be included in this current project.

Waste Decomposition Emissions

Once waste has been buried in a landfill, it undergoes a series of biological transformations that decompose the waste and produce a mixture of gases referred to as landfill gas. This biological waste decomposition process continues throughout the active life of the landfill. The landfill gas generation rate generally peaks about one-year after waste placement ceases and then declines exponentially over the subsequent decades. By 30-50 years after waste placement ceases, the landfill gas generation rate is typically quite low.

As the landfill gas generation rate increases, pressure will build up within the landfill and this gas will soon begin to seep through the surface of the landfill. In the Bay Area, landfills containing more than 1 million tons of decomposable material - where the waste was placed less than 30 years ago – are required to have landfill gas collection and control systems to minimize these fugitive surface emissions. The captured landfill gas is delivered to an emission control system, such as a flare or IC engine. Emissions from these devices are discussed under the landfill gas control emissions section below. Although most of the landfill gas is captured and controlled, a small amount of un-captured landfill gas is still emitted from the landfill surface.

This fugitive landfill gas seeping from the landfill surface contains mainly methane, carbon dioxide, and water vapor. It also contains small quantities of non-methane organic compounds (ethane, propane, butane, other larger chain hydrocarbons, alcohols, ketones, aromatics, and halogenated compounds) and sulfur compounds (hydrogen sulfide, carbon disulfide, mercaptans, etc.) and trace amounts of many different toxic air contaminants (benzene, toluene, ethyl benzene, xylene, perchloroethylene, trichloroethylene, vinyl chloride, etc.).

The discussion below identifies the specific criteria used to calculate Redwood Landfill's fugitive surface emissions that are caused by the waste decomposition process.

Landfill Gas Generation Rates:

Maximum potential POC, NPOC, HAP, and GHG emissions are calculated using the peak landfill gas (LFG) generation rate for the landfill. The District uses EPA's LANDGEM program to determine the landfill gas generation rate for each year of a landfill's life. The District typically uses the default LANDGEM inputs for methane generation rate constant (k), potential methane generation capacity (L_0), and landfill gas methane content (% CH_4). This program requires site-specific historical annual waste placement data and projected decomposable material placement rates for future years. Using the maximum possible decomposable material placement rate typically results in the highest possible peak gas generation rate for a landfill. For cancer risk assessment purposes, the District also determines the 70-year average landfill gas generation rate for each year of a landfill's life and the highest 70-year average LFG generation rate for the landfill.

Based on Redwood Landfill's actual waste placement data through 2001 (8.543 million tons of decomposable materials); the currently approved decomposable material placement limits for Redwood Landfill (17.1 million tons total and 450,000 tons/year for year 2002 and later); and LANDGEM inputs of: $k = 0.04 \text{ year}^{-1}$, $L_0 = 100 \text{ m}^3/\text{Mg}$, and methane concentration = 50%; Redwood Landfill's current permit results in a peak LFG generation rate of 3998 scfm at 50% methane. However, actual decomposable material disposal rates were well below these maximum limits (an average of 374,260 tons/year during the last five years); Redwood deposited an average of 344,650 tons/year of waste and an average of 29,610 tons/year of decomposable cover materials during 2005-2009. The present plan to

shift more of the organic waste and cover from landfill disposal into composting is expected to prevent any significant increases in Redwood Landfill's future decomposable material disposal rates. Based on actual waste placement data through 2008 (11.403 million tons) and the more reasonable decomposable material placement projection of 406,500 tons/year for all future years, the District expects that the LFG generation rate for the currently permitted landfill will not exceed 3820 scfm at 50% methane. This generation rate was used in earlier applications for baseline emission calculations.

For the proposed permit condition changes, the District determined a new projected peak LFG generation rate using the same LANDGEM inputs except for decomposable material placement rates. Actual annual decomposable material placement data was used from 1958-2009 with a total of 12.176 million tons in 2009. The proposed peak decomposable material placement rate of 541,140 tons/year (432,290 tons/year of waste and 108,850 tons/year of decomposable cover materials) is used for year 2010 and later until the landfill reaches the new cumulative limit of 23.185 million tons of total decomposable materials in 2029. For this proposal, the peak LFG generation rate was determined to be 4995 scfm and the highest 70-year average LFG generation rate was determined to be 3130 scfm.

Fugitive Emissions from the Landfill Surface:

The District assumes that landfill gas control systems complying with Regulation 8, Rule 34 requirements will achieve at least 75% capture of the generated landfill gas. Thus, no more than 25% of the landfill gas produced in Redwood Landfill is expected to be emitted from the surface of the landfill. For Redwood, this 25% fugitive emission rate is equal to 955 scfm for the currently permitted landfill and a maximum of 1249 scfm for the proposed landfill permit.

Redwood reported that the current landfill gas control system collected 1406.08 MM scf of LFG between 10/1/09 and 9/30/10. From the April 2010 source test data, the average methane concentration of the collected landfill gas was 51.3% CH₄. Based on this data, the 2010 average gas capture rate was 2744.7 scfm at 50% methane. The projected gas generation rate for 10/1/09-9/30/10 is 3129.4 scfm at 50% CH₄. A comparison of the actual gas capture rate to the projected gas generation rate indicates that Redwood Landfill's current gas collection system is capturing 87.7% of the generated gas and emitting 384.7 scfm of fugitive landfill gas.

In consideration of the current actual landfill gas capture rate for Redwood Landfill (87.7%), the District's use estimation of 75% minimum capture rate will result in a conservative estimate of emissions from the landfill. Actual fugitive landfill emissions may be up to 60% lower than the maximum permitted emission rates determined below.

POC:

Redwood Landfill currently has a landfill gas concentration limit of 360 ppmv for total non-methane organic compounds (calculated as hexane equivalent). This concentration is equal to an NMOC emission rate of 8.052E-5 lbs of NMOC/scf of fugitive LFG. This limit and the baseline fugitive landfill gas emission rate above were used to calculate the maximum fugitive NMOC emission rate for Redwood Landfill. POC emissions are assumed to be 100% of the NMOC emissions.

The current maximum permitted fugitive POC emission rate is 20.397 tons/year. In December 2010, Redwood Landfill provided POC offsets to reimburse the District for POC offsets the District provided in the past from the District's small facility banking account. These offset reimbursements included offsets provided for the 2002 landfill emission increases authorized under Application # 17752 and subsequent permit condition changes. Thus, this 20.397 ton/year POC emission rate has now been fully

offset by Redwood Landfill. In accordance with Regulation 2-2-605.4, the fully offset emission rate of 20.397 tons/year of POC is the baseline fugitive emission rate for S-5.

Redwood requested to retain the current NMOC concentration limit of 360 ppmv (as C6). However, the higher fugitive LFG emission rate for the proposed permit will result in higher fugitive POC emissions. From LANDGEM, the NMOC generation rate is 105.5 tons/year of NMOC at 4995 scfm of LFG. The fugitive emission rate is 25% of this generation rate, or 26.380 tons/year of NMOC. POC emissions are 100% of NMOC. Thus, the proposed POC emission rate is 26.380 tons/year.

POC emission increases are $(26.380 \text{ tons/yr} - 20.397 \text{ tons/yr}) = 6.433 \text{ tons/year}$ of POC.

NPOC:

NPOC emissions are assumed to be no more than 1% of the total NMOC emissions. At the current maximum permitted LFG generation rate, the current maximum permitted NPOC emission rate is 0.202 tons/year (determined from LANDGEM and the 1% factor above).

Since this NPOC emission rate is not limited by permit condition and was never offset, the baseline NPOC emission rate for the existing landfill should be determined in accordance with Regulation 2-2-605.1-3. The baseline period for this application is 2007-2009. The actual average landfill gas generation rate during the baseline period was 2921.0 scfm of LFG and the fugitive emission rate is 25% of this generation rate. During the baseline period, the average concentrations of NPOCs in the landfill gas were: 645 ppb of chlorodifluoromethane, 470 ppb of dichlorodifluoromethane, 126 ppb of dichlorofluoromethane, 70 ppb of fluorotrichloromethane, 140 ppb of methylene chloride, and 117 ppb of perchloroethylene. Based on this concentration data, the average NPOC emission rate is: $4.32E-7 \text{ lbs/scf}$ of fugitive LFG (about 0.5% of the NMOC emission rate). The baseline NPOC emission rate is: 0.083 tons/year.

As discussed above, the proposed NMOC emission rate is 26.380 tons/year and maximum NPOC emissions are 1% of this emission rate, or 0.264 tons/year of NPOC.

NPOC emission increases are $(0.264 \text{ tons/yr} - 0.083 \text{ tons/yr}) = 0.181 \text{ tons/year}$ of NPOC.

GHG:

Landfill gas contains primarily methane and carbon dioxide, which are both greenhouse gases. Methane and carbon dioxide emissions will be calculated using LANDGEM, which assumes that the landfill gas contains 50% CH₄ and 50% CO₂. Based on CARB data, landfill gas may also contain up to 0.001% of another GHG, nitrous oxide (N₂O). For this analysis, the global warming potentials for these gases are: 1.0 for CO₂, 21 for CH₄, and 310 for N₂O.

As with POC and NPOC emission calculations, the District assumes that 75% of the GHG generation rate is captured by the gas collection system. In addition, the soil cover in landfills is assumed to convert 10% of the non-captured methane into carbon dioxide in accordance with standard landfill GHG inventory procedures. The methane emission rate is therefore: $(25\% * 0.9) = 22.5\%$ of the methane generation rate. The carbon dioxide emission rate is $(25\% + 25\% * .1) = 27.5\%$ of the carbon dioxide generation rate. Nitrous oxide emissions are 25% of the nitrous oxide generation rate.

At the maximum expected landfill gas generation rate of 3820 scfm of LFG for the current case, GHG generation rates are: 57088 tons/year of CO₂, 20810 tons/year of CH₄, and 1.14 tons/year of N₂O. After

accounting for landfill gas capture and methane oxidation, GHG fugitive emission rates are: 15,699 tons/year of CO₂, 4682 tons/year of CH₄, and 0.29 tons/year of N₂O. Using the global warming potentials discussed above, the maximum potential CO₂ equivalent GHG emission rate for the existing landfill is: 114,114 tons/year of CO₂e. Note that all of these emissions are fugitive, and these GHG emissions include 15,699 tons/year of biogenic CO₂ emissions.

In 2010, Redwood Landfill reported that the total annual collection rate was 1406.08 MM scf of LFG (2675 scfm of LFG). From this data, the actual gas generation rate is estimated to be 3567 scfm and the fugitive landfill gas flow rates is estimated to be 891.75 scfm. From 2010 source test data, the actual LFG concentrations were 33.0% CO₂ and 51.3% CH₄. The actual concentration of N₂O is assumed to be 0.0%. Based on this actual concentration data and the estimated fugitive flow rate, actual fugitive GHG emissions for 2010 are: 10,148 tons/year of CO₂, 4485 tons/year of CH₄, and 0.00 tons/year of N₂O. The total 2010 actual GHG equivalent emissions are: 104,336 tons/year as CO₂e.

For the peak proposed landfill gas generation rate of 4995 scfm, the fugitive GHG emissions are: 20,525 tons/year of CO₂, 6121 tons/year of CH₄, and 0.37 tons/year of N₂O. The total GHG equivalent emissions are: 149,190 tons/year of CO₂e.

The GHG emission increases are 35,076 tons/year of CO₂e above the current maximum potential GHG emission rate (potential to potential comparison) and 105,242 tons/year of CO₂e above the 2010 actual GHG emission rate (actual to potential comparison). When fugitive greenhouse gas emissions are excluded, the actual to potential emission increase is only 60,388 tons/year of CO₂e.

TAC:

The District has numerous laboratory analyses of the landfill gas collected from Redwood Landfill. This data was used to determine the baseline concentrations and baseline TAC emission rates for S-5 and was also used to establish new landfill gas concentration limits for the most significant toxic air contaminants found in Redwood's landfill gas. Proposed fugitive emissions were determined using the proposed concentration limits and the proposed LFG emission rate discussed previously.

Since Regulation 2, Rule 5 includes all TAC emission increases for a source occurring since 1/1/87, the TAC emission increases for this application include the TAC increases allowed under Application # 17552 and all subsequent applications. The baseline TAC concentrations and baseline fugitive landfill gas emission rate determined for S-5 under Application # 17552 were also used as the baseline waste decomposition emission rates for this current project.

Detailed LFG analyses, baseline concentrations, baseline TAC calculations, proposed TAC concentration limits, and proposed TAC emission calculations are presented in the attached spreadsheets.

HAP:

Most of the California toxic air contaminants (TAC) are also EPA hazardous air pollutants (HAP). The four compounds that are TACs that are not HAPs are: hydrogen sulfide (H₂S), isopropyl alcohol (IPA), methyl ethyl ketone (MEK), and 1,1,1 trichloroethane (TCA). For S-5, the maximum permitted HAP emission rate is the sum of all of the proposed TAC emission rates except for these four compounds (13.078 tons/year). The HAP with the largest individual emission rate is methanol with a proposed fugitive waste decomposition emission rate of 8.187 tons/year.

The District calculates HAP emission increases for a project to determine the applicability of Regulation 2-2-317. This requirement is based on a potential to potential emission comparison. The current HAP potential to emit for waste decomposition is determined using the current TAC concentration limits (excluding H₂S, IPA, MEK, and TCA) and the maximum potential generation rate of 3820.5 scfm LFG for the currently permitted landfill (1.617 tons/year).

For waste decomposition, the potential HAP emission increases are: $(13.078 - 1.617) = 11.461$ tons/year. Since methanol emissions were not specifically identified in the current landfill permit, the current potential to emit for methanol is assumed to be 0. tons and methanol potential emission increases are 8.187 tons/year.

Landfill Gas Control Emissions

The collection and control of landfill gas, which typically involves burning landfill gas in a flare or an energy recovery device, results in secondary emissions of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), particulate matter (PM₁₀), and TACs such as formaldehyde and acid gases.

Redwood Landfill is currently limited to burning 2207.52 MM scf/year of LFG in the two flares combined, which is equivalent to an annual average of 4200 scfm or 126 MM BTU/hour of heat input. All maximum potential emissions are based on this throughput limit. Since Redwood is not changing any flare limits except for the inlet TACs, this project has no increases for NO_x, CO, SO₂, or PM₁₀.

For TAC emissions, the proposed TAC emission rates are determined based on the permitted flow rate, the proposed TAC concentration limits, and 98% control by weight for each TAC. As discussed previously, TAC emission increases for a project should include all emission increases from a device after 1/1/87. Since A-51 and A-60 were both permitted after 1/1/87, the baseline emission rate for these flares is 0 for each TAC, and all flare TAC emissions are included as part of this project.

HAP emissions include all TACs except H₂S, IPA, MEK, and TCA. The HAP increases are determined based on a potential to potential emission comparison and are: $(5.498 - 4.787) = 0.711$ tons/year for all HAPs combined from A-51 and A-60. For the largest single HAP, methanol, the flare emission rate and potential emission increase is 0.552 tons/year.

Material Handling Emissions

Active landfilling operations also result in particulate matter emissions (TSP, PM10, and PM2.5) due to excavation, waste disposal, and cover activities; and due to wind erosion. The handling, processing, placement or disposal of certain wastes, cover materials, and other designated materials (asbestos, petroleum contaminated soil, metal contaminated soil, VOC-laden cover materials, auto shredder fluff, shredded tires, green waste, construction debris, and sewage sludge) can result in elevated levels of air emissions.

Particulate Matter:

Particulate matter emissions from waste disposal and covering activities are determined using EPA's AP-42 emission factor equations for each operation (see AP-42 Table 13.2.3-1 for the recommended AP-42 chapter for each type of activity).

The act of dumping waste or cover materials onto the active face is a drop type operation with emissions estimated in accordance with the equation on page 13.2.4-4 of AP-42. This equation uses average wind speed and moisture content as input variables. The site-specific average wind speed for the Novato area is reported to be 6 mph by nation weather station data. Moisture content for waste and cover materials is based on AP-42 Table 13.2.4-1.

The particulate emissions resulting from the use of excavators, bulldozers, and compactors to prepare the active face to receive waste, to spread the waste around once it has been dumped, to compact the waste, and to spread and compact cover materials are determined using the equation in AP-42 Table 11.9-1 for bulldozing of overburden. This equation uses silt content and moisture content data from Table 13.2.4-1. The equation results in an emission rate per hour of operation for off-road vehicle. The number of vehicles and operating times were estimated from data provided by Redwood Landfill.

Detailed PM emission calculations are provided in the attached spreadsheets.

POC, NPOC, TACs, and HAPs:

The disposal of VOC contaminated soil and the re-use of low VOC content soil as cover material results in the unintended aeration of the VOCs contained in the soil. The District initially established limits for these operations under Application # 17552. Redwood Landfill is not proposing any changes to these limits; however, the TAC emissions from these aeration operations were new emissions under Application # 17552 and must therefore be included as part of this project.

Road Dust Emissions

Active landfilling operations also result in particulate matter emissions (TSP, PM10, and PM2.5) due to vehicle deliveries and mobile equipment travel on paved and unpaved roads within the site (road dust emissions). These road dust emissions are calculated in accordance with the equations and procedures in AP-42 Chapters 13.2.1 and 13.2.2. Redwood Landfill uses frequent watering to control emissions from gravel and dirt roads. These dust control measures are expected to reduce PM10 emissions by 75%. For paved roads, the only current control is the natural mitigation achieved by site-specific rainfall, which gets about 4% control.

Under Application # 17552, the District used these same AP-42 chapters and control efficiencies to calculate road dust emissions for this site. At that time the equations in effect were from 1998. The

maximum permitted road dust emission rates were determined to be: 1290 pounds/day of PM10 and 201.2 tons/year of PM10. However, the AP-42 road dust emission rate equations were modified in 2006. Using the fleet weight and vehicle trip data for the currently permitted landfill and the new AP-42 equations results in revised road dust emission rates of 951 pounds/day of PM10 and 148.3 tons/year of PM10. This revised road dust emission rate data and the currently permitted vehicle rates will be combined with the currently permitted PM emission rates for material handling operations to establish new maximum permitted emission rate levels for the landfill as it is currently permitted. These revised maximum permitted PM10 emission rates are: 992.5 pounds/day of PM10 and 154.25 tons/year of PM10 total from road dust and material handling activities.

Projected road dust emissions were determined using site-specific fleet weight and vehicle miles traveled data provided by Redwood Landfill, the new (2006) AP-42 road dust equations, and the emission control efficiencies discussed previously. Detailed emissions calculations are provided in the attached spreadsheets. The road dust emissions were projected to be 950.9 lbs/day and 146.0 tons/year of PM10 with total road dust and material handling emissions of 992.3 pounds/day and 151.94 tons/year of PM10.

Since the projected road dust and material handling emissions are not expected to exceed the current permitted emission rates (which are 26% lower than previously estimated due to EPA's emission equation improvements), this project will not result in any particulate matter emission increases.

C. STATEMENT OF COMPLIANCE

Regulation 2, Rule 1 (CEQA and Public School Notifications)

This application involves permit condition changes that will allow an expansion of the existing permitted landfill and will result in emission increases for POC, NPOC, TAC, HAP, and GHG. On June 10, 2008, Marin County certified the Final Environmental Impact Report (EIR) that was prepared for Proposed Revisions of the Solid Waste Facility Permit for Redwood Landfill (March 2008 Final EIR, Final EIR Response to Comments Amendment, and Final EIR Second Amendment). This EIR included an evaluation of the environmental impacts resulting from several possible project alternatives. The proposed increases in waste acceptance rates and decomposable material disposal rates that have been requested in this current BAAQMD permit application are consistent with the Mitigated Alternative evaluated in this EIR package. Even with implementation of all feasible mitigation measures, this project was found to result in significant and unavoidable air quality impacts. In particular, criteria pollutant emission increases (after mitigation) and the cumulative impacts of these ROG, NOx, and PM10 emission increases due to the proposed additional truck trips, the proposed increases in decomposable material disposal limits, and the proposed increases in composting rates were deemed to be greater than the significant air quality impact levels in effect at that time. However, the EIR found that toxic emission increases and odors could be mitigated to less than significant levels. This EIR also included mitigation measures for GHG emission increases.

For this BAAQMD permit application, the BAAQMD review of this certified Final EIR is restricted to the sources and operations contained within this permit application, which include the S-5 Redwood Landfill. All of the POC, NPOC, TAC, HAP, and GHG emissions from the landfill are currently mitigated through the use of an active landfill gas collection system and a landfill gas control system, which currently includes two enclosed flares with a combined permitted capacity of 4200 scfm of landfill gas. The proposed emission increases for this project will also be mitigated by these landfill gas collection and control systems. Redwood Landfill will expand the landfill gas collection system as needed in order to capture the additional landfill gas that will be generated due to the proposed capacity

limit increases at S-5. The existing emission control system will be adequate for at least 8 more years. Although the current permitted control capacity of 4200 scfm of LFG is less than the maximum expected landfill gas generation rate for the proposed landfill (4995 scfm of LFG), the physical capacity of the existing flares is actually much larger (6000 scfm of LFG). Redwood Landfill will be able to meet the additional control capacity needs for this project by modifying the existing flare permits or by submitting an application for additional landfill gas control equipment, such as the energy recovery devices that are required as a mitigation measure for the project's GHG emission increases.

After implementation of adequate landfill gas collection and control for S-5, this project will result in 6.433 tons/year (35.2 pounds/day) of POC emission increases. Redwood Landfill will be required to provide POC emission reduction credits at a ratio of 1.15 to 1.0 to offset these POC emission increases. These POC offsets will mitigate the cumulative impacts of this project on the regional air quality problem (specifically, the BAAQMD region's ozone non-attainment status). All future increases of ozone precursors (POC and NO_x) that will occur due to the expected increase in landfill gas control capacity for this landfill will also be offset with emission reduction credits. Thus, the emissions of ozone precursors due to this application will be fully mitigated by emission reduction credits.

For all other pollutants with emission increases, the impacts from this application have been found to be less than significant after employing the mitigation measures identified in the certified Final EIR.

In summary, the District finds that the project proposed in this permit application is consistent with the Final EIR certified by Marin County in June 2008. The project covered by this permit application will not have any air quality impacts that were not reviewed or considered by Marin County pursuant to the certification of the Final EIR discussed above. The impacts resulting from the project proposed in this permit application are no greater than the impacts evaluated under this certified Final EIR. The project proposed in this permit application will employ the mitigation measures discussed in the certified Final EIR and the additional mitigation measure of providing emission reduction credits for all emission increases of ozone precursors (POC and NO_x). The District has considered the information presented in the certified Final EIR and concludes that no additional CEQA review is required for the project proposed in BAAQMD Permit Application # 20607.

The certified Final EIR discussed above is currently undergoing court challenges. However, as of this date, the Final EIR is valid and in effect.

The project is over 1000 feet from the nearest school and is therefore not subject to the public notification requirements of Regulation 2-1-412.

Regulation 2, Rule 2 (New Source Review)

As discussed in the Background Section of this report, the proposed condition changes for the S-5 Redwood Landfill constitute a modification of S-5 pursuant to Regulation 2-1-234, because these condition changes will result in POC and NPOC emission increases. From Tables 1 and 2, the proposed maximum permitted emission rates for S-5 are: 29.3 tons/year of POC (163.5 pounds/day of POC) and 0.3 tons/year of NPOC (1.7 pounds/day of NPOC). The proposed project will result in the following emission increases at S-5: 6.433 tons/year of POC increases (35.25 pounds/day of POC increases) and 0.181 tons/year of NPOC increases (0.99 pounds/day of NPOC increases).

Best Available Control Technology (BACT):

In accordance with Regulation 2-2-301, Best Available Control Technology (BACT) is required for a modified source if a project results in emission increases for a pollutant and the maximum permitted emission rate for that pollutant exceeds 10 pounds per highest day. The proposed project will result in emission increases for both POC and NPOC, but only POC emissions will exceed the BACT threshold of 10 pounds per highest day. Therefore, BACT is required for POC emissions from S-5.

BACT for POC emissions from a landfill includes the installation of a state-of-the-art landfill gas collection system that minimizes landfill surface emissions and a state-of-the-art landfill gas control system that destroys collected landfill gas to the maximum extent possible for the particular device employed. The landfill gas collection and control systems must be operated continuously and must – as a minimum – satisfy all performance and operating requirements specified in BAAQMD Regulation 8, Rule 34 and the federal NSPS for MSW Landfills (40 CFR, Part 60, Subpart WWW).

The S-5 Redwood Landfill satisfies POC BACT requirements by being equipped with continuously operating landfill gas collection and control systems. For large active landfills, the operating requirements and other standards specified in BAAQMD Regulation 8-34 are at least as stringent as the Subpart WWW performance standards. Thus, compliance with Regulation 8, Rule 34 will assure compliance with Subpart WWW and with BACT for the landfill's fugitive POC emissions. The existing Redwood Landfill is equipped with a continuously operating landfill gas collection system and two enclosed landfill gas flares that have been generally operating in compliance with all applicable requirements of Regulation 8, Rule 34. Landfill operators have quickly corrected any surface or component leaks that they have discovered and have expanded the landfill gas collection system in a timely fashion. The District expects that Redwood Landfill will continue to maintain and expand the landfill gas collection and control systems for this landfill in a manner that will minimize fugitive POC emissions from the landfill. In addition, the California Air Resources Board (CARB) has adopted a landfill methane capture rule, which will require Redwood Landfill to meet a new integrated surface emission leak limit of 25 ppmv of methane (averaged over each grid) and to employ enhanced surface emission monitoring procedures. This rule also establishes a minimum methane control efficiency of 99% for the landfill gas control systems. This new rule has the potential to result in improved capture efficiency and lower fugitive emissions from the landfill. Redwood Landfill will complete the gas collection system and monitoring system improvements that are necessary for this site to comply with the new CARB rule prior to exceeding the landfill's current capacity limits. Redwood Landfill's flares are currently complying with the 99% methane control efficiency (source test data indicates the flares are achieving >99.9% methane control). Therefore, Redwood Landfill will be using state-of-the-art landfill gas collection and control systems upon commencing the landfill expansion and will comply with BACT for POC.

Since this application will not result in any emission increases of PM10, NOx, CO, or SO2, BACT is not triggered for these pollutants. The Regulation 2-2-301 BACT requirements do not apply to GHG emissions. However, if BACT did apply to GHG emissions from the landfill, the BACT requirements would likely be similar to those discussed above for POC emissions.

Maximum Achievable Control Technology (MACT):

In accordance, with Regulations 2-2-114 and 2-2-317, the Maximum Achievable Control Technology (MACT) requirements for HAP emission increases do not apply if (a) the site is not a major source of HAP, or (b) if HAP emission increases (based on a potential to potential emission comparison) are less than 10 tons/year for each HAP and less than 25 tons/year for all HAPs combined. As shown in Table 2a, total HAP emission increases are less than these thresholds. Therefore, MACT does not apply to this project.

Offsets:

As discussed previously, this application only addresses emission increases from the S-5 Redwood Landfill. Any residual or secondary pollutant emission increases that will occur in the future due to modifying the current throughput limit for the flares or due to the installation of landfill gas fired energy recovery devices will be determined in the future application for these permit revisions or new equipment.

This application results in POC emission increases, and the facility emits more than 35 tons/year of POC emissions. Therefore, this facility is required to provide POC emission reduction credits (ERCs) to offset the POC increases at a ratio of 1.15:1.0, pursuant to Regulation 2-2-302.

In 2010, Redwood Landfill submitted Application # 21867, which resulted in NO_x and POC emission increases and triggered the requirement to reimburse the District for all NO_x and POC emission reduction credits provided in the past from the District's small facility banking account. The District reviewed and corrected the cumulative emission inventory for this site to eliminate sources or operations that had been shut down and determined the total amount of NO_x and POC credits due for this reimbursement and the emission increases for Application # 21287. Redwood Landfill surrendered POC emission reduction credits to offset both NO_x and POC increases. Redwood Landfill has now fully reimbursed the District for all past NO_x and POC increases. Therefore, the only ERCs required for this application are the credits required due to emission increases from this application.

From Table 2a, the total emission increases for Application # 20607 are 6.433 tons/year of POC. After applying the offset ratio (1.15 to 1.0), the total amount of emission reduction credits due for Application # 20607 are: 7.398 tons/year of POC. Redwood Landfill had 3.5 tons/year of POC ERCs left over from the banking certificates submitted for offset reimbursement and Application # 21287, and Redwood has surrendered Banking Certificate #1238 for 4.000 tons/year of POC. These total POC credits are sufficient to offset the POC increases for Application # 20607.

Regulation 2-2-303 offset requirements for PM₁₀ and SO₂ emission increases only apply if the application results in emission increases for these pollutants. Since this application will not result in PM₁₀ or SO₂ emission increases, PM₁₀ and SO₂ offsets are not required.

Prevention of Significant Deterioration (PSD):

Since landfill facilities are not one of 28 special PSD categories, landfill facilities are subject to a federal PSD major facility threshold of 250 tons/year for each regulated air pollutant (CO, NO_x, POC, SO₂, and PM₁₀). In addition, fugitive emissions are excluded from this PSD applicability determination. In accordance with EPA's new GHG emissions tailoring rule, the applicable PSD threshold for GHG emissions is 100,000 tons/year of CO₂ equivalent emissions (CO₂e). The inclusion or exclusion of fugitive GHG emissions should follow the same criteria as other regulated air pollutants. Thus, fugitive GHG emissions should be excluded for this site when determining PSD applicability.

Table 3 identifies the potential to emit (PTE) for all sources at Site # A1179 and the total site-wide PTE.

Since the facility wide PTE for NO_x, CO, POC, PM₁₀, and SO₂ are each less than 250 tons/year, this facility is not a major facility for PSD and is not currently subject to PSD requirements. In accordance with EPA's tailoring rule, the GHG PSD threshold does not apply to this site until July 1, 2011, because this site is not a PSD major source for any other pollutant. However, this facility will be considered a PSD major source due to greenhouse gas emissions, effective July 1, 2011, because the non-fugitive GHG PTE will exceed the new GHG PSD applicability threshold of 100,000 tons/year of CO₂e.

Since this site is not currently subject to federal PSD, Regulations 2-2-303-309 do not apply.

Table 3. Facility Wide Potential to Emit for Site # A1179

Source #	Source Description	Maximum Potential Emissions (tons/year)							
		NOx	CO	POC	NPOC	PM10	SO2	HAP	GHG
S-2	Sewage Sludge Storage, Main Pond			0.106		0.106		0.106	
S-5	Redwood Landfill, waste decomposition			26.380	0.264			13.078	149190
S-5	Redwood Landfill, waste disposal					154.250			
S-5	Redwood Landfill, contaminated soil disposal			0.312				0.312	
S-5	Redwood Landfill, VOC-laden soil as daily cover			2.633				2.633	
S-34	Active Compost and Co-Compost Windrows			22.500		1.055		0.225	
S-39	Trommell Screening Processes					0.009			
S-41	Temporary Stockpiles for Yard and Green Waste Shredding Operations					2.430			
S-42	Soil Stockpiles (including VOC-laden soil)			2.638		0.026		2.638	
S-49	Diesel Engine (BUG)	0.034	0.004	0.001		0.001	0.001	0.001	48
S-55	Gasoline Dispensing Facility G# 8573			0.987				0.099	
S-56	Horizontal Grinder (exempt)					10.000			
S-57	Diesel Engine for Portable Horizontal Grinder	10.000	1.667	0.120		0.131	0.257	0.120	809
S-58	Aerated Leachate Pond			0.084	0.050			0.084	
A-51 & A-60	Landfill Gas Flares	33.113	110.376	7.716	0.077	9.440	64.338	5.498	130583
S-61	Portable Diesel Engine for Waste Tipper	0.828	0.385	0.044	0.000	0.010	0.018	0.044	189
S-62	Portable Diesel Engine for Power	0.828	0.385	0.044	0.000	0.010	0.018	0.044	189

APPENDIX G: Engineering Evaluation for Application # 20607

	Screens								
Total	All Sources and Abatement Devices	44.803	112.816	63.562	0.391	177.466	64.631	24.879	281007
Total	All Non-Fugitive Emissions	44.803	112.816	8.994	0.127	19.599	64.631	5.889	131818

Regulation 2, Rule 5 (NSR of Toxic Air Contaminants)

As shown in Table 2b, this project and the related 2002-2009 applications for modifications of the S-5 Redwood Landfill and its associated landfill gas control system (A-51 and A-60) result in emission increases for numerous toxic air contaminants. Since the S-61 and S-62 portable diesel engines were also permitted less than two years ago under Application # 21287, these diesel engines are considered to be part of this current project. The total project's TAC emission increases exceed the District's risk screen trigger levels for numerous TACs. Therefore, a health risk screening analysis is required.

The District conducted a health risk screening analysis for the total post-1987 TAC emission increases at S-5 due to waste decomposition, for all TAC emissions from the flares, and for all TAC emissions from the S-61 and S-62 diesel engines. A detailed description of this HRSA and all modeling and health risk calculation procedures is included in the attached September 2010 HRSA report. This HRSA was updated in January 2011 to include post-1987 TAC emission increases due to disposal of contaminated soil and use of VOC-laden soil as cover material and due to minor changes to the proposed TAC emissions from the waste decomposition process at S-5. The health impacts determined by the January 2011 Updated HRSA are presented in Table 4. Hydrogen sulfide (H₂S) emission limits are being imposed as a result of this project to ensure compliance with the Regulation 2-5-302.3 acute hazard index limit of 1.0.

Table 4. January 2011 Updated HRSA Results for Application # 20607

Health Impact Type	Receptor Type	Landfill (S-5)	LFG Flares (A-51 & A-60)	Diesel Engines (S-61 & S-62)	Maximum Project Impacts
Acute HI	Resident or Worker	1.00	0.04	NA	1.00
Chronic HI	Worker	0.12	0.01	0.002	0.12
Chronic HI	Resident	0.24	0.07	0.002	0.24
Cancer Risk in a million	Worker	1.87	0.05	2.41	2.60
Cancer Risk in a million	Resident	7.71	0.62	4.21	9.14

After inclusion of the new H₂S limits, the maximum project impacts were determined to be: an increased cancer risk of 9.1 in a million, a chronic hazard index of 0.24, and an acute hazard index of 1.00. These project health risks comply with the Regulation 2-5-302 project risk limits (cancer risk \leq 10.0 in a million, chronic HI \leq 1.0 and acute HI \leq 1.0).

Regulation 2-5-301 requires Best Available Control Technology for Toxics (TBACT) for any source that results in health risks greater than 1.0 cancer risk or 0.2 chronic HI. The S-5 Redwood Landfill and the two portable diesel engines (S-61 and S-62) each have the potential to exceed these TBACT thresholds.

For waste decomposition emissions from landfills, TBACT is the same as BACT for POC emissions. A landfill satisfies TBACT for waste decomposition emissions by using a state-of-the-air landfill gas collection system to minimize fugitive TAC emissions from the landfill surface and by using BACT/TBACT compliant landfill gas control devices to minimize residual and secondary TACs from the

landfill gas control system. As discussed previously, Redwood Landfill is equipped with a state-of-the-art landfill gas collection and control system. The TAC emissions resulting from the use of VOC-laden soil as cover material and from the handling and disposal of VOC contaminated soil are minimized by the material handling procedures identified in Condition # 19867, Parts 14 and 15 and Regulation 8, Rule 40. The only way to limit these emissions further would be to reduce the amounts of VOC-laden soil and VOC contaminated soil accepted at the site. Since the health risks resulting from these material handling activities are less than the TBACT thresholds and are far less than the health risks resulting from waste decomposition emissions, the reduction or elimination of VOC soil disposal or reuse is not deemed to be necessary at this time.

As discussed in the Engineering Evaluation for Application #21867, TBACT for diesel PM is compliance with a PM_{10} emission limit of 0.01 g/bhp-hour or “equivalent technology.” In the case of on-site portable engines that are subject to the CARB ATCM for portable engines rather than the CARB ATCM for stationary engines, equivalent TBACT technology is deemed to be: an engine that has a CARB certified diesel PM emission rate that is less than or equal to the applicable PM_{10} tier standard for a new engine and that is equipped with a Level-3 CARB-Verified diesel PM filter certified to achieve at least 85% control of diesel PM and approved for use with the specific proposed engine. For engines between 100-175 bhp, the current Tier 3 standard is 0.22 g/bhp-hour. The proposed S-61 and S-62 engines are 125 bhp engines with a certified PM_{10} emission rate of 0.25 g/kW-hr (0.186 g/bhp-hr) per engine. Thus, these engines comply with the current tier standard. Redwood Landfill has installed CARB-Verified Level-3 diesel PM filters on each of these engines. These filters are certified to achieve at least 85% control of diesel PM emissions. After control, the S-61 and S-62 engines will each emit 0.028 g/bhp-hr of PM_{10} . Although the post-control emission rate from these engines is not less than the TBACT standard of 0.01 g/bhp-hr, the engines meet the equivalent technology criteria discussed above. Therefore, S-61 and S-62 (when equipped with CARB-verified Level-3 diesel PM filters) satisfy District TBACT requirements for prime on-site portable compression ignition engines.

Regulation 2, Rule 6

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act (40 CFR, Part 70) and BAAQMD Regulation 2, Rule 6, Major Facility Review (MFR), because it is a major facility, as defined by Regulation 2-6-212. This facility has the “potential to emit,” as defined by Regulation 2-6-218, more than 100 tons per year of a regulated air pollutant, specifically more than 100 tons per year of carbon monoxide. Therefore, this facility is required to have an MFR permit pursuant to Regulation 2-6-301.

This facility is also subject to the Title V operating permit requirements and Regulation 2, Rule 6, MFR permit requirements, because it is a designated facility as defined by Regulation 2-6-204. The Standards of Performance for Municipal Solid Waste Landfills (40 CFR Part 60, Subpart WWW) require the owner or operator of a landfill that is subject to Subpart WWW and that has a design capacity of greater than or equal to 2.5 million megagrams (Mg) and 2.5 million cubic meters (m^3) to obtain an operating permit pursuant to Part 70. The landfill at this facility is subject to 40 CFR, Part 60, Subpart WWW and has design capacities of 14.6 million m^3 and 15.5 million Mg. Therefore, this facility is a designated facility and is required to have an MFR permit pursuant to 2-6-304.

The initial MFR Permit for this facility was issued on November 10, 2003 and was last revised on October 24, 2007. The renewal of the Title V permit for this facility is underway pursuant to Application #17987. The MFR permit revision incorporating the condition changes described in this application will be handled pursuant to Application #20623.

Regulation 6, Rule 1

Regulation 6-1-301 limits the visible emissions from each activity at the landfill, soil excavation areas, soil stockpiles, and on-site roadways to Ringelmann 1.0. In accordance with Regulation 6-1-401, the operator will be required to observe all roads and all loading, unloading, scraping, bulldozing, and compacting operations and to take whatever action is necessary to control emissions, if any visible emissions are identified.

Regulation 8, Rule 34

The Redwood Landfill's Active Landfill with Gas Collection System (S-5) is expected to comply with Regulation 8 Rule 34 Section 301 by:

- (a) continuously operating the gas collection system (90 vertical wells and 7 horizontal collectors) and flares,
- (b) having no leaks (exceeding 1000 ppmv) from the gas collection system, and
- (c) processing all collected gases in flares achieving at least 98% destruction efficiency or emitting no more than 30 ppmv of NMOC (as methane) at 3% O₂.

The S-5 Active Landfill is also subject to 8-34-303, which limits leaks on the surface of the landfill to less than 500 ppmv as methane. Redwood Landfill has generally been operating in compliance with this standard since it became effective in 2002. The District has not documented any violations of this standard in over 3 years. The gas collection system will be expanded as needed to prevent surface emission leaks that may exceed this standard.

The gas collection system components at this site are subject to the Regulation 8-34-305 Wellhead Standards, except where alternative wellhead standards have been approved in the permit conditions. The gas collection system components are expected to continue to comply with these wellhead standards.

Regulation 8, Rule 34, Sections 405, 408, 411, 412, 413, 414, 415, 416, 501, 503, 504, 505, 506, 507, 508, 509, and 510 are on-going administrative and monitoring requirements. Redwood Landfill is expected to comply with these repairing, monitoring, testing, record keeping, and reporting requirements whenever necessary.

Regulation 9, Rule 2

Regulation 9, Rule 2, Section 301 limits the off-site ground level concentration of hydrogen sulfide (H₂S) that may occur due to any facility's emissions. The off-site ground level concentration limits are: 0.03 ppmv of H₂S averaged over any 60-minute period and 0.06 ppmv of H₂S averaged over any 3-minute period.

The proposed maximum permitted fugitive emission rates from the landfill are 2.45 pounds of H₂S during any hour and 20,315 pounds of H₂S per year. Using the air dispersion modeling analysis conducted for the HRSA and the maximum hourly H₂S emission rate above, the maximum off-site H₂S concentration was determined to be 64.19205 µg/m³ averaged over a 1-hour period. At standard conditions, this concentration is equal to 0.045 ppmv of H₂S averaged over a 60-minute period.

$$(64.19205 \mu\text{g H}_2\text{S/m}^3 \text{ air}) * (1\text{E-}6 \text{ g}/\mu\text{g}) / (34.076 \text{ g/mol}) * (24.055 \text{ L/mol}) * (0.001 \text{ m}^3/\text{L}) \\ = 4.53\text{E-}8 \text{ m}^3 \text{ H}_2\text{S/m}^3 \text{ air} = 0.045 \text{ ppmv of H}_2\text{S, maximum ground level concentration}$$

Short term concentrations may be estimated from the 1-hour concentration using a power law equation:

$Y_{3\text{-min}} = Y_{60\text{-min}} * (60/3)^p$, where p ranges from 0.167-0.5, depending on the stability class.¹

The maximum H₂S concentration for the Redwood Landfill occurred at hour 99052624 of the SCREEN3 met data set, which has Stability Class A. For Stability Classes A and B, the exponent (p) is 0.5. The short term hydrogen sulfide concentration is estimated to be:

$(0.0453) * (60/3)^{0.5} = 0.203$ ppmv of H₂S averaged over any 3-minute period.

The above analysis demonstrates that the proposed H₂S emission limits for the Redwood Landfill could potentially result in fence-line hydrogen sulfide concentrations that exceed the Regulation 9-2-301 H₂S ground level concentration limits under certain meteorological conditions. However, these projected fence-line concentrations were determined using very conservative emission calculation and air dispersion assumptions. Based on a more realistic gas capture efficiency of 85% instead of 75%, fugitive H₂S emissions are estimated to be no more than 1.47 pounds/hour and the fence-line concentrations are estimated to be 0.027 ppmv of H₂S averaged over 60-minutes and 0.12 ppmv of H₂S averaged over 3 minutes. For meteorological conditions with Stability Classes D, E, or F, the 3-minute average H₂S concentration would be less than the 0.06 ppmv H₂S limit. When more realistic emissions assumptions and meteorological conditions are taken into account, the air dispersion modeling analysis indicates that the proposed landfill would comply with the Regulation 9, Rule 2 limits. The District concludes that while it is possible that H₂S emissions from the proposed landfill could exceed the Regulation 9, Rule 2 H₂S concentration limits, it is not likely that off-site H₂S concentrations will exceed the District limits given the conservative nature of this analysis. The District also notes that the proposed landfill limits will result in a maximum hourly H₂S emission rate that is 20% lower than the maximum hourly H₂S emission rate allowed by the current permit limits.

Since the modeling analysis demonstrates that it may be possible under certain circumstances for the Redwood Landfill to have fence-line H₂S concentrations in excess of the Regulation 9, Rule 2 limits, the District has determined that additional H₂S monitoring is necessary to verify that this site is indeed complying with Regulation 9, Rule 2. However, a permanent ground level area monitoring station is not a justifiable option for this site due to the high capital and operating costs of such systems, the limited availability of power at this site, and the low probability of non-compliance with the Regulation 9, Rule 2 limits. The District and Redwood Landfill are discussing various alternative H₂S monitoring protocols. To address this monitoring issue, the District will add a permit condition requiring the submission of an H₂S monitoring plan within 3 months of approval of the permit condition changes for this application and initiation of H₂S monitoring within 3 months of District approval of the monitoring plan.

¹ Dispersion Modeling of Odorous Emissions, Wang, J. and Skipka, K., For Presentation at A&WMA 86th Annual Meeting & Exhibition, June 1993, Document # 93-RA-114A.05, pages 5-6.
Stability Class: A: p=0.5, B: p=0.5, C: p=0.333, D: p=0.2, E: p=0.167, and F: p=0.167.

California Requirements:

The California Air Resource Board (CARB) has adopted a rule, pursuant to the AB 32 California Global Warming Solutions Act, that will control methane emissions from municipal solid waste landfills (California Code of Regulations, Title 17, § 95460-95476). This rule is similar to BAAQMD's Regulation, Rule 34 and the federal NSPS requirements for landfills, but it applies to smaller landfill sites, it has several additional limits (in particular, a new integrated surface methane emission limit for the landfill and a new methane destruction efficiency limit for the control devices), and it includes number of more stringent monitoring requirements. Redwood Landfill is subject to this CARB rule and will be required to collect and control landfill gas in accordance with this rule's emission control, monitoring, and reporting requirements (§95464-95476), because this landfill's current landfill gas heat input capacity is greater than 3.0 MM BTU/hour, see §95463(b)(2).

Redwood Landfill will be required to meet the following surface methane emission standards pursuant to §95465(a)(1-2): no location on the landfill surface may exceed 500 ppmv of methane (the "instantaneous" surface methane limit), and no landfill surface grid may exceed an average of 25 ppmv of methane (the "integrated" surface methane limit). In accordance with CARB's December 2010 Regulatory Advisory for this rule, enforcement of these instantaneous and integrated surface methane limits should not begin until July 1, 2011. Design plans are required if a site needs to modify their gas collection system in order to meet the surface methane limits and should be submitted to CARB by June 17, 2011. Redwood Landfill's recent quarterly surface monitoring sweeps demonstrate that this landfill has no instantaneous surface methane emissions greater than 500 ppmv. Redwood Landfill has not initiated integrated surface leak testing at this site and has not yet determined if gas collection system modifications will be required to meet this integrated surface methane standard.

Redwood Landfill's flares will be required to achieve a methane destruction efficiency of 99% by weight pursuant to §95464(b)(2)(A)(1) upon commencement of the first compliance test after June 17, 2011. Recent source test results indicated that the flares are currently satisfying this minimum destruction efficiency requirement with a high compliance margin (A-51 and A-60 each achieved 99.9% methane destruction or higher).

Federal Requirements:

The S-5 Redwood Landfill is subject to the NSPS for MSW Landfills (40 CFR, Part 60, Subpart WWW), because the design capacity for the landfill was modified in 1995 and is being modified again with this application. The Subpart WWW collection and control standards for this site have been in effect since December 10, 1998. Recent source testing confirms that the flares are complying with 40 CFR 60.752(b)(2)(iii)(B) by emitting no more than 20 ppmv of NMOC (as hexane) at 3% O₂. Redwood's quarterly monitoring has demonstrated compliance with the 40 CFR 60.753(d) surface leak limit of 500 ppmv as methane, and Redwood has been expanding the collection system as needed to maintain compliance with this limit. Redwood Landfill is complying with the monthly wellhead and cover monitoring requirements (40 CFR 60.756(a) and 40 CFR 60.755(c)(5)) and quarterly surface monitoring requirements (40 CFR 60.755(c)(1-4) and (d)) of this NSPS. Redwood Landfill has submitted the required Amended Design Capacity and Amended Collection and Control System Design Plan Reports required by 40 CFR 60.757(a)(3) and (c).

In accordance with 40 CFR Part 60.759(c), the gas mover equipment for each landfill gas control system should be designed to handle the maximum gas generation flow rate over the period of intended use (up to 15 years). Currently, the gas control system is permitted to accept up to 4200 scfm of landfill gas. The landfill gas generation rate will not exceed 4200 scfm of landfill gas until at least the year 2019.

Thus, the currently permitted gas collection and control system is adequate for at least 8 more years. In 15 years (2026), the gas generation rate for Redwood Landfill is projected to be 4787 scfm of landfill gas. Although the currently permitted landfill gas throughput rate to the flares is limited to 4200 scfm of gas and is not sufficient for the next 9-15 years, the flares have a combined total control capacity of up to 6000 scfm. Thus the flares have sufficient control capacity but inadequate permit limits. This discrepancy can be addressed by increasing the permitted landfill gas flow rate to the flares. Redwood Landfill is planning to submit an application for energy recovery equipment at this site in 2011. This additional energy recovery equipment could also supply the additional control capacity needed for the 2020 and beyond time frame. During this future application, the District will thoroughly evaluate the adequacy of the proposed control system with respect to the Part 60.759(c) requirement. The District will ensure that the combined control system (energy recovery devices and flares) have permit limits that will allow full control of the maximum projected landfill gas generation rate for the site. The District will also ensure that the site has adequate flare permit limits to allow full back-up control by the flares alone in the event the energy recovery devices cannot operate.

The S-5 Redwood Landfill is also subject to the NESHAPs for MSW Landfills (40 CFR, Part 63, Subpart AAAA). In accordance with NESHAP requirements, Redwood Landfill has prepared a Start-up, Shut-down, and Malfunction Plan and is submitting the required reports on a semi-annual basis.

D. PERMIT CONDITIONS

The S-5 Redwood Landfill is subject to Condition # 19867. These conditions will be revised as indicated below in order to allow operational changes at the landfill that are consistent with the December 18, 2008 Solid Waste Facility Permit and that are necessary to assure compliance with all applicable District, California, and federal air regulations.

Condition # 19867

FOR: S-5 REDWOOD LANDFILL WITH GAS COLLECTION SYSTEM; A-18 WATER SPRAYS; A-51 LANDFILL GAS FLARE; AND A-60 LANDFILL GAS FLARE

1. The maximum design capacity of the landfill (total volume of all wastes and cover materials placed in the landfill, excluding final cover) shall not exceed ~~19.1~~25.0 million cubic yards, unless the Permit Holder can demonstrate that an increase of this design capacity limit will not result in any increases in the maximum permitted emission rates for the S-5 Redwood Landfill, A-51 Landfill Gas Flare, and A-60 Landfill Gas Flare, which are ~~described in~~identified in the Engineering Evaluations for Applications #19098 and #20607. (Basis: Regulation 2-1-301)
2. The total cumulative amount of all decomposable materials placed in the landfill (total weight of all decomposable wastes and all decomposable cover materials placed in the landfill, excluding final cover) shall not exceed 541,140 tons per calendar year and shall not exceed a cumulative amount of 17.1 ~~23.185~~ million tons, unless the Permit Holder can demonstrate that ~~an~~increases of ~~this~~these limits will not result in ~~an~~increases in waste decomposition related emissions. The maximum permitted fugitive precursor organic compound (POC) emission rate is 20.397 ~~26.380~~ tons/year of POC from the S-5 Redwood Landfill. The maximum permitted residual POC emission rate is 7.716 tons/year from the flares (A-51 and A-60). Any changes in waste acceptance rates, types

of waste accepted, or other practices that will result in an increase in the maximum permitted POC, NPOC, or toxic air contaminant emission rates for S-5 or A-51 or A-60, which are ~~described-identified~~ in the Engineering Evaluations for Applications #19098 and #20607, shall be considered a modification of S-5, A-51, or A-60 pursuant to Regulation 2-1-234. (Basis: Regulations 2-1-301 and 2-5-302, Cumulative Increase, and Offsets)

3. Total particulate emissions from the S-5 Redwood Landfill and the associated waste and cover material delivery, placement, and compaction operations shall not exceed 992.5 pounds of PM10 per day and shall not exceed 154.25 tons of PM10 per year. Compliance with these emission limits shall be demonstrated by meeting the requirements of Parts 3-11. The total amount of all ~~waste~~ materials ~~(including sewage sludge)~~ accepted at the landfill (total waste for disposal, total materials for composting, total materials for recycling, and total decomposable cover materials, but excluding non-decomposable cover materials and construction materials, which are also excluded from the equivalent limit in the SWFP) shall not exceed ~~2300~~2310 tons per day (except during temporary emergency situations approved by the Local Enforcement Agency) and shall not exceed ~~450,000~~ 718,410 tons per calendar year. The total amount of sewage sludge accepted at the landfill shall not exceed ~~1000~~310 wet tons per day (except during temporary emergency situations approved by the Local Enforcement Agency) and shall not exceed ~~200,750~~96,410 wet tons per calendar year. (Basis: Regulation 2-1-301)

4. The total amount of all cover materials (excluding final cover) placed in the landfill shall not exceed 1160 tons per day, with no more than 350 tons per day to consist of decomposable cover materials, and shall not exceed 360,760 tons per calendar year, with no more than 105,500–108,850 tons per calendar year from decomposable cover materials. (Basis: Regulation 2-1-301)

5. In order to demonstrate compliance with Parts 1-4 above, the Permit Holder shall maintain the following records in an APCO approved log book:
 - a. Record on a daily basis the type and amount of all materials received at the landfill.
 - b. For each type of material received at the landfill, clearly identify how the material will be used at this site (i.e. disposed of in the landfill directly, used as daily cover material, used as intermediate cover material, used in composting operations, sent to yard and green waste recycling operations, sent to other recycling operations, used for on-site road construction or surfacing, used for other construction purposes, sent to on-site stockpiles for later use, etc.). For material types that may be used for multiple purposes at this site, identify the amount of material used for each purpose.
 - c. For each type of material received at the landfill, clearly identify whether the material is decomposable or inert. Inert materials are defined by Regulation 8-34-203. For the purposes of this condition, soils containing more than 50 ppm by weight of volatile organic compounds (VOC) or "contaminated soil" as defined in Regulation 8-40-205 are decomposable materials. Soils containing 50 ppm by weight VOC or less are inert materials.
 - d. If cover materials are taken from on-site stockpiles, record on a daily basis the amount of material removed from the stockpiles and used as cover material (for each type of material).

- e. Summarize on a monthly basis: the total amount of all wastes accepted, the total amount of sewage sludge accepted, the total amount of accepted materials that were directly used as cover material, the amount of cover materials that were removed from on-site stockpiles, the total amount of materials used for cover, the total amount of decomposable cover materials, the total amount of decomposable wastes placed in the landfill, the total amount of non-decomposable wastes disposed of in the landfill, the total amount of decomposable materials placed in the landfill, and the total amount of all materials placed in the landfill.

The Permit Holder shall begin maintaining the above records by no later than December 1, 2002. These records shall be kept at site for at least 5 years from the date the data is entered and shall be made available to the District staff for inspection. (Basis: Regulations 2-1-301, 8-34-501, and 40 CFR 60.758)

6. The mean vehicle fleet weight for all off-site vehicles (~~excluding vehicles that are not transporting waste, recyclables, or construction related materials such as employee, contractor, or visitor vehicles~~) traveling on paved roads shall not exceed 15.415.31 tons. The mean vehicle fleet weight for all off-site vehicles traveling on gravel or dirt roads shall not exceed 16.63 tons. (Basis: Regulation 2-1-301)
7. The mean vehicle fleet weight for all on-site landfilling and construction related vehicles (bulldozers, scrapers, back hoes, compactors, road graders, loaders, dump trucks, soil trucks, water trucks, fuel trucks, or maintenance vehicles, etc.) shall not exceed 28.428.37 tons. (Basis: Regulation 2-1-301)
8. The total vehicle miles traveled (VMT) by the off-site vehicle fleet shall not exceed the following limits:
- 875-280 VMT per day on gravel roads
 - 438-639 VMT per day on dirt roads
 - 50-662 VMT per day on paved roads
 - 273,000-87,080 VMT per calendar year on gravel roads
 - 136,500-198,650 VMT per calendar year on dirt roads
 - 15,600-205,880 VMT per calendar year on paved roads
- (Basis: Regulation 2-1-301)
9. The total vehicle miles traveled (VMT) by the on-site vehicle fleet shall not exceed the following limits:
- 62-61 VMT per day (~~essentially~~ all travel is assumed to occur on dirt roads)
 - 19,145-19,080 VMT per calendar year (~~essentially~~ all travel is assumed to occur on dirt roads)
- (Basis: Regulation 2-1-301)
10. In order to demonstrate compliance with Parts 6-9, the Permit Holder shall maintain the following records in an APCO approved log book:
- For each type of vehicle fleet (off-site vehicles and on-site construction equipment) maintain a list of all the types of vehicles in the fleet. For each vehicle type, record the empty vehicle weight, maximum load weight, and average vehicle weight (average of full and empty weights). This list shall be reviewed annually and updated whenever necessary to ensure that the list

- accurately reflects the types of vehicles that may be present at the landfill during any calendar year.
- b. For the off-site vehicle fleet, record on a daily basis and summarize on a monthly basis: the number of vehicle trips (round trips to/from the landfill) for each type of vehicle in the fleet.
 - c. For the on-site vehicle fleet, record on a daily basis and summarize on a monthly basis: the number of vehicle trips for each type of vehicle in the fleet. For construction vehicles like bulldozers or compactors that have no set travel route but instead make many small trips across the active face, the number of vehicle trips can be estimated from operating times and procedures or odometer readings and the maximum round trip travel distance (see subpart f. below). If no data is available for estimating vehicle trips, the vehicle trips shall be recorded as 1 vehicle trip per day per vehicle used during that day.
 - d. At least once per calendar year, the Permit Holder shall calculate and record the mean vehicle fleet weight for each type of vehicle fleet. For each vehicle fleet, the mean vehicle fleet weight shall be calculated using the vehicle trip data for: (i) the day with the highest number of vehicle trips during the previous calendar year; and (ii) the day with the highest total amount of waste accepted during the previous calendar year. Mean vehicle fleet weights shall also be recalculated whenever new vehicle types are added to a vehicle fleet. The mean vehicle fleet weight (MVFW) is a weighted average calculated by multiplying the average vehicle weight for each vehicle type (AVWi) times the number of vehicle trips per day for that vehicle type (DVTi), summing AVWi*DVTi for all vehicle types, and dividing the resulting sum by the total number of vehicle trips for that day (DVT).
 - e. For the off-site vehicle fleet, the Permit Holder shall determine (using odometer measurements, maps, or other appropriate means) the maximum round trip distance traveled on-site by each vehicle type in the fleet on gravel roads, dirt roads, and paved roads (VMT per round trip per vehicle type per road type). Alternatively, the Permit Holder may determine a maximum round trip distance per road type for one or more groups of vehicle types, if all vehicle types in the group travel essentially the same roads and distances. This distance shall be determined at least once per calendar year and whenever significant changes to on-site travel routes have occurred.
 - f. For the on-site vehicle fleet, the Permit Holder shall determine (using odometer measurements, maps, or other appropriate means) the maximum round trip distance traveled by each vehicle type in the fleet on dirt roads (VMT per round trip per vehicle type). Alternatively, the Permit Holder may determine a maximum round trip distance per road type for one or more groups of vehicle types, if all vehicle types in the group travel essentially the same roads and distances. This distance shall be determined at least once per calendar year and whenever significant changes to travel routes have occurred.
 - g. For each vehicle fleet type, the Permit Holder shall calculate and record the total vehicle miles traveled (VMT) per day on each type of road (dirt, gravel, and paved for off-site vehicles and dirt only for on-site vehicles) using the data recorded pursuant to subparts b., c., d., and f. The daily VMT per road type shall be summarized for each calendar month and for each calendar year.

The Permit Holder shall begin maintaining the above records by no later than December 1, 2002. These records shall be kept at site for at least 5 years from the date the data is

entered and shall be made available to the District staff for inspection. (Basis: Regulations 2-1-301, 8-34-501, and 40 CFR 60.758)

11. Particulate emissions from any operation of the landfill shall be abated by A-18 Water Sprays in such a manner that visible dust emissions 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. The Permit Holder shall meet the following minimum watering requirements:
- a. On any dry operating days, water shall be applied to unpaved roads and parking areas at a rate of 0.5 gallons per square yard or more.
 - b. On any dry operating days, water shall be applied to unpaved roads at a frequency of at least once every three hours of operation.
 - c. On any dry operating days, water shall be applied to unpaved parking areas or infrequently traveled unpaved roads at least twice per day or at least once per every 150 vehicle trips (whichever is more frequent).
 - d. On any dry operating days, water shall be applied to the active landfill face, the active area of stockpiles, composting operations, or other dust prone areas at least twice per day.
 - e. On any operating day when rain fall is not sufficient to prevent visible emissions, additional water shall be applied to any road, parking area, active face, stockpile, or dusty area as frequently as necessary to prevent visible emissions that persist for longer than 3 minutes in an hour.

In order to demonstrate compliance with this requirement, the Permit Holder shall maintain the following information in an APCO approved log book:

- f. Accurate maps of the facility showing the locations of all roads and parking areas at the facility (dirt, gravel, and paved roads shall be clearly distinguished), stockpiles, and active filling areas. The current travel routes for both off-site and on-site vehicle traffic and the water spray trucks shall be clearly indicated on the maps.
- g. Record the frequency of water spray applications (on gravel roads, dirt roads, stockpiles, the active face, and any other dust prone areas) for each operating day.

(Basis: Regulations 1-301, 2-1-301, and 6-301)

- *12. If the plant receives two or more violation notices from the District for "Public Nuisance" in any consecutive 12 month period, the Permit Holder shall implement the following control measures, as applicable, or any other measures that the District deems necessary and/or appropriate, within the time period specified by the District. If requested by the District, the Permit Holder shall submit to the District a permit application to modify the Permit to Operate and/or these permit conditions, within 30 days of notification. (Basis: Regulation 1-301)

- a. Pave main haul roads and parking areas associated with the nuisance operation such as roads for landfilling, composting, recycling, or sludge handling operations.
- b. Add gravel or other aggregate based surfacing to dirt roads and parking areas that are associated with the nuisance operation.
- c. Use chemical suppressants on unpaved roads and unpaved parking areas that are associated with the nuisance operation.

- d. Increase the frequency of water application on unpaved roads, parking areas, the active face of the landfill, stockpiles, or any other dust prone areas that are associated with the nuisance operation.
 - e. Use frequent sweeping and/or water flushing, during the dry season, on paved areas that are associated with the nuisance operation.
- *13. The Permit Holder may use non-hazardous contaminated materials containing no more than 50 ppm by weight of Volatile Organic Compounds (VOC) as daily or interim cover material, provided that these materials are properly handled and disposed of in accordance with this part and any other applicable requirements.
- a. Any metal laden materials (materials that have been contaminated with arsenic, asbestos, beryllium, cadmium, hexavalent chromium, nickel, copper, lead, mercury, selenium, or zinc) shall be properly handled at all times and shall be abated by appropriate dust mitigation measures including: the use of covers during on-site transport, the use of frequent water sprays during active handling (loading, unloading, spreading, etc.) of these materials, and the use of water sprays, covers, or chemical dust suppressants on inactive storage areas.
 - b. If metal laden materials are used as interim cover, the metal laden material shall be covered with a non-contaminated material such as clean soil or compacted green waste prior to subjecting the area to frequent vehicle or construction equipment traffic.
 - c. Metal laden materials shall not be used in the construction of unpaved roadways or parking lots.
- (Basis: ~~Toxic Risk Management Policy Regulation 2-5-302~~)
14. This part applies to the acceptance, handling, storage, and on-site reuse of VOC-laden soil. VOC-laden soil is any soil that contains volatile organic compounds, as defined in Regulation 8-40-213, other than contaminated soil. As defined in Regulation 8-40-205, contaminated soil contains more than 50 ppmw of VOC or has a surface concentration greater than 50 ppmv of VOC as C1, and contaminated soil is subject to Part 15 below instead of this part. Materials containing only non-volatile hydrocarbons and materials meeting the requirements of Regulation 8-40-113 are not subject to this part. For each lot of VOC-laden soil accepted at this site, the Permit Holder shall comply with the daily limits identified in either subpart a or subpart b below and shall comply with the annual emissions limit identified in subpart c below. To demonstrate compliance with the daily and annual emission limits, the Permit Holder shall comply with the monitoring procedures listed in subpart a(i-v). If the Permit Holder opts to comply with the daily concentration limit in subpart b rather than the daily emission limit in subpart a, then the Permit Holder shall also comply with the soil screening procedures listed in subpart b(i-v).
- a. Unless the Permit Holder demonstrates compliance with Regulation 8-2-301 in accordance with subpart b below, the Permit Holder shall limit the quantity of VOC laden soil handled per day such that no more than 15 pounds of total carbon could be emitted to the atmosphere per day. In order to demonstrate compliance with this subpart and the annual emissions limit specified in subpart c, the Permit Holder shall maintain the following records in a District approved log for all VOC-laden soil accepted at the landfill.

-
- i. Record on a daily basis the amount of VOC laden soil accepted for each truckload or each soil lot, as appropriate. This amount (in units of pounds per day) is Q in the equation in subpart a(iii) below.
 - ii. Record on a daily basis the VOC content for each truckload or each soil lot, as appropriate. This VOC Content (C in the equation below) should be expressed as parts per million by weight as total carbon (or C1).
 - iii. Calculate and record on a daily basis the VOC Emission Rate (E) using the following equation: $E = Q * C / 1E6$
This equation may be applied to each truckload or to each soil lot received per day depending on the amount of soil that is represented by the VOC Content data. If the equation is applied to multiple loads per day, the VOC Emission Rate shall be totaled for all loads received each day.
 - iv. Summarize all daily emission rates on a monthly and calendar year basis.
 - v. All records shall be maintained on site or shall be made readily available to District staff upon request for at least 5 years from the date of entry.
 - b. Unless the Permit Holder demonstrates compliance with Regulation 8-2-301 in accordance with subpart a above, the Permit Holder shall screen each lot of VOC laden soil accepted per day for VOC surface emissions to show that each lot of VOC laden soil is not contaminated soil.
 - i. The Permit Holder shall use the testing procedures outlined in Regulation 8-40-604.
 - ii. The screening test shall be representative of the entire lot of VOC-laden soil. The soil surface shall be disturbed prior to screening to ensure that the screening is representative of the entire load.
 - iii. The Permit Holder shall maintain records of all testing conducted to satisfy this subpart and shall record the amount of VOC-laden soil accepted and the highest surface concentration measured pursuant to this subpart. These records shall be maintained for each truckload or each soil lot accepted, as appropriate, provided that the records are made or summarized on at least a daily basis.
 - iv. Summarize the daily waste acceptance rates and the weighted average of the surface concentration records on a monthly basis and for each calendar year.
 - v. All records shall be maintained on site or shall be made readily available to District staff upon request for at least 5 years from the date of entry.
 - c. The Permit Holder shall limit the quantity of VOC laden soil handled per year such that annual VOC emissions due to on-site handling, storage, disposal, or reuse of VOC laden soil shall not exceed 10,530 pounds per calendar year. The Permit Hold shall comply with the monitoring procedures in subpart a(i-v) above to demonstrate compliance with this annual emissions limit.

(Basis: Offsets and Regulation 8-2-301)

15. Handling Procedures for Soil Containing Volatile Organic Compounds:

- a. The procedures listed below in subparts b-l do not apply if the following criteria are satisfied. However, the record keeping requirements in subpart m below are applicable.
 - i. The Permit Holder has appropriate documentation demonstrating that either the organic content of the soil or the organic concentration above

- the soil is below the "contaminated" level (as defined in Regulation 8, Rule 40, Sections 205, 207, and 211). The handling of soil containing VOCs in concentrations below the "contaminated" level is subject to Part 14 above.
- ii. The Permit Holder has no documentation to prove that soil is not contaminated, but source of the soil is known and there is no reason to suspect that the soil might contain organic compounds.
- b. The Permit Holder shall provide notification to the Compliance and Enforcement Division of the Permit Holder's intention to accept contaminated soil at the facility at least 24 hours in advance of receiving the contaminated soil. The Permit Holder shall provide an estimate of the amount of contaminated soil to be received, the degree of contamination (range and average VOC Content), and the type or source of contamination.
 - c. Any soil received at the facility that is known or suspected to contain volatile organic compounds (VOCs) shall be handled as if the soil were contaminated, unless the Permit Holder receives test results proving that the soil is not contaminated. To prove that the soil is not contaminated, the Permit Holder shall collect soil samples in accordance with Regulation 8-40-601 within 24 hours of receipt of the soil by the facility. The organic content of the collected soil samples shall be determined in accordance with Regulation 8-40-602.
 - i. If these test results indicate that the soil is still contaminated or if the soil was not sampled within 24 hours of receipt by the facility, the Permit Holder must continue to handle the soil in accordance with the procedures subparts d-1 below, until the soil has completed treatment or has been placed in a final disposal location and adequately covered. Storing soil in a temporary stockpile or pit is not considered treatment. Co-mingling, blending, or mixing of soil lots is not considered treatment.
 - ii. If these test results indicate that the soil - as received at the facility - has an organic content of 50 ppmw or less, then the soil may be considered to be not contaminated and need not be handled in accordance with the procedures listed in subparts d-1 below, but shall be handled in accordance with Part 14 above.
 - d. Any contaminated soil received at the facility shall be clearly identified as contaminated soil, shall be handled in accordance with subparts e-1 below, and shall be segregated from non-contaminated soil. Contaminated soil lots may not be co-mingled, blended, or otherwise mixed with non-contaminated soil lots prior to treatment, reuse, or disposal. Mixing soil lots in an attempt to reduce the overall concentration of the contaminated soil or to circumvent any requirements or limits is strictly prohibited.
 - e. On-site handling of contaminated soil shall be limited to no more than 2 on-site transfers per soil lot. For instance, unloading soil from off-site transport vehicles into a temporary storage pile is considered one transfer. Moving soil from a temporary storage to a staging area is considered one transfer. Moving soil from a temporary storage pile to a final disposal site is one transfer. Moving soil from a staging area to a final disposal site is one transfer. Therefore, unloading soil from off-site transport into a temporary storage pile and then moving the soil from that temporary storage pile to the final disposal site is allowed. Unloading soil from off-site transport into a staging area and then moving the soil from that staging area to the final disposal site is allowed. However, unloading soil from

- off-site transport to a temporary storage pile, moving this soil to a staging area, and then moving the soil again to a final disposal site is 3 on-site transfers and is not allowed.
- f. All contaminated soil shall be either treated, deposited in a final disposal site, or transported off-site for treatment, within 90 days of receipt at the facility.
 - g. The total amount of contaminated soil disposed of at this site shall not exceed 6240 tons during any calendar year. The Permit Holder shall apply for a change of conditions before accepting any soil containing more than 100 ppm by weight of VOC. (Basis: Offsets)
 - h. All active storage piles shall meet the requirements of Regulation 8-40-304 by using water sprays, vapor suppressants or approved coverings to minimize emissions. The exposed surface area of any active storage pile (including the active face at a landfill) shall be limited to 6000 ft². The types of storage piles that may become subject to these provisions include (but are not limited to) truck unloading areas, staging areas, temporary stockpiles, soil on conveyors, bulldozers or trucks, the active face of a landfill, or other permanent storage pile at the final disposal location.
 - i. All inactive storage piles shall meet the requirements of Regulation 8-40-305 including the requirement to cover contaminated soil during periods of inactivity longer than one hour. The types of storage piles that may become subject to these provisions include (but are not limited to) soil on trucks or other on-site equipment, staging areas, temporary stockpiles, and the permanent storage pile at the final disposal location. District approved coverings for inactive storage piles include continuous heavy-duty plastic sheeting (in good condition, joined at the seams, and securely anchored) or encapsulating vapor suppressants (with re-treatment as necessary to prevent emissions).
 - j. The Permit Holder must:
 - i. Keep contaminated soil covered with continuous heavy-duty plastic sheeting (in good condition, joined at the seams, and securely anchored) whenever soil is to be stored in temporary stockpiles or during on-site transport in trucks. Soil in trucks shall not be left uncovered for more than 1 hour.
 - ii. Establish a tipping area for contaminated soils near the active face that is isolated from the tipping area for other wastes.
 - iii. Spray contaminated soil with water or vapor suppressant immediately after dumping the soil from a truck at the tipping area.
 - iv. Ensure that all contaminated soil is transferred from the tipping area to the active face immediately after spraying with water or vapor suppressant.
 - v. Ensure that contaminated soil in the tipping area is not disturbed by subsequent trucks. Trucks shall not drive over contaminated soil in the tipping area or track contaminated soil out of the tipping area on their wheels.
 - vi. Spray contaminated soil on the active face with water or vapor suppressant (to keep the soil visibly moist) until the soil can be covered with an approved covering.
 - vii. Limit the area of exposed soil on the active face to no more than 6000 ft².

- viii. Ensure that contaminated soil spread on the active face is completely covered on all sides with one of the following approved coverings: at least 6 inches of clean compacted soil, at least 12 inches of compacted garbage, or at least 12 inches of compacted green waste.
- ix. Ensure that covering of soil on the active face is completed within one hour of the time that the soil was first dumped from a truck at the tipping area.
- k. Contaminated soil shall not be used as daily, intermediate, or final cover material for landfill waste operations unless the requirements of Regulation 8, Rule 40, Sections 116 or 117 have been satisfied.
- l. Contaminated soil is considered to be a decomposable solid waste pursuant to Regulation 8, Rule 34. All contaminated soil disposed of at a site shall be included in any calculations of the amount of decomposable waste in place for annual reporting requirements or for purposes of Regulation 8-34-111 or 8-34-304.
- m. The Permit Holder shall keep the following records for each lot of soil received, in order to demonstrate on-going compliance with the applicable provisions of Regulation 8, Rule 40 and this part.
 - i. For all soil received by the facility (including soil with no known contamination), record the arrival date at the facility, the soil lot number, the amount of soil in the lot, the organic content or organic concentration of the lot (if known), the type of contamination (if any), and keep copies of any test data or other information that documents whether the soil is contaminated (as defined in 8-40-205) or not contaminated, with what, and by how much.
 - ii. If the soil is tested for organic content after receipt by the facility, a report with the sampling date, test results, and the date results were received.
 - iii. For all on-site handling of contaminated soil, use a checklist or other approved method to demonstrate that appropriate procedures were followed during all on-site handling activities. One checklist shall be completed for each day and for each soil lot (if multiple lots are handled per day).
 - iv. For soil aerated in accordance with 8-40-116 or 117 record the soil lot number, the amount of soil in the lot, the organic content, the final placement date, the final placement location, and describe how the soil was handled or used on-site.
 - v. For final disposal at a landfill, record on a daily basis the soil lot number, the amount of soil placed in the landfill, the disposal date, and the disposal location.
 - vi. Summarize the total amount of contaminated soil disposed of at this site on a monthly and calendar year basis to demonstrate compliance with subpart g.

All records shall be retained for at least 5 years from the date of entry and shall be made available for District inspection upon request.

(Basis: Offsets and Regulation 8-40-301, 8-40-304 and 8-40-305)

- 16. During all times that the landfill gas collection system is operating, all collected landfill gas shall be vented to one of the following control system configurations: A-51 Landfill

Gas Flare operating alone, A-60 Landfill Gas Flare operating alone, or A-51 and A-60 operating concurrently. In order to assure compliance with this condition, A-51 and A-60 shall be equipped with local and remote alarms and auto restart capabilities. (Basis: 8-34-301.1, 8-34-301.3, and 40 CFR 60.752(b)(2)(iii))

17. The landfill gas collection system described in subpart a below shall be operated continuously as defined in Regulation 8-34-219. Wells, collectors, and adjustment valves shall not be shut off, disconnected, or removed from operation without written authorization from the District, unless the Permit Holder complies with all applicable requirements of Regulation 8, Rule 34, Sections 113, 116, 117, and 118. The Permit Holder shall apply for and receive an Authority to Construct before altering the landfill gas collection system described in subpart a below. Increasing or decreasing the number of wells or collectors, or significantly changing the length of collectors or the locations of wells or collectors are alterations that are subject to the Authority to Construct requirement. Adding or altering risers, laterals, or header pipes are not subject to this Authority to Construct requirement. The authorized number of landfill gas collection system components is the baseline count listed below plus any components added and minus any components decommissioned pursuant to Part 17b as evidenced by start-up/shut-down notification letters submitted to the District.

- a. The Permit Holder has been issued a Permit to Operate for the landfill gas collection system components listed below, which includes all start-up/shut-down notifications submitted through February 1, 2010. Well and collector locations, depths, and lengths are as described in detail in Permit Application #21623.

	Required Components
Total Number of Vertical Wells:	90
Total Number of Horizontal Collectors:	7

- b. The Permit Holder has been issued an Authority to Construct for the landfill gas collection system components listed below. Specific well and collector locations, depths, and lengths of associated piping are as described in detail in Permit Application #21623.

	Minimum	Maximum
Install New Vertical Wells:	0	36
Decommission Vertical Wells:	0	20
Install New Horizontal Collectors	0	10
Decommission Horizontal Collectors	0	5
Replace Vertical Wells *	0	15

* one-for-one well replacement at new optimal locations

Wells installed or shutdown pursuant to subpart b shall be added to or removed from subpart a in accordance with the procedures identified in Regulations 2-6-414 or 2-6-415. The Permit Holder shall maintain records of the decommissioning date for each well that is shut down and the initial operation date for each new well.

(Basis: Regulations 2-1-301, 8-34-301.1, 8-34-304, 8-34-305, and 2-6-413)

18. ~~If a gas characterization test indicates that this site's landfill gas contains organic compounds in excess of any of the concentrations listed in Parts 18a or 18b below, then the Permit Holder shall submit an application for a Change of Permit Conditions, within no later than 30 days from receipt of the test results. The concentrations of non-methane~~

organic compounds (NMOC), toxic air contaminants (TAC), and total reduced sulfur (TRS) compounds in landfill gas collected from the S-5 Redwood Landfill shall not exceed the limits listed below.

a. Total Non-Methane Organic Compounds: 360 ppmv
(calculated as hexane equivalent)
(Basis: Cumulative Increase and Offsets)

*b. For toxic air contaminants (TACs):

<u>Compound</u>	<u>Concentration</u>
Acrylonitrile	280 300 ppbv
Benzene	340 1,500 ppbv
<u>Benzyl Chloride</u>	500 ppbv
Carbon Tetrachloride	70 200 ppbv
<u>Chlorobenzene</u>	200 ppbv
<u>Chloroethane</u>	500 ppbv
Chloroform	70 200 ppbv
1,4 Dichlorobenzene	400 1,000 ppbv
<u>Ethylbenzene</u>	4,000 ppbv
1,1 Dichloroethane	150 ppbv
Ethylene Dibromide	70 200 ppbv
Ethylene Dichloride	70 200 ppbv
<u>Ethylidene Dichloride</u>	500 ppbv
<u>Hexane</u>	2,000 ppbv
<u>Isopropyl Alcohol</u>	10,000 ppbv
<u>Methyl Alcohol</u>	300,000 ppbv
<u>Methyl Ethyl Ketone</u>	15,000 ppbv
Methylene Chloride	320 1,000 ppbv
<u>Methyl tert-Butyl Ether</u>	500 ppbv
Perchloroethylene	450 1,000 ppbv
1,1,2,2 Tetrachloroethane	70 200 ppbv
<u>Styrene</u>	500 ppbv
<u>Toluene</u>	20,000 ppbv
<u>1,1,1 Trichloroethane</u>	200 ppbv
Trichloroethylene	250 500 ppbv
Vinyl Chloride	880 2,000 ppbv
<u>Vinylidene Chloride</u>	500 ppbv
<u>Xylenes</u>	20,000 ppbv

(Basis: ~~Toxic Risk Management Policy Regulation 2-5-302~~)

c. The concentration of total reduced sulfur compounds (TRS) in collected landfill gas shall not exceed ~~a peak of 600 ppmv (calculated as H2S) and shall not exceed~~ an annual average of 350 ppmv (calculated as H2S) and shall not exceed the following peak limits during any single test:

505 ppmv of TRS (calculated as H2S), during 2011-2014;

450 ppmv of TRS (calculated as H2S), during 2015-2018;

410 ppmv of TRS (calculated as H2S), during 2019-2022; and

370 ppmv of TRS (calculated as H2S), during 2023 and later.

— The peak and annual average TRS concentrations shall be measured and calculated in accordance with Parts 31a and 31b. (Basis: Cumulative Increase, RACT, AB-2588 Air Toxics Hot Spots Act, and Regulations 2-5-302.3, 9-1-302, and 9-2-301)

19. The A-51 and A-60 Landfill Gas Flares shall be fired on landfill gas. (Basis: RACT and Regulation 2-2-112)
20. The throughput of landfill gas (with an HHV of 500 BTU/scf) to the A-51 Landfill Gas Flare shall not exceed shall not exceed 4,320,000 scf during any one day. The throughput of landfill gas (with an HHV of 500 BTU/scf) to the A-60 Landfill Gas Flare shall not exceed 4,320,000 scf during any one day. The total throughput of landfill gas (with an HHV of 500 BTU/scf) to the A-51 and A-60 Flares combined shall not exceed 2,207,520,000 scf during any consecutive 12 month period. In order to demonstrate compliance with this condition, the A-51 and A-60 Flares shall each be equipped with one or more properly operating continuous gas flow meters. (Basis: Cumulative Increase, 40 CFR 60.756(b)(2)(i))
21. [deleted]
22. The temperature in the combustion zone of each flare shall be maintained at the minimum temperature listed below, averaged over any 3-hour period. In order to demonstrate compliance with this condition, A-51 and A-60 shall each be equipped with a continuous temperature monitor and recorder. The A-60 Flare shall be equipped with a continuous temperature monitor in each operating zone of the stack (Zone A and Zone B). The temperature recorder for A-60 shall continuously record either the Zone A or the Zone B temperature, compatible with the zone the flare is operating in. If a source test demonstrates compliance with all applicable requirements at a different temperature, the APCO may revise these temperature limits, in accordance with the procedures identified in Regulation 2-6-414 or 2-6-415, based on the following criteria. The minimum combustion zone temperature for the flare shall be equal to the average combustion zone temperature determined during the most recent complying source test minus 50 degrees F, provided that the minimum combustion zone temperature is not less than 1400 degrees F. (Basis: Regulations 2-5-302, 8-34-301.3 and 8-34-501.3, and 40 CFR 60.756(b)(1))
 - a. The minimum combustion zone temperature for A-51 is 1400 degrees F, averaged over any 3-hour period.
 - b. The minimum combustion zone temperature for each stack zone at A-60 (Zone A and Zone B) is 1400 degrees F, averaged over any 3-hour period.
23. The A-51 and A-60 Landfill Gas Flares shall comply with the NMOC emission limit in Regulation 8-34-301.3. (Basis: Cumulative Increase, 8-34-301.3, and 40 CFR 60.752(b)(2)(iii)(B))
- *24. [deleted]
25. Nitrogen oxides (NO_x) emissions from each enclosed flare (A-51 and A-60) shall not exceed 0.06 pounds of NO_x, calculated as NO₂, per million BTU. Compliance with this emission limit may be demonstrated by not exceeding the following flue gas concentration limit: 15 ppmv of NO_x, corrected to 15% oxygen, dry basis. (Basis: RACT and Offsets)

-
26. Carbon monoxide (CO) emissions from each enclosed flare (A-51 and A-60) shall not exceed 0.20 pounds of CO per million BTU. Compliance with these emission limits may be demonstrated by not exceeding the following flue gas concentration limits: 82 ppmv of CO, corrected to 15% oxygen, dry basis. (Basis: RACT and Cumulative Increase)
27. [deleted]
28. [deleted]
29. The Permit Holder shall maintain records of all planned and unanticipated shut downs of the A-51 and A-60 Flares and of any temperature excursions. The records shall include the date, time, duration, and reason for any shut down or excursion. Any unanticipated shut downs or temperature excursions shall be reported to the Enforcement Division immediately. All inspection and maintenance records, records of shut downs and excursions, gas flow records, temperature records, analytical results, source test results, and any other records required to demonstrate compliance with the above permit conditions, Regulation 8 Rule 34, or 40 CFR Part 60 Subpart WWW shall be retained on site for a minimum of five years and shall be made available to District staff upon request. (Basis: 2-6-501, 8-34-501, 40 CFR 60.758)
30. In order to demonstrate compliance with Parts 22, 23, 25, and 26 above, Regulation 8, Rule 34, Sections 301.3 and 412, and 40 CFR 60.8 and 60.752(b)(2)(iii)(B), the Permit Holder shall ensure that a District approved source test is conducted annually on the A-51 Landfill Gas Flare and the A-60 Landfill Gas Flare. Each annual source test shall determine the following:
- a. landfill gas flow rate to the flare (dry basis);
 - b. concentrations (dry basis) of carbon dioxide (CO₂), nitrogen (N₂), oxygen (O₂), total hydrocarbons (THC), methane (CH₄), and total non-methane organic compounds (NMOC) in the landfill gas;
 - c. stack gas flow rate from the flare (dry basis);
 - d. concentrations (dry basis) of NO_x, CO, NMOC, and O₂ in the flare stack gas;
 - e. NMOC destruction efficiency achieved by the flare;
 - f. NO_x and CO emission rates from the flare in units of pounds per MM BTU,
 - g. average combustion zone temperature in the flare during the test period.
- Annual source tests shall be conducted no later than 12 months after the previous test. The annual source test at A-60 may be conducted while it is operating in either zone, provided that each operating zone is tested at least once every five years. The Source Test Section of the District shall be contacted to obtain approval of the source test procedures at least 14 days in advance of each source test. The Source Test Section shall be notified of the scheduled test date at least 7 days in advance of each source test. The source test report shall be submitted to the Compliance and Enforcement Division and the Source Test Section within 60 days of the test date. (Basis: Cumulative Increase, RACT, Offsets, Regulations 2-5-501, 8-34-301.3, 8-34-412, 40 CFR 60.8 and 40 CFR 60.752(b)(2)(iii)(B))
31. Landfill Gas Testing:
- a. The Permit Holder shall conduct a characterization of the landfill gas on a quarterly basis with one test concurrent with one of the annual source tests required by Part 30 above. The landfill gas sample shall be drawn from the main

landfill gas header. Each quarterly landfill gas sample shall be analyzed for the sulfur compounds listed below. Once per year (concurrent with a Part 30 annual source test) the landfill gas shall be analyzed for all the organic and sulfur compounds listed below. All concentrations shall be reported on a dry basis. The laboratory analysis report for the annual organic and sulfur compound gas characterization test shall be included with the Part 30 source test report and shall be submitted to the Compliance and Enforcement Division and the Source Test Section within 60 days of the test date. (Basis: ~~Toxic Risk Management Policy and AB-2588 Air Toxics Hot Spots Act, Cumulative Increase, and Regulations 2-5-302, 8-34-412, and 9-1-302, and 9-2-301~~)

<u>Organic Compounds</u>	<u>Sulfur Compounds</u>
acrylonitrile	carbon disulfide
benzene	carbonyl sulfide
carbon tetrachloride	dimethyl sulfide
chlorobenzene	ethyl mercaptan
chlorodifluoromethane <u>benzyl chloride</u>	hydrogen sulfide
chloroethane	methyl mercaptan
chloroform	
1,1 dichloroethane	
1,1 dichlorethene	
1,2 dichlorethane	
1,4 dichlorobenzene	
dichlorodifluoromethane <u>methyl alcohol</u>	
dichlorofluoromethane <u>MTBE</u>	
ethylbenzene	
ethylene dibromide	
fluorotrichloromethane <u>styrene</u>	
hexane	
isopropyl alcohol	
methyl ethyl ketone	
methylene chloride	
perchloroethylene	
toluene	
1,1,1 trichloroethane	
1,1,2,2 tetrachloroethane	
trichloroethylene	
vinyl chloride	
xylenes	

- b. Once per week, beginning no later than March 31, 2005, the Permit Holder shall analyze the landfill gas for hydrogen sulfide (H₂S) concentration using a Draeger tube to further demonstrate compliance with Part 18c and Regulation 9-1-302. The landfill gas sample shall be drawn from the main landfill gas header. The Permit Holder shall follow the manufacturer's procedures for using the Draeger tube and interpreting the results. The total reduced sulfur (TRS) content of the landfill gas shall be calculated using the average ratio of TRS/H₂S for this

site according to the following equation: $TRS = 1.015 * H_2S$ measured by Draeger tube. The Permit Holder shall maintain records of all Draeger tube test dates and test results and shall summarize the average H_2S concentrations and the calculated TRS content of the landfill gas on a quarterly basis. Each Draeger tube test result (after conversion to TRS content) and the quarterly laboratory analysis in Part 31a shall be compared to the Peak TRS Limit in Part 18c. On a rolling quarterly basis, the Permit Holder shall determine the annual average TRS content for comparison to the Annual Average TRS Limit in Part 18c. (Basis: Cumulative Increase, RACT, and Regulations 9-1-302 and 9-2-301).

32. The annual report required by BAAQMD Regulation 8-34-411 shall be submitted in two semi-annual increments. The reporting period for the first increment of the Regulation 8-34-411 annual report that is submitted subsequent to the issuance of the MFR Permit for this site shall be from December 1, 2003 through April 30, 2004. This first increment report shall be submitted by May 31, 2004. The reporting periods and report submittal due dates for all subsequent increments of the Regulation 8-34-411 report shall be synchronized with the reporting periods and report submittal due dates for the semi-annual MFR Permit monitoring reports that are required by Section I.F of the MFR Permit for this site. A single report may be submitted to satisfy the requirements of Section I.F, Regulation 8-34-411, and 40 CFR Part 63.1980(a), provided that all items required by each applicable reporting requirement are included in the single report. (Basis: Regulation 8-34-411 and 40 CFR Part 63.1980(a))

33. Within 3 months of approval of the permit condition changes pursuant to Application # 20607, the Permit Holder shall submit a proposal for monitoring ground level hydrogen sulfide concentrations at or near the fence line or property boundary for this facility and a proposal that identifies all feasible hydrogen sulfide emission reduction measures that could be implemented at this site if necessary. The Permit Holder shall initiate hydrogen sulfide monitoring within 3 months of receiving District approval for the monitoring protocol. If a measured hydrogen sulfide concentration at the fence line or property boundary exceeds a concentration limit in Regulation 9-2-301 (0.03 ppmv averaged over 60 minutes or 0.06 ppmv averaged over 3 minutes), the Permit Holder shall notify the District of the excess and shall implement any hydrogen sulfide emission reduction measures required by the District at that time. Ground level hydrogen sulfide monitoring may be discontinued five years after this facility ceases waste disposal activities or when the TRS content in the collected landfill gas (measured pursuant to Part 31b) is less than 110 ppmv of TRS for at least 8 consecutive quarters, whichever occurs sooner. (Basis: Regulation 9-2-301)

E. RECOMMENDATION

Issue a Change of Conditions for the following source subject to the revised conditions above (Condition # 19867):

S-5 Redwood Landfill with Gas Collection System.

By: _____
Carol S. Allen
Principal Air Quality Engineer

_____ Date