Bay Area Air Quality Management District

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

Statement of Basis
for
MAJOR FACILITY REVIEW PERMIT
MINOR REVISION

for

Redwood Landfill
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

Application: 11370

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STATEMENT OF BASIS

Redwood Landfill; SITE # A1179

APPLICATION # 11370

A. BACKGROUND

Site 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 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, and several diesel engines that provide portable or standby power.

Current Project (Application # 11370):

In accordance with minor new source review under Application # 11371, the District approved permit condition revisions for the A-50 and A-51 Landfill Gas Flares on January 9, 2007. These permit condition revisions increased the landfill gas throughput limit for the A-51 flare up to the maximum capacity for this device and reduced the landfill gas throughput limit for A-50 to the equivalent of 36 MM BTU/hour. Previously, these flares had a single combined annual landfill gas throughput limit of 1,490,000,000 scf/year. The District issued new separate annual landfill gas throughput limits for each flare. The District reduced the CO limit for A-51 from 0.3 pounds CO/MM BTU to 0.2 pounds CO/MM BTU as an updated RACT requirement for A-51. The District also changed the minimum combustion zone temperature limit for A-51 from 1422 ºF to 1400 ºF based on recent source testing results. The permit condition amendments for A-50 and A-51, the associated emissions from the flares and emission increases for this project, and the applicable requirements for this project are discussed in detail in the engineering reports for Application # 11371, which are attached as Appendix A.

Redwood Landfill submitted Title V Application # 11370 in order to incorporate the permit condition revisions described above into the MFR Permit. In addition to these flare condition amendments, Redwood Landfill has submitted several start up and shut down notifications for individual landfill gas collection system components. The District is proposing to update the collection system description for the S-5 Redwood Landfill based on these notifications. This collection system description update will not result in any emission increases or trigger any new applicable requirements. Redwood Landfill also requested several administrative amendments, as described below:

- Change the Responsible Official to Jessica Jones and update her title
- Change the Facility Contact to Alisha McCutchin and update her title
- Delete the S-25 Yard and Green Waste Stockpiles from the permit
- Delete the S-45 Pumpmaster Engine from the permit

B. EMISSIONS

The flare permit condition revisions will result in increases of the facility-wide potential to emit (PTE) for Site # A1179. The maximum permitted emissions from the A-50 and A-51 Landfill Gas Flares and the project emission increases are discussed in detail in Appendix A. The updated landfill gas collection system description for S-5 will not result in any changes to the facility-wide PTE. The removal of S-25 and S-45 from the MFR Permit will result in decreases of the PTE. These changes to the facility-wide PTE and the most recent emissions summary for this site are presented in Table 1 below.

Table 1. Summary of Potential to Emit Changes and Current Actual Emissions for Site #A1179

Pollutant	Current PTE * Tons/Year	Increases Tons/Year	Decreases Tons/Year	New PTE * Tons/Year	2006 Actual Emissions Tons/Year
PM_{10}	235.18	3.07	0.27	237.98	170.93
CO	115.36	14.39	2.55	127.20	62.47
SO_2	52.91	25.39	0.05	78.25	45.02
NO_x	33.19	10.76	3.11	40.85	19.29
POC	33.38	2.44	0.18	35.64	28.01

* The PTE for each device is either the maximum permitted emission rate (if the device was subject to new source review) or the maximum possible emissions determined using standard calculation procedures (if the device was never subject to new source review). The facility-wide PTE is the sum of the individual PTEs for all permitted devices.

C. PROPOSED MFR PERMIT MODIFICATIONS

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act, Part 70 of Volume 40 of the Code of Federal Regulations (CFR), and BAAQMD Regulation 2, Rule 6, Major Facility Review pursuant to Regulation 2-6-301, because it is a Major Facility for CO emissions (PTE > 100 tons/year). It is also required to have an MFR Permit pursuant to Regulation 2-6-304, because it is a designated facility. The NSPS for Municipal Solid Waste Landfills (40 CFR Part 60, Subpart WWW) requires 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. Redwood Landfill is subject to Part 60, Subpart WWW and meets these design capacity criteria; therefore it is subject to Part 70 and must have a Title V permit.

The initial MFR Permit for this facility was issued on November 10, 2003, and the MFR Permit was revised on November 10, 2004, July 27, 2005, December 29, 2005, April 18, 2006, July 13, 2006, and September 20, 2006. Pursuant to Application # 11370, the District is proposing to revise the current MFR Permit for Site # A1179. Since Statements of Basis were prepared for the initial MFR Permit and for each subsequent revision of this permit that fully describe and explain the legal and factual basis for the current MFR Permit, this report will only address the proposed revisions to the current MFR Permit.

This application involves permit condition revisions for S-5, A-50, and A-51, the removal of S-25 and S-45, and changes to site contact information. This application does not involve any permit revisions that are significant as defined in Regulation 2-6-226. Although the flare condition changes result in emission increases, all emission increases are less than the major modification thresholds for 40 CFR Parts 51 and 52. Therefore, Section 2-6-226.1 does not apply to this

application. This application does not involve any NSPS or NESHAP modifications, monitoring or record keeping revisions, avoidance of Title 1 or Section 112 requirements, case-by-case emission limits, facility-specific determinations, or new Clean Air Act requirements. Therefore, Sections 226.2-226.7 do not apply, and this application is not significant. This application does involve some changes (updating contact information and removal of sources) that are considered administrative amendments pursuant to Regulation 2-6-201. However, it also involves permit changes other than these administrative amendments. Thus, these non-administrative permit changes require a minor revision of the MFR pursuant to Regulation 2-6-215.

The proposed changes to the MFR permit sections are described below in the order they appear in the permit. All proposed changes to the permit are identified by strikeout and underline formatting in the attached proposed MFR Permit for Site # A1179.

Title Page

The District is proposing to change the Responsible Official and Facility Contact information as requested by the applicant.

Section I

The District is not proposing any changes to this section.

Section II

In Table II-A, the District is proposing to update the description of the number of components in the gas collection system based on recent changes that were reported by the applicant. The District is also proposing to remove S-25 and S-45 from Tables II-A and II-B, because these sources have been shut down and removed from this facility.

Section III

The District is not proposing any changes to this section.

Section IV

In Table IV-B the District is proposing to replace “Toxic Risk Management Policy” with “Regulation 2-5-302” in the bases for Condition # 19867, Parts 22 and 25. Regulation 2-5-302 was adopted in June 2005 and supercedes the District’s Toxic Risk Management Policy.

The District is deleting Table IV-C for S-25 and IV-G for S-45, because these sources have been shut down and removed from the site. The District is updating the lettering sequence for all subsequent tables in this section.

Section V

The District is not proposing any changes to this section.

Section VI

The District is deleting Conditions # 16066 and # 17842 (which applied to S-25 and S-45, respectively) because these sources have been shut down and removed from this site.

For Condition # 19867, the District is proposing to revise Parts 17, 20, 22, 24, and 26. For Part 17, the District is proposing to update the gas collection system component lists based on start-up and shut-down notifications submitted by the applicant. The proposed changes to Parts 20, 22, 24, and 26 will incorporate the permit condition revisions that were approved by the District pursuant to a minor new source review permit (Application # 11371). These condition changes will revise the landfill gas throughput limits for the flares, correct a minimum combustion zone temperature limit for A-51, eliminate an obsolete reference to leachate vapors, update the bases for two parts by citing the new toxic new source review regulation (Regulation 2, Rule 5), and reduce the CO emission limit for A-51 to comply with RACT. The reasons for these changes to Parts 20, 22, 24, and 26 and the impacts of each change are discussed in detail in the engineering reports for Application # 11371 (see Appendix A).

Section VII

In Table VII-B, the District is proposing to delete the current combined landfill gas throughout limit for A-50 and A-51 and to replace it with new limits for each flare, as described in Condition # 19867, Part 20. For A-51, the District is proposing to correct the minimum combustion zone temperature limit by using recent source test data for A-51 and the currently established procedure for setting this temperature limit, which is described in Condition # 19867, Part 22. For A-51, the District is also proposing to revise the CO emission limit in accordance with Condition # 19867, Part 26.

The District is deleting Table VII-C for S-25 and VII-G for S-45, because this equipment has been removed from the site. The District is updating the lettering sequence for all subsequent tables in this section.

Sections VIII-IX

The District is not proposing any changes to these sections.

Section X

The District is adding a summary of these proposed permit changes to Section X. The District is listing the administrative amendments (title page corrections and revisions related to the removal of S-25 and S-25) and the minor revisions (all other changes related to S-5, A-50, and A-51) separately due to the different permit revision procedures for these two types of permit revisions.

Sections XI-XII

The District is not proposing any changes to these sections.

D. SUMMARY OF PROPOSED ACTIONS

The District recommends incorporation of an administrative amendment for Site # A1179 that will:

- Correct the Responsible Official and Facility Contact information on the Title Page.
- Remove S-25 and S-45 from Tables II-A and II-B, delete the associated source-specific requirements tables (Table IV-C and IV-G), delete the associated permit conditions

(Conditions #16606 and #17842), and delete the associated limits and monitoring requirements tables (Table VII-C and VII-G).
- Update the lettering sequence for subsequent tables in Sections IV and VII.

The District recommends approval of a proposed minor revision for Site # A1179 that will:
- Correct the landfill gas collection system component lists in Table II-A and in Condition # 19867, Part 17.
- Update the bases for Condition # 19867 in Table IV-B and in Condition # 19867, Parts 22 and 24.
- Revise the landfill gas throughput limits for A-50 and A-51 in Condition # 19867, Part 20 and in Table VII-B.
- Correct the minimum combustion zone temperature limit for A-51 in Condition # 19867, Part 22 and in Table VII-B.
- Eliminate obsolete text from Condition # 19867, Part 24.
- Alter the CO emission limit for A-51 in Condition # 19867, Part 26 and in Table VII-B.
- Add a summary of these changes to the revision history section of this permit.

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APPENDIX A

ENGINEERING REPORTS for

APPLICATION # 11371

ENGINEERING EVALUATION REPORT

APPLICATION # 11371

Redwood Landfill, Inc.; Site # A1179

A. BACKGROUND

Redwood Landfill operates an active MSW landfill in Novato, CA. The permitted operations at this facility include the active landfill (S-5), cover material stockpiles (S-42), an aerated leachate pond (S-58), two landfill gas flares (A-50 and A-51), sludge and green waste handling and composting operations (S-2, S-25, S-28, S-34, S-35, S-37, S-38, S-39, and S-41), four diesel engines (S-46, S-47, S-48, and S-49), and a gasoline dispensing facility (S-55). This application concerns the landfill (S-5) and the newest flare (A-51).

On December 6, 2004, Redwood Landfill submitted Application # 11371 to request a major expansion of the existing landfill operations and to request an Authority to Construct and Permit to Operate for a new enclosed landfill gas flare. Redwood proposed to expand the maximum design capacity of the landfill from 19.1 million cubic yards to 34.8 million cubic yards and to increase the limit on the amount of decomposable waste placed in the landfill from 17.1 million tons to 32.3 million tons. Redwood Landfill also proposed a number of related permit condition changes and requested an Authority to Construct for a new flare, which was assigned abatement device number A-51. Redwood planned to use this new flare to control the additional landfill gas that would be generated by the expanded landfill.

This project was subject to CEQA and the Lead Agency was the County of Marin. As the environmental review of this project progressed, Redwood Landfill made numerous changes to this project in order to satisfy the County of Marin's requirements and the public's requests. Review of this application was delayed until the District received a final revised project description.

Prior to resolution of these issues, Redwood Landfill began experiencing problems with their existing landfill gas flare (A-50). A-50 is now only able to properly operate when the throughput rate is limited to 30% (1200 scfm) of its current permitted capacity (4000 scfm). To ensure that sufficient control capacity is available to control all landfill gas that will be generated by the currently permitted landfill, Redwood decided to accelerate their plans for the design and purchase of the new flare (A-51). Redwood now plans to use A-51 as a supplemental control device to the poorly performing existing flare.

Redwood Landfill submitted a new application for A-51 (Application # 11757) and requested an Authority to Construct and Permit to Operate for A-51 pursuant to the accelerated permit program. Since A-51 will now be providing abatement for the existing permitted landfill, A-51 is categorically exempt from CEQA review pursuant to 2-1-312.2. In order to qualify for accelerated permitting, the abatement device must be at least as efficient as the device it is replacing and should have secondary emissions that are no greater than the current abatement system. To ensure that these emissions requirements would be satisfied, the District limited the landfill gas throughput rate to A-50 and A-51 combined to the same limits that were already in place for A-50 alone: 5,760,000 scf/day (2880 MM BTU/day) and 1,490,000,000 scf/year (745,000 MM BTU/year). The daily emission limit is equivalent to the maximum permitted capacity of A-50 (120 MM BTU/hour, or 4000 scfm). The annual limit, which was establish pursuant to Application # 8501, was imposed to ensure that CO emission increases from the facility would not exceed 100 tons/year, because the facility did not want to trigger major modification or CO modeling requirements. This annual limit is equal to an annual average heat input of 85.0 MM BTU/hour or

2835 scfm. On May 17, 2005, the District issued an accelerated permit to Redwood Landfill for the A-51 Landfill Gas Flare pursuant to Application # 11757.

Since May 2005, the CEQA review process has continued, but Redwood Landfill and the County of Marin have not reached agreement on the scope of the landfill expansion that would be allowed. The most recent landfill expansion proposal has changed significantly from the initial proposal that was described in the application materials. In addition, legal issues have indefinitely stalled the CEQA review process for this proposed landfill expansion. Since the application is now two years old, the current project proposal differs from the application submittal, and resolution of the legal issues may take another year or more, the District requested that Redwood Landfill withdraw the landfill expansion related requests in this application. Redwood Landfill agreed to withdraw their current request for a landfill expansion and intends to submit a new application when the CEQA process is further along.

Although Redwood Landfill has withdrawn the landfill expansion related requests for Application # 11371, Redwood requested that the District modify the landfill gas throughput limits for the A-50 and A-51 Flares. Redwood is now planning to reduce the heat input rate to A-50 to no more than 36 MM BTU/hour to ensure that this flare will operate properly, and Redwood is requesting to operate A-51 at its full maximum capacity of 90 MM BTU/hour for 24 hours/day and 365 days/year. For A-50, continuous operation at 36 MM BTU/hour is equal to landfill gas throughput rates of 1,728,000 scf/day and 630,720,000 scf/year, which are allowed under the current throughput limits. Since this de-rating of A-50 will not result in any emission increases, this change does not constitute a modification of A-50. For A-51, continuous operation at 90 MM BTU/hour is equal to landfill gas throughput rates of 4,320,000 scf/day and 1,576,800,000 scf/year. The proposed annual throughput rate for A-51 will exceed the current throughput limit. Therefore, this request constitutes a modification of A-51.

B. EMISSIONS

Criteria Pollutants:

The current criteria pollutant emission factors for A-50 and A-51 Landfill Gas Flares were derived from the following: site-specific permit condition limits for NO_x, CO, and SO_2; an AP-42 emission factor for PM_{10}; the Regulation 8-34-301.3 limit for POC; and site-specific landfill gas characterization data for NPOC. The maximum daily emission rates for each flare were calculated using these emission factors and the maximum permitted capacity of each flare: 120 MM BTU/hour for A-50 and 90 MM BTU/hour for A-51, and the maximum throughput limit (5,760,000 scf/day = 2880 MM BTU/day) for the two flares combined. The current maximum permitted daily emission rates for Redwood Landfill's flare are summarized in Table 1. The Engineering Evaluation for Permit Application # 11757 contains a more detailed derivation of all emission factors.

Table 1. Current Maximum Permitted Daily Emission Rates from A-50 and A-51 Flares

	Emission Factors lbs/MM BTU	A-50 at 120 MM BTU/hr Pounds/Day	A-51 at 90 MM BTU/hr Pounds/Day	A-50 and A-51 at 2880 MM BTU/day Pounds/Day
NO_x	0.0600	172.80	129.60	172.80
CO	0.3000	864.00	648.00	864.00
PM_{10}	0.0171	49.26	36.95	49.26
SO_2	0.4330 (daily) 0.1416 (annual)	1247.07	935.30	1247.07
POC	0.0136	39.10	29.33	39.10
NPOC	0.0004	1.16	0.87	1.16

The maximum annual throughput rate for A-50 and A-51 combined is 1,490,000,000 scf/year (745,000 MM BTU/year). Under this limit, neither flare is permitted to operate at maximum capacity. Therefore, this throughput limit applies to each flare individually as well as to the two flares combined. The current maximum permitted annual emission rates are summarized in Table 2.

Table 2. Current Maximum Permitted Annual Emission Rates from A-50 and A-51 Flares

	Emission Factors lbs/MM BTU	A-50 at 745,000 MM BTU/yr Tons/Year	A-51 at 745,000 MM BTU/yr Tons/Year	A-50 + A-51 at 745,000 MM BTU/yr Tons/Year
NO_x	0.0600	22.350	22.350	22.350
CO	0.3000	111.750	111.750	111.750
PM_{10}	0.0171	6.370	6.370	6.370
SO_2	0.4330 (daily) 0.1416 (annual)	52.731	52.731	52.731
POC	0.0136	5.057	5.057	5.057
NPOC	0.0004	0.150	0.150	0.150

Due to A-50's poor performance at higher flow rates, Redwood Landfill is proposing to limit the operating rate of A-50 to 36 MM BTU/hour (864 MM BTU/day and 315,360 MM BTU/year). The emission factors for A-50 will remain the same. The revised maximum permitted emission rates for A-50 are summarized in Table 3. Since these emissions do not exceed the current maximum permitted emission rates for A-50, this change does not constitute a modification.

Table 3. Proposed Emission Rates from A-50 Compared to Current Limits

	Proposed A-50 at 36 MM BTU/hr Pounds/Day	Current A-50 at 120 MM BTU/hr Pounds/Day	Proposed A-50 at 315,360 MM BTU/yr Tons/Year	Current A-50 at 745,000 MM BTU/yr Tons/Year
NO_x	51.84	172.80	9.461	22.350
CO	259.20	864.00	47.304	111.750
PM_{10}	14.78	49.26	2.697	6.370
SO_2	374.12	1247.07	22.321	52.731
POC	11.73	39.10	2.141	5.057
NPOC	0.35	1.16	0.064	0.150

For A-51, Redwood Landfill is proposing to operate A-51 at maximum capacity for 24 hours/day and 365 days/year. In addition, the District is proposing to change the CO limit for A-51 from 0.3 lbs/MM BTU to 0.2 lbs/MM BTU as an updated RACT requirement. The rest of the emission factors for A-51 will remain the same. The proposed emission factors and maximum limits for A-51 are summarized in Table 4. The proposed daily and annual emission rates for A-51 are compared to the current limits in Table 5.

Table 4. Proposed Emission Factors and Emission Rates from A-51

	Emission Factors lbs/MM BTU	A-51 at 90 MM BTU/hr Pounds/Hour	A-51 at 2160 MM BTU/day Pounds/Day	A-51 at 788,400 MM BTU/yr Tons/Year
NO_x	0.0600	2.683	129.60	23.652
CO	0.2000	13.417	432.00	78.840
PM_{10}	0.0171	0.765	36.95	6.743
SO_2	0.4330 (daily) 0.1416 (annual)	19.366	935.30	55.803
POC	0.0136	0.607	29.33	5.352
NPOC	0.0004	0.018	0.87	0.159

Table 5. Proposed Emission Rates from A-51 Compared to Current Limits

	Proposed A-51 at 90 MM BTU/hr Pounds/Day	Current A-51 at 90 MM BTU/hr Pounds/Day	Proposed A-51 at 788,400 MM BTU/yr Tons/Year	Current A-51 at 745,000 MM BTU/yr Tons/Year
NO_x	129.60	129.60	23.652	22.350
CO	432.00	648.00	78.840	111.750
PM_{10}	36.95	36.95	6.743	6.370
SO_2	935.30	935.30	55.803	52.731
POC	29.33	29.33	5.352	5.057
NPOC	0.87	0.87	0.159	0.150

As shown in Table 5, proposed CO emission rates from A-51 are lower than the current limits due to the revised CO RACT limit. Although maximum daily emissions from A-51 are no greater than the current limits, the maximum annual emission rates of NO_x, PM_{10}, SO_2, POC, and NMOC are higher than the current emission limits for A-51. Since offsets were not provided by the facility for any of these pollutants, the cumulative emission increases for this project must be determined pursuant to Regulation 2-2-605.1-605.3, using baseline emission rates rather than maximum permitted emission rates. All baseline emissions were calculated using the actual annual average heat input rate of 609,611 MM BTU/year. For NO_x and POC, the actual emission factors are the average of the NO_x and NMOC factors measured during the 2005 and 2006 source tests at A-51. Measured NMOC emission rates were assumed to be 100% POC and 0% NMOC. For SO_2, the actual emission factor was determined using the average of the measured sulfur content in the landfill gas. For PM_{10}, no source test data was available, and the AP-42 emission factor was used. Baseline emissions for A-51 and the cumulative emission increases for this application are summarized in Table 6. Detailed calculations are available in the attached spreadsheet.

Table 6. Cumulative Emission Increases for Application # 11371

	Actual Emission Rate from A-51 lbs/MM BTU	Baseline Emissions (TPY) from A-51 at 609,611 MM BTU/yr	Proposed Emissions from A-51 Tons/Year	Cumulative Emission Increases Tons/Year
NO_x	0.046	13.869	23.652	9.783
SO_2	0.102	31.240	55.803	24.563
PM_{10}	0.017	5.214	6.743	1.529
POC	0.002	0.628	5.352	4.724
NPOC	0.000	0.000	0.159	0.159

Toxic Pollutants:

For toxic emissions, the current project must include any related applications. The following NSR applications were completed within the last two years: 14421, 14139, 13811, 13027, 12967, 12003, 11757, and 10874. Application # 14421 concerns an aerated leachate pond and is not related to landfill gas collection and control. Likewise, Applications # 14139 and # 13811 concern green waste processing equipment and are not related to this project. The rest of the applications are related to the S-5 Landfill, which is abated by A-50 and A-51 Flares. Applications # 13027 and # 12967 had no emission increases. Application # 12003 was for the permitting of a temporary flare that has now been removed from the facility. Therefore, Application # 12003 will not be considered part of the project. Application # 11757 was for the initial permitting of A-51 and Application # 10874 modified several landfill gas sulfur limits. Therefore, the current project includes all projected toxic emissions from the A-51 Landfill Gas Flare.

For residual emissions of individual toxic air contaminants, the emission factor for each compound was calculated using the maximum expected landfill gas concentration for that compound and an assumed control efficiency of 83% by weight (per Condition # 19867, Part 24. The landfill gas concentration is either the concentration limit identified in Condition # 19867, Part 18b or the default AP-42 concentration for compounds not listed in Part 18b.

For residual hydrogen sulfide emissions, the hourly emission factor was based on the Part 18c maximum hourly concentration limit of 1300 ppmv of TRS expressed as H_2S and 83% control, while the annual emission factor was based on the Part 18c annual average concentration limit of 425 ppmv of TRS expressed as H_2S and 83% control.

The combustion of organic compounds containing bromine, chlorine, and fluorine in landfill gas flares will result in secondary emissions of acid gases: hydrogen bromide, hydrogen chloride, and hydrogen fluoride. The secondary pollutant emission rates for these acid gases were calculated based on the maximum expected inlet concentration of the halide ion (5000 ppbv of Br^-, 20,000 ppbv of Cl^-, and 2000 ppbv of F^-) and the assumption that all of this halide was converted to an acid gas.

The combustion of landfill gas also creates secondary emissions of formaldehyde. For other similar applications, the District has used CARB's CATEF formaldehyde emission factor for gas turbines (1.8E-1 lbs/MM scf of LFG) to determine the formaldehyde emissions from landfill gas flares. Although the CATEF database cited formaldehyde emission factor data for flares, this data is highly variable (ranging from 1.33E-1 to 6.74E+1 lbs/MM scf with and average of 2.95E+1lbs/MM scf) and has a high uncertainty ratio (131%). The CATEF formaldehyde data for landfill gas fired boilers and turbines is much less variable (1.19E-1 to 2.00E-1 lbs/MM BTU) and appears to be more realistic. A source test in 2003 on a similar flare located at a different Bay Area landfill found formaldehyde emission rates ranging from 5.9E-3 to 1.5E-2 lbs/MM scf (average of 8.8E-3 lbs/MM scf). A comparison of the CATEF factors to this source test data shows that the CATEF flare factor is more than 3000 times the measured emission factor, while

the CATEF boiler and turbine factors are only 14 and 20 times, respectively, the measured factor. This 2003 source test data confirms that using the CATEF formaldehyde emission factor for turbines is a reasonable assumption. Therefore, maximum expected formaldehyde emissions from A-51 are based on an emission rate of 0.18 lbs/MM scf (3.6E-4 lbs/MM BTU).

The maximum expected toxic emissions from A-51 are summarized in Table 7 on the following page. Detailed toxic emission spreadsheets are attached. As shown in Table 7, the emissions from A-51 will exceed both acute and annual risk screen trigger levels. Therefore, a risk screen is required.

Table 7. Toxic Emissions from A-51 Compared to Risk Screen Trigger Levels

Significant TACs From A-51	Abated lbs/MM BTU	Proposed pounds/hour	Trigger Levels pounds/hour	Emissions > Trigger ?	Proposed pounds/year	Trigger Levels pounds/year	Emissions > Trigger ?
Acrylonitrile	1.31E-05	1.18E-03	NA		1.04E+01	6.4E-01	yes
Benzene	2.35E-05	2.11E-03	2.9E+00	no	1.85E+01	6.4E+00	yes
1,3 Butadiene	1.33E-05	1.20E-03	NA		1.05E+01	1.1E+00	yes
Carbon Tetrachloride	9.52E-06	8.57E-04	4.2E+00	no	7.50E+00	4.3E+00	yes
Chloroform	7.39E-06	6.65E-04	3.3E-01	no	5.82E+00	3.4E+01	no
Chloroprene	2.18E-05	1.96E-03	NA		1.72E+01	3.9E+01	no
1,4 Dichlorobenzene	5.20E-05	4.68E-03	NA		4.10E+01	1.6E+01	yes
1,4 Dioxane	2.168E-05	2.0E-03	6.60E+00	no	1.71E+01	2.4E+01	no
Ethylene Dibromide	1.16E-05	1.05E-03	NA		9.16E+00	2.6E+00	yes
Ethylene Dichloride	6.12E-06	5.51E-04	NA		4.83E+00	8.9E+00	no
Formaldehyde	3.62E-04	3.26E-02	2.1E-01	no	2.86E+02	3.0E+01	yes
Hydrogen Bromide	2.10E-03	1.89E-01	NA	no	1.66E+03	9.3E+02	yes
Hydrogen Chloride	3.79E-03	3.41E-01	4.6E+00	no	2.99E+03	3.5E+02	yes
Hydrogen Fluoride	2.08E-04	1.87E-02	5.3E-01	no	1.64E+02	5.4E+02	no
Hydrogen Sulfide (Hourly)	3.92E-02	3.52E+00	9.3E-02	yes			
Hydrogen Sulfide (Annual)	1.28E-02				1.01E+04	3.9E+02	yes
Methylene Chloride	2.40E-05	2.16E-03	3.1E+00	no	1.89E+01	1.8E+02	no
Perchloroethylene	6.60E-05	5.94E-03	4.4E+01	no	5.20E+01	3.0E+01	yes
1,1,2,2 Tetrachloroethane	1.04E-05	9.35E-04	NA		8.19E+00	3.2E+00	yes
1,1,2 Trichloroethane	8.15E-06	7.33E-04	NA		6.42E+00	1.1E+01	no
Trichloroethylene	2.90E-05	2.61E-03	NA		2.29E+01	9.1E+01	no
Vinyl Chloride	4.86E-05	4.38E-03	4.0E+02	no	3.83E+01	2.4E+00	yes

C. STATEMENT OF COMPLIANCE

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

This application involves a throughput increase at the A-51 Landfill Gas Flare and does not modify the associated source of landfill gas: the S-5 Redwood Landfill. The bulk of the flare emissions will simply shift from the existing A-50 Flare to the nearby A-51 Flare with a 5% increase in overall flaring capacity. A risk screening analysis that was conducted for the A-51 flare emissions confirms that this flare will not result in any significant health impacts. Since the flare is already installed and operating, this project will have no impact on existing features, scenic views, or the general area of the project. 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 condition modification for the abatement device only, this application is categorically exempt from CEQA review pursuant to Regulation 2-1-312.2, because there is no possibility that this application could result in any significant adverse environmental impacts. 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: 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 Landfill Gas Flare is necessary to meet these BARCT requirements of Regulation 8, Rule 34. Pursuant to Regulation 2-2-112, the secondary emissions from A-51 (NO_x, CO, SO_2, and PM_{10}) are exempt from the BACT requirements of Regulation 2-2-301, because A-51 is complying with BARCT for POC emissions. Regulation 2-2-112 requires that NO_x, CO, SO_2, and PM_{10} emissions from A-51 comply with RACT instead of BACT. As discussed in more detail below, A-51 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 the A-51 Flare to 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 A-51 Flare is an enclosed ground flare and meets the three criteria identified above. Therefore, A-51 satisfies the RACT requirements for CO emissions. To ensure adequate POC destruction, permit conditions will that this 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 flares. This flare was initially given a higher limit because the flare was permitted to burn leachate vapors. However, the leachate evaporator has been removed and burning

leachate vapors was found to have no significant impact of CO emissions. Therefore, this higher CO limit is no longer necessary. The District has permitted numerous other new landfill gas fired flares at a CO limit of 0.2 pounds/MM BTU. While it may be feasible to achieve a lower CO emission level, the proposed CO emission limit allows reasonable compliance margins and is accepted as RACT for landfill gas fired flares. Permit conditions will require the A-51 Flare to meet this new 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 PM_{10}: PM_{10} 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 PM_{10} emissions from landfill gas fired flares. Since A-51 will be equipped with a fuel pretreatment system, it will comply with RACT for PM_{10} emissions.

RACT for SO_2: Application # 10874 contains a detailed discussion of the SO_2 RACT determination for the existing 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 SO_2 emissions from landfill gas combustion operations was determined to be compliance with reasonable landfill gas sulfur content limits. The Regulation 9-1-302 limit was used to establish a reasonable peak landfill gas sulfur content limit of 1300 ppmv as H_2S. An annual average landfill gas sulfur content limit of 425 ppmv (expressed as H_2S) was determined to be a reasonable RACT limit for the existing flare. These peak and annual average limits on the landfill gas sulfur content are reasonable limits for the A-51 Landfill Gas Flare as well.

In accordance with the condition revisions approved pursuant to Application # 10874, Redwood Landfill is monitoring the landfill gas sulfur content on a weekly basis using draeger tubes to demonstrate compliance with the 1300 ppmv sulfur content limit. These weekly tests are supplemented by quarterly laboratory analysis for landfill gas sulfur content. All weekly and quarterly tests are averaged to demonstrate compliance with the annual average sulfur content limit of 425 ppmv of TRS in landfill gas. Fuel sulfur content monitoring is a standard method of demonstrating compliance with sulfur dioxide limits from combustion equipment. Quarterly monitoring has been found to be a sufficient monitoring frequency for most landfill gas combustion equipment. However, past testing has found that the landfill gas from this site has variable sulfur content with one test showing sulfur content at 90% of the permit limit. Therefore, weekly testing is necessary to ensure compliance with sulfur content limits at this site.

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. However, this application was deemed complete prior to the District's approval of amendments to Regulation 2-2-302, which reduced the NOx and POC offset threshold from 15 tons/year to 10 tons/year and which reduced the Small Facility Banking Account (SFBA) qualification criteria from 50 tons/year to 35 tons/year. As a result, this application is subject to the old offset and SFBA criteria of 15 tons/year and 50 tons/year, respectively. Regulation 2-2-303 requires offsets for SO_2 and PM_{10} emission increases if (a) the site is a major facility and (b) facility-wide emissions of SO_2 or PM_{10} are greater than 100 tons/year (this section was not modified).

A facility-wide potential to emit evaluation was conducted to determine the applicability of these District offset requirements. The results of this potential to emit evaluation are summarized in Table 8. Since this site will emit more than 100 tons/year of CO, Redwood Landfill is a major facility for CO. Although PM_{10} emissions will also exceed 100 tons/year, Redwood Landfill is not considered a major facility of PM_{10} emissions, because the major facility emission thresholds exclude fugitive emissions, and Redwood Landfill will only emit 20.1 tons/year of non-fugitive

PM_{10}. Redwood Landfill is not a major facility for SO_2 emissions, because facility wide SO_2 emissions are less than 100 tons/year.

Table 8. Facility Wide Potential to Emit for Plant # 1179, December 2006

Source #	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			20.424	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-28	Co-Compost Biosolids Feed Stockpiles			0.200		0.004	
S-34	Active Compost and Co-Compost Windrows			0.300		0.030	
S-35	Compost and Co-Compost Curing Piles			0.050		0.005	
S-37	Compost and Co-Compost Final Product Storage Piles			0.025		0.005	
S-38	On-Site Material Hauling					3.390	
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)	0.031	0.004	0.001		0.001	0.001
S-55	Gasoline Dispensing Facility G# 8573			0.987			
S-58	Aerated Leachate Pond			0.084	0.050		
A-50	Landfill Gas Flare	9.461	47.304	2.197	0.007	2.697	22.321
A-51	Landfill Gas Flare	23.652	78.840	5.492	0.019	6.743	55.803
Total	**All Permitted Sources and Abatement Devices**	**40.847**	**127.204**	**35.833**	**0.284**	**227.979**	**78.249**

Since facility wide NO_x and POC emissions will each exceed 15 tons/year, Regulation 2-2-302 requires offsets for both NO_x and POC emission increases. From Table 6, this application will result in 9.783 tons/year of NO_x and 4.724 tons/year of POC emission increases. For this application only, Redwood Landfill qualifies for the SFBA, because facility wide emissions from all permitted equipment will be less than 50 tons/year of NO_x and less than 50 tons/year of POC. The current actual emissions are estimated to be 29.3 tons/year of NO_x and 28.0 tons/year of POC (assuming 62% of NMOC are POC, per Application # 17552). The offset ratio for SFBA supplied offsets is 1.0 to 1.0. Therefore, this application requires 9.783 tons/year of NO_x offsets and 4.724 tons/year of POC offsets from the SFBA.

For future applications, facility wide NO_x and POC emissions will each exceed 35 tons/year, and Redwood will no longer qualify for the SFBA for NO_x or POC emission increases. The databank cumulative emission increase reports for NO_x and POC emissions include equipment that has now been shut down (such as the S-24 and S-40 Tub Grinder Engines and the S-50 Leachate Vaporator) and equipment that was never installed (such as the S-52, S-53, and S-54 LFG Engines). This archived equipment is no longer required to be in the cumulative emission increase inventory. This inventory will be updated to remove all archived equipment to ensure that cumulative emission increases that are subject to reimbursement are reported accurately.

Since $S0_2$ emissions do not exceed 100 tons/year, SO_2 offsets are not required.

Since Redwood Landfill is a major facility and PM_{10} emissions will exceed 100 tons/year, Redwood Landfill is subject to Regulation 2-2-303 for PM_{10} emission increases. The offset ratio for PM_{10} emission increases is 1.0 to 1.0. From Table 6, PM_{10} emission increases for this application are 1.529 tons/year. PM_{10} offsets must also be supplied for existing cumulative emission increases, excluding increases from equipment that has been shut down or that was never installed. PM_{10} emission increases for Applications # 3540, #17625, #25173, and #10747 are only for equipment that has been shut down or that was never installed. These emission increases will all be removed from the cumulative increase inventory. Application # 17639 includes a source (S-50) that has been shut down as well as cumulative emission increases for the A-50 Flare. The cumulative increase inventory for Application # 17639 will be adjusted to reflect that S-50 has now been removed from the site. Cumulative increases for the remaining permitted equipment are: (9.440 – 1.680 – 1.529) = 6.231 tons/year for A-50 and A-51, 0.009 tons/year for S-39, 1.225 tons/year for compost operations, (0.485 + 0.026 – 0.033) = 0.478 for S-41 and S-42. Total existing cumulative emission increases are (6.231 + 0.009 + 1.225 + 0.478) = 7.943 tons/year of PM_{10}, and the total offset burden is (1.529 + 7.943) = 9.472 tons/year of PM_{10}.

From Application # 17552, baseline emissions for the S-5 Redwood Landfill were determined to be 259.34 tons/year of PM_{10}, while proposed emissions for S-5 were 212.05 tons/year of PM_{10}. This 47.29 ton/year PM_{10} emission reduction was not recorded in the District's database, but qualifies as a contemporaneous emission reduction. Redwood achieved this emission reduction by having longer paved roads, more gravel roads, and by increasing watering frequency compared to the particulate emission reduction measures that were in place under the baseline scenario. Therefore, the landfill expansion and truck traffic changes associated with the Application # 17552 expansion were found to result in no emission increase, but the contemporaneous emission reduction of 47.29 tons/year PM_{10} was never accounted for under Application # 17552. The August 2002 contemporaneous reduction in PM_{10} emissions should have been used to offset the concurrent PM_{10} emission increases for S-40, S-41, and S-42 (note that S-40 is no longer permitted) and the 1996 PM_{10} emission increases for S-39 (Application # 16939) and the 1996 PM_{10} emission increases for the compost operations (Application # 25812). The databank will be corrected to reflect that 1.712 tons/year of PM_{10} emission reductions were supplied by contemporaneous emission reductions from S-5 under Application # 17552. The remaining cumulative emission increase (7.760 tons/year of PM_{10}) is all due to the A-50 and A-51 flares, which were modified after the Application # 17552 landfill expansion project. The excess

PM_{10} emission reductions at S-5 are still considered contemporaneous to these flare emission increases per 2-2-242, because these emission reductions were approved less than five years prior to this current application. Therefore, the remaining PM_{10} offset burden of 7.76 tons/year of PM_{10} will be supplied from excess contemporaneous PM_{10} emission reductions that were associated with Application # 17552.

Staff also notes that the databank PM_{10} emission factor for S-5 was last revised in June 1992 and is incorrect. The correct PM_{10} emission factor (based on Application # 17552 emission and throughput data) is calculated below:

(212.05 tons PM_{10}/year)*(2000 lbs PM_{10}/ton PM_{10})/(365 days/year)/(1350 avg. tons waste/day)
= 0.8607 lbs PM_{10}/ton of waste accepted,
where waste accepted includes ~ 60% solid waste and 40% sludge.

State Offset Prohibition for Abatement Equipment:

As discussed above, Regulation 2, Rule 2 requires offsets for some pollutants. However, the District has recently determined that the Regulation 2, Rule 2 offset requirements may conflict with California Health and Safety Code Section 42301.2, when the emission increases are due to abatement devices. In September 1996, the State of California adopted an amendment to the California Health & Safety Code, which states:

> H&SC Section 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.

The flare modification applications (# 17639, # 8501, and # 11371) were intended to replace old equipment and to increase the overall flaring capacity to keep pace with increases in landfill gas generation rates that occurred partially due to a 1978 landfill expansion and partially due to a 1994 landfill expansion that was ultimately permitted in 2002. Higher than anticipated waste acceptance rates in recent years have resulted in higher than predicted landfill gas collection rates and the need for additional flaring capacity. Prior to Application # 17552, the landfill was predicted to have a peak landfill gas generation rate of 1662 scfm of landfill gas, which was equivalent to 51.087 MM BTU/hour of heat input at 100% capture efficiency or 38.315 MM BTU/hour at the more typical capture rate of 75%. The facility is now requesting landfill gas flaring capacity of 126 MM BTU/hour. Therefore, 70% of the additional flaring capacity is due to the most recent landfill expansion (Application # 17552) rather than the 1978 landfill expansion. Flare emissions due the 1978 landfill expansion would not be subject to offset per H&S Code 42301.2. However, the additional flare emissions that are due to this most recent landfill expansion (Application # 17552) were caused by an increase in waste disposal capacity that was permitted after September 1996. Consequently, 70% of the total flare emissions do not qualify for H&SC 42301.2 and are subject to offsets.

It is very difficult to distinguish the emissions associated with an earlier landfill expansion from those associated with a later landfill expansion, because the former landfill gas generation rates will eventually dwindle down to zero while the new gas generation rates rise. Eventually, essentially all landfill gas burned in the A-50 and A-51 flares may be collected from waste associated with the 1995 expansion rather than the 1978 expansion. To simplify matters, the District will provide NO_x and POC offsets from the SFBA for all current flare emission increases. This matter may need to be revisited in future applications when offset reimbursement becomes necessary.

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 emissions from the A-51 Landfill Gas Flare. The detailed toxic emissions in Table 7 reveal that emissions from A-51 will exceed several risk screen trigger levels. Therefore, a risk screening analysis was required.

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 at the fence line and beyond. The point of maximum impact was located about 950 west of A-51. For a 1 g/s emission rate from A-51, the maximum 1-hour concentration was 42.4 $\mu g/m^3$. Since Screen3 meteorological data was used, the annual average concentration is 0.1 times this maximum 1-hour concentration, or 4.24 $\mu g/m^3$. All health risk calculations used these maximum 1-hour or maximum annual average concentrations.

Health risks due to A-51 emissions were highest for a residential receptor. The cancer risk at the maximum impact point was determined to be 0.78 in a million, the chronic hazard index (chronic HI) was 0.09, and the acute hazard index (acute HI) was 0.45. For worker receptors, the health impacts were 0.15 cancer risk, 0.02 chronic HI, and 0.45 acute HI. Residual emissions of acrylonitrile, 1,3-butadiene, and vinyl chloride and secondary emissions of formaldehyde were the largest contributors to cancer risk. Residual emissions of hydrogen sulfide and secondary emissions of hydrogen chloride were the largest contributors to chronic HI. Residual emissions of hydrogen sulfide and secondary emissions of formaldehyde were the largest contributors to acute HI. Since the health risks from the source (A-51) were less than the TBACT trigger levels of 1 in a million cancer risk and 0.2 chronic HI, TBACT is not required for A-51. 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 revised on November 10 2004, July 27, 2005, December 29, 2005, April 18, 2006, July 13, 2006, and September 20, 2006. Redwood Landfill has submitted Application # 11370 for the MFR permit changes associated with Application # 11371. These MFR permit revisions will be discussed in the Statement of Basis for Application # 11370.

Regulation 6 (Particulate Matter and Visible Emissions):

Particulate matter emissions from the A-51 Landfill Gas Flare are subject to Regulation 6. Section 6-310 limits PM emissions to 0.15 grains/dscf of exhaust. At the expected PM_{10} emission rate of 0.0171 lbs/MM BTU, the PM_{10} grain loading in the exhaust will be 0.0124 grains/sdcf at 0% O_2. This expected PM_{10} 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% O_2,

dry basis) from the flare. Recent source testing on A-51 confirms that A-51 is meeting the latter NMOC outlet concentration limit. 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 is also 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 SO_2 concentration in an exhaust stream to 300 ppmv (dry basis). At the peak inlet total reduced sulfur content of 1300 ppmv (expressed as H_2S) allowed by Condition # 19867, Part 18c, the outlet SO_2 concentration will be 272 ppmv of SO_2 at 0% O_2. 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% O_2, 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 modify four parts (Parts 20, 22, 24, and 26) of Condition # 19867 that are associated with the A-51 Landfill Gas Flare. The changes to each part are discussed below followed by the proposed text changed in strike through and underline formatting.

Part 20: The District is proposing to modify the daily and annual landfill gas throughput limits in Condition # 19867, Part 20 to be consistent with the requested flare capacity modifications for A-50 and A-51. The new flare capacities are 36 MM BTU/hour for A-50 and 90 MM BTU/hour for A-51. For operation times of 24 hours/day and 365 days/year, the maximum heat input rates are: 864 MM BTU/day and 315,360 MM BTU/year for A-50 and 2160 MM BTU/day and 788,400 for A-51. For a heat content of 500 BTU/scf, these heat input limits are equal to: 1,728,000 scf/day for A-50, 630,720,000 scf/year for A-50, 4,320,000 scf/day for A-51, and 1,576,800,000 for A-51.

Part 22: The June 8, 2006 source test on A-51 found that A-51 was emitting 6.6 ppmv of NMOC (as methane at 3% O_2) while the flare was operating at an average combustion temperature of 1450 °F. This NMOC outlet concentration is well below the 30 ppmv limit. In accordance with the provisions of Part 22, the minimum required operating temperature for a flare is the average temperature measured during a compliant source test minus 50 °F, provided this temperature is not less than 1400 °F. Therefore, the new minimum operating temperature for A-51 is (1450 – 50) = 1400 °F. This minimum flare operating temperature for A-51 will be revised accordingly. During the June 7, 2006 source test on A-50, the average flare operating temperature (1647 °F) far exceeded the current minimum limit and the outlet NMOC concentration was 4 ppmv at 3% O_2. Since the outlet NMOC concentration was far below the limit, the minimum flare operating temperature for A-50 does not need to be revised.

Part 22 (basis): The minimum flare operating temperature of 1400 °F is necessary to ensure adequate destruction of toxic compounds and to minimize formation of secondary toxic emissions. The toxic emissions from A-50 and A-51 were initially evaluated pursuant to the District's Toxic Risk Management Policy. This Policy has been replaced by Regulation 2, Rule 5. For this application, the toxic emissions from A-51 were evaluated in an HRSA and found to meet the requirements of Regulation 2-5-302. This basis for Part 22 will be corrected by deleting the obsolete reference to the Toxic Risk Management Policy and by adding the appropriate section of Regulation 2, Rule 5.

Part 24: This part refers to "leachate vapors". However, the S-50 Leachate Vapaorator has been shut down and leachate vapors are no longer burned in the flares. For clarity, this extraneous text will be deleted. The basis for Part 24 will also be corrected for the same reasons as discussed above for Part 22.

Part 26: The A-51 Landfill Gas Flare was subject to a new RACT review as a result of this request to increase the capacity of A-51. Since this flare will no longer be burning leachate vapors and a higher CO limit during the combustion of leachate vapors was not found to be necessary anyway, the District is imposing a new RACT limit of 0.2 lbs/MM BTU for CO emissions from A-51. This new RACT limit is identified in Part 26. Since A-50 is not being modified, A-50 will retain the current CO limit of 0.3 lbs/MM BTU. During the June 2006 source tests, A-50 was emitting an average of 0.081 lbs/MM BTU and A-51 emitting an average of 0.028 lbs/MM BTU. Thus, each flare is complying with its respective CO RACT limit.

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

20. The ~~total combined~~ throughput of landfill gas (with an HHV of 500 BTU/scf) to the A-50 Landfill Gas Flare ~~and the A-51 Landfill Gas Flare~~ shall not exceed ~~1,490,000,000~~ 630,720,000 scf during any consecutive 12-month period and shall not exceed ~~5,760,000~~ 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. In order to demonstrate compliance with this condition, the A-50 and A-51 Flares shall be equipped with one or more properly operating continuous gas flow meters. (Basis: Cumulative Increase, 40 CFR 60.756(b)(2)(i))

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 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:~~Toxic Risk Management Policy,~~ 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.

b. The minimum combustion zone temperature for A-51 is ~~1422~~ 1400 degrees F, averaged over any 3-hour period.

*24. The A-50 and A-51 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 ~~or leachate vapors~~. (Basis: ~~Toxic Risk Management Policy~~ Regulation 2-5-302)

26. Carbon monoxide (CO) emissions from ~~each enclosed flare (~~A-50 ~~and A-51)~~ 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 ~~this~~ these emission limit 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)

E. RECOMMENDATION

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

S-5 Redwood Landfill; abated by A-50 and A-51 Landfill Gas Flares.

signed by Carol S. Allen — 1/8/2007

By: Carol S. Allen — January 8, 2007
Senior Air Quality Engineer — Date

ADDENDUM to ENGINEERING EVALUATION REPORT

APPLICATION # 11371

Redwood Landfill, Inc.; Site # A1179

A. BACKGROUND

As discussed in the January 8, 2007 Engineering Evaluation Report, Redwood landfill is limiting the use of the A-50 Landfill Gas Flare, which is experiencing performance problems and will be replaced soon. Redwood had requested to increase the maximum permitted landfill gas throughput limits to the A-51 Landfill Gas Flare so this newer flare could be operated at full capacity (90 MM BTU/hour) for 24 hours/day and 365 days/year. This project will reduce the maximum hourly heat input rate to the A-50 Landfill Gas Flare to 36 MM BTU/hour, will reduce the CO emission limit for the A-51 Landfill Gas Flare to 0.2 lbs CO/MM BTU, and will increase the total maximum daily and maximum annual landfill gas throughput limit to the two flares (A-50 and A-51) combined. The District concluded that this project would result in a reduction in the maximum permitted emission rates for A-50 and that the proposed permit condition revisions would not constitute a modification of A-50. The District concluded that this project would result in emission increases for all pollutants except CO at A-51 and that this project would constitute a modification of A-51.

The District has now determined that the emission calculation procedure used to evaluate CO emissions from A-50 and A-51 contained an error. As a result, the District erroneously concluded that this project would not result in any CO emission increases. This addendum report explains the emission calculation error, corrects the emission increases for this project, and re-evaluates the new source review requirements for this project based on these revised cumulative emission increases.

B. EMISSIONS

In the January 8, 2007 Engineering Evaluation Report, the District correctly compared the current and proposed emissions for each flare individually. However, the District should have also compared the compared the proposed emissions from the two flares combined to the current combined emission limits. This additional comparison is presented in Table 1 below.

Table 1. Comparison of Proposed Emission Rates from both A-50 and A-51 to the Current Combined Limits

	Proposed from A-50 at 36 MM BTU/hr	Proposed from A-51 at 90 MM BTU/hr	Proposed from A-50 and A-51 combined	Current Limit for A-50 and A-51 combined
Daily	Pounds/Day	Pounds/Day	Pounds/Day	Pounds/Day
NO_x	51.84	129.60	181.44	172.80
CO	259.20	432.00	691.20	864.00
PM_{10}	14.78	36.95	51.73	49.26
SO_2	374.12	935.30	1309.42	1247.07
POC	11.73	29.33	41.06	39.10
NPOC	0.35	0.87	1.22	1.16
Annual	Tons/Year	Tons/Year	Tons/Year	Tons/Year
NO_x	9.461	23.652	33.113	22.350
CO	47.304	78.840	126.144	111.750
PM_{10}	2.697	6.743	9.440	6.370
SO_2	22.321	55.803	78.124	52.731
POC	2.141	5.352	7.493	5.057
NPOC	0.064	0.159	0.223	0.150

For daily emissions, the District previously concluded that A-50 would result in emission reductions for all pollutants due to the reduction in the landfill gas throughput limit for A-50 (see Table 3 of the 1/8/07 Engineering Evaluation). For A-51, the District previously concluded that maximum daily emissions from A-51 would be no greater than the current permitted emissions from A-51 (see Table 3 of the 1/8/07 Engineering Evaluation). However, the District should have also compared the proposed daily emissions for the two flares combined to the current combined daily emission limit. This omitted comparison is presented in Table 1. As illustrated above, this project results in increases in maximum permitted daily emissions for NO_x, PM_{10}, SO_2, POC, and NPOC. This project does not result in increases of daily CO emissions, due to the proposed reduction in the CO emission limit for the A-51 Landfill Gas Flare. Although this project results in a small increase in the maximum permitted daily landfill gas throughput limit to the two flares combined (from 4000 scf of landfill gas to 4200 scfm of landfill gas), the concurrent reduction in the CO emission limit at A-51 results in an overall reduction in maximum permitted daily CO emissions.

For annual emissions, the District previously compared the proposed annual emissions from each flare to the maximum possible emissions for each flare (see Tables 3 and 5 of the 1/8/07 Engineering Evaluation) and determined that this project would result in emission increases at A-51 for NO_x, PM_{10}, SO_2, and POC. For CO, the proposed emissions from A-51 were 78.84 tons/year of CO and the maximum permitted emissions (for A-50 and A-51 combined) were 111.75 tons/year of CO. Consequently, the District concluded that this project would not result in any CO emission increases. As with daily emissions, the District should have also compared the sum of the proposed emissions from A-50 and A-51 to the combined annual limit for A-50 and A-51. From Table 1, this project results in CO emission increases as well as emission increases for the other pollutants.

Since the District is reducing the throughput limits for A-50, all cumulative emission increases should be attributed to A-51. Cumulative emission increases should be equal to the higher of the following: (a) the actual emission increases at A-51 alone or (b) the proposed increases in potential to emit for the total project (A-50 and A-51 combined). The actual emission increases for A-51 are determined in Table 2 below. The proposed increases in project potential to emit are summarized in Table 3 below.

Table 2. Revised Actual Increases at A-51 Alone

	Actual Emission Rate from A-51 lbs/MM BTU	Baseline Emissions from A-51 at 609,611 MM BTU/yr Tons/Year	Proposed Emissions for A-51 Tons/Year	Actual Emission Increases at A-51 Tons/Year
NO_x	0.046	13.869	23.652	9.783
CO	0.033	9.906	78.840	68.934
PM_{10}	0.017	5.214	6.743	1.529
SO_2	0.102	31.240	55.803	24.563
POC	0.002	0.628	5.352	4.724
NPOC	0.000	0.000	0.159	0.159

Table 3. Proposed Potential to Emit Increases for the Project

	Current Emission Limits for A-51 and A-51 combined Tons/Year	Proposed Project Emissions from A-50 and A-51 Tons/Year	Potential to Emit Increases for A-50 and A-51 Tons/Year
NO_x	22.350	33.113	10.763
CO	111.750	126.144	14.394
PM_{10}	6.370	9.440	3.070
SO_2	52.731	78.124	25.393
POC	5.057	7.493	2.436
NPOC	0.150	0.223	0.073

From Tables 2 and 3 above, the potential to emit increases for NO_x, PM_{10}, and SO_2 are higher than the actual emission increases at A-51. However, the actual emission increases at A-51 are higher than the potential to emit increases for CO, POC, and NPOC emissions. Cumulative emission increases for this project are the higher of these two calculation procedures. The revised cumulative emission increases for this application are presented in Table 4.

Table 4. Revised Cumulative Emission Increases for Application # 11371

	Cumulative Emission Increases for App. # 11371 Tons/Year	Excess On-Site Credit Available from App. # 17552 Tons/Year	Offsets Supplied from SFBA Tons/Year	Net Change After Credits and Offsets Tons/Year
NO_x	10.763		10.763	0.000
CO	68.934			68.943
PM_{10}	3.070	37.635		0.000
SO_2	25.393			25.393
POC	4.724		4.724	0.000
NPOC	0.159			0.159

The NO_x emission increases for this application are higher than previously determined and will need to be corrected. This facility continues to qualify for the small facility banking account; therefore, the additional NO_x offsets required for this corrected cumulative increase will be supplied from the SFBA.

The CO emission increases will need to be added to the record for this application. CO emission increases are not subject to offset requirements.

The PM_{10} emission increases are higher than previously determined and will need to be corrected. However, there are sufficient excess on-site credits still available from Application # 17552 to reduce all PM_{10} emission increases to zero.

The SO_2 emission increases for this application are higher than previously determined and will need to be corrected. Since facility wide SO_2 emissions are less than 100 tons/year, SO_2 offsets are not required.

The POC and NPOC emission increase are the same as previously determined. No changes are necessary for these pollutants.

C. STATEMENT OF COMPLIANCE

As discussed in the 1/8/07 Engineering Evaluation for Application # 11371, this project required offsets for NO_x and POC emissions. For Application # 11371, this facility qualified to use the small facility banking account, because this application was subject to the 50 ton/year thresholds for the SFBA and facility wide emissions of NO_x and POC were less than 50 tons/year. This addendum results in a revised cumulative increase for NO_x, but it does not impact the facility-wide potential to emit for NO_x or change any of the conclusions regarding offset and SFBA applicability for Application # 11371. Therefore, the only changes necessary are to correct the NO_x increase for this application and to correct the amount of NO_x offsets supplied from the SFBA.

Similarly, this addendum results in a revised cumulative increase for PM_{10} and SO_2 emissions, but it does not impact the facility-wide potential to emit for PM_{10} or SO_2. There are sufficient excess on-site emission reduction credits from Application # 17552 to offset this higher PM_{10} emission increase. SO_2 offsets were not required. Therefore, correcting the cumulative increase inventory is the only necessary action.

For CO, the District had concluded that the project would not result in any CO increases. This conclusion is incorrect. Application # 11371 will result in a 14.394 ton/year increase in the potential to emit for CO and a 68.943 ton/year increase in actual CO emissions from A-51. The District had already discussed RACT requirements for CO emissions from the A-51 flare in the 1/8/07 Engineering Evaluation for Application # 11371. The District is proposing to reduce the CO RACT emission limit for A-51 from 0.3 pounds/ton to 0.2 pounds/ton as an updated RACT requirement. Offsets are not required for CO emissions. Since the facility wide potential to emit is less than 250 tons/year for all pollutants, PSD does not apply to this facility. Since CO emission increases are less than 100 tons/year, the CO modeling requirement in Regulation 2-2-305.2 does not apply. Consequently, the only action needed is to add the CO emission increases to the inventory for this application.

This addendum did not result in any changes to the NPOC emission increases.

D. RECOMMENDATION

Correct the Cumulative Emission Increase Inventory for Application # 11371 as indicated in Table 4 above.

signed by Carol S. Allen 8/14/07
By: Carol S. Allen Date
Senior Air Quality Engineer