

**ENGINEERING REVIEW**  
of the  
**COLLECTION AND CONTROL SYSTEM DESIGN PLAN**  
from  
Republic Services Vasco Road; PLANT #5095  
and  
**APPLICATION #2244**

**BACKGROUND**

Republic Services Vasco Road (RSV) owns and operates the Vasco Road Landfill located on North Vasco Road in Livermore. The site includes the following permitted equipment: the Vasco Road Landfill (active) and Gas Collection System (S-1), a Pugmill (S-5), a Silo (S-6), a Non-Retail Gasoline Dispensing Facility (S-7), three Diesel Engines (S-8, S-9, and S-10), a Landfill Gas Flare (A-3), and a Baghouse (A-6).

The Vasco Road Landfill is a 323-acre Class III disposal site that accepts household, commercial, industrial, construction, and demolition wastes but does not accept any hazardous wastes. The maximum design capacity of the site is 31.65 million yd<sup>3</sup> (24.2 million m<sup>3</sup>). Waste disposal began in 1963. As of December 31, 2002, the landfill had disposed of a total of 14.1 million tons of waste. The maximum amount of waste that will be placed in this landfill is estimated to be 23.8 million tons. The landfill is expected to reach full capacity in the year 2022.

The landfill is equipped with an active gas collection system. All collected landfill gas is burned in the on-site A-3 Landfill Gas Flare. This flare has a maximum firing capacity of 71 MM BTU/hour and is capable of handling up to 2600 scfm of landfill gas with a heat content of 455.1 BTU/scf (about 45.8% methane), where methane has a heat content of 1013 BTU/ft<sup>3</sup> at 60 °F or 993.9 BTU/scf at 70 °F.

This application concerns the Vasco Road Landfill, gas collection system, and flare (S-1 and A-3). The main purpose of this report is the review and approval of the March 2001 Collection and Control System Design Plan for this site. In a May 2003 Addendum to Design Plan, RSV has requested an Authority to Construct for an expansion of the gas collection system and for a Change of Conditions at the landfill. RSV has requested to install up to 46 vertical wells. These wells are mainly intended to collect gas in newly filled areas. RSV has requested condition changes that will establish alternative temperature and oxygen concentration limits for selected wells. RSV has also requested that the District clarify the requirements for vaults that contain gas collection system components using language that has been approved for other landfill sites.

This report will discuss (a) emission changes associated with the proposed installation of new wells and the proposed condition changes, (b) all changes to the MFR Permit that are necessary for the issuance of an Authority to Construct for new wells and revised conditions, and (c) collection and control system design issues that were identified in the March 2001 Design Plan and May 2003 Addendum but were not addressed in the MFR Permit and Statement of Basis for Site # A5095.

## **EMISSIONS**

Particulate emissions from landfills are determined based on the waste disposal rate for the site. The sources of particulate emissions, which include vehicle traffic, excavation, disposal, and cover operations, and wind erosion, can all be related to the amount of waste disposed of per day. Since this application does not involve any changes in traffic or waste disposal rates, this application will not result in any increases of particulate emissions.

Organic compound emissions from landfills are determined based on the cumulative amount of decomposable refuse that is placed in the landfill, the waste placement history, the resulting methane generation rate, and the capture efficiency of the landfill gas collection system. The maximum expected methane generation rate, the gas collection system's capture efficiency, and the maximum permitted non-methane organic compound (NMOC) emissions from the Vasco Road Landfill are discussed in detail later in this report. Since this application will not increase the maximum permitted amount of decomposable waste or the future waste placement rate, this application will not impact the amount of organic compounds generated by the landfill.

The installation of new wells will not affect the permitted capture efficiency achieved by the gas collection system, because all collection systems that are meeting the requirements of Regulation 8, Rule 34 are assumed to achieve the same minimum capture efficiency (75%). The proposed installation of 46 new vertical wells at this site is intended to ensure that the Vasco Road Landfill continues to comply with the Regulation 8-34-303 surface leak limit and the Regulation 8-34-304 gas collection system installation date requirements. Therefore, the collection system capture efficiency and the maximum permitted NMOC emissions from this landfill will not increase due to this action.

The Regulation 8-34-305 limits (including limits on either nitrogen or oxygen concentration in the gas at a wellhead and limits on temperature of the gas at a wellhead) are intended to prevent subsurface fires and are not related to organic emissions. Therefore, modifications of these wellhead limits will not result in any emission increases. The language concerning vaults is intended to clarify applicable requirements and will not impact the maximum permitted emission rate for the landfill.

In summary, the proposed installation of 46 new wells and the proposed permit condition revisions will not result in any changes in cumulative emissions for this site.

## **MFR PERMIT REVISIONS**

Since the District expects to issue the final MFR Permit for this site shortly, any permit condition changes must be reflected in the MFR Permit. Therefore, this application will be considered a request to revise the MFR Permit as well as a request for an Authority to Construct for new wells and a Change of Permit Conditions. The establishment of alternative wellhead limits will require a significant revision of the MFR Permit and a new public comment period.

The proposed revisions to the MFR Permit (pursuant to this application) are identified below in strikeout and underline format.

### Sections I Standard Conditions

No changes to Section I will be necessary.

### Section II Equipment

No changes to Section II will be necessary.

Section III Generally Applicable Requirements

No changes to Section III will be necessary.

Section IV Source-Specific Applicable Requirements

As discussed in more detail in the initial Title V permit for this site (Application # 2630), the landfill and flare at this site are subject to the Emission Guidelines for MSW Landfills and Regulation 8, Rule 34. These operations are also subject to several other District regulations and permit conditions as identified in Table IV-A of the MFR Permit. The site history and applicable requirements were thoroughly reviewed and described in the Statement of Basis and the MFR Permit that were prepared for Application # 2630.

The proposed installation of new wells, establishment of alternative wellhead limits, and clarification of requirements for vaults will be described in permit condition revisions, specifically revisions to Condition # 818, Parts 2 and 3. Parts 2 and 3 are described in a general fashion in Table IV-A. The only change necessary is to update the basis of Part 3 as indicated below.

**Table IV – A  
Source-Specific Applicable Requirements  
S-1 VASCO ROAD LANDFILL WITH GAS COLLECTION SYSTEM  
AND A-3 LANDFILL GAS FLARE**

Applicable Requirement	Regulation Title or Description of Requirement	Federally Enforceable (Y/N)	Future Effective Date
<b>BAAQMD Condition # 818</b>			
Part 1	Control requirements for collected landfill gas (Regulations 8-34-301 and 8-34-303)	Y	
Part 2	Landfill gas collection system description (Regulations 2-1-301, 8-34-301.1, 8-34-304, and 8-34-305)	Y	
Part 3	Landfill gas collection system operating requirements (Regulations 8-34-301.1, <u>8-34-301.2, 8-34-303, and 8-34-305</u> )	Y	

Section V Schedule of Compliance

No changes to Section V will be necessary.

Section VI Permit Conditions

All permit conditions modifications that were necessary to ensure compliance with the applicable requirements of Regulation 8, Rule 34 were discussed in the MFR Permit and Statement of Basis for this site (see Application # 2630). The permit condition revisions discussed in the proposed MFR Permit and the District’s responses to the Applicant’s comments will become effective upon the issuance of the final MFR Permit. The District expects to issue this final MFR Permit shortly.

As discussed above, the proposed installation of new wells, establishment of alternative wellhead limits, and clarification of requirements for vaults will require revisions to Condition # 818, Parts 2 and 3. The proposed permit condition revisions are shown below.

**Condition # 818**

**FOR: S-1 VASCO ROAD LANDFILL WITH GAS COLLECTION SYSTEM;**

**FOR: A-3 LANDFILL GAS FLARE**

2. The Permit Holder shall apply for and receive an Authority to Construct before modifying the landfill gas collection system described in Parts 2a-b below. Increasing or decreasing the number of wells or collectors, changing the length of collectors, or changing the locations of wells or collectors are all considered to be modifications that are subject to the Authority to Construct requirement.

a. The Permit Holder has been issued a Permit to Operate for the landfill gas collection system components listed below.

	<u>Required Components</u>
Total Number of Vertical Wells:	83
Total Number of Horizontal Collectors:	5

b. The Permit Holder has been issued an Authority to Construct (Application Number: ~~274042244~~) for the additional landfill gas collection system components listed below.

Total Number of Vertical Wells: 2046

Wells installed pursuant to subpart b shall be added to 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 initial operation date for each new well.

(basis: Regulations 2-1-301, 8-34-301.1, 8-34-304, 8-34-305)

3. a. The landfill gas collection system described in Part 2a shall be operated continuously, as defined in Regulation 8-34-219 and Part 3b below. Wells shall not be shut off, disconnected or removed from operation without written authorization from the APCO, unless the Permit Holder complies with all applicable requirements of Regulation 8, Rule 34, Sections 113, 116, 117, and 118. (basis: Regulation 8-34-301.1)

b. For the specified wells and collectors listed below, the gas collection system operating requirements listed in Parts 3b(i-ii) shall replace the wellhead requirements identified in Regulation 8-34-305.2 through 8-34-305.4. All wells and collectors remain subject to the Regulation 8-34-305.1 requirement to maintain vacuum on each wellhead and to the Regulation 8-34-505 monthly monitoring requirements. The specified wells and collectors shall be deemed to be operating continuously, if the components are complying with Regulation 8-34-305.1 and any applicable limits in Part 3b(i-ii). In addition, Part 3b(iii) clarifies the applicable limits for vaults containing gas collection system components. If the Permit Holder discovers an excess of a Part 3b(i-iii) limit and corrects the excess in accordance with the Regulation 8-34-414 repair schedule, the excess shall not be deemed a violation of this part. (basis: Regulations 8-34-301.1, 8-34-301.2, 8-34-303, and 8-34-305)

i. The Regulation 8-34-305.2 temperature limit shall not apply to the wells or collectors listed below. The landfill gas temperature in each of the components listed below shall not exceed 140 degrees F. OEW-HA, OEW-HB, OEW-14, EW-9, EW-33A, EW-43, EW-44, EW-45, EW-52, EW-53, EW-54, EW-57, and EW-58.

ii. The Regulation 8-34-305.3 nitrogen concentration limit and the Regulation 8-34-305.4 oxygen concentration limit shall not apply to the wells listed below, provided that the oxygen concentration in the landfill gas at the main header does not exceed 5% O<sub>2</sub> by volume (dry basis) and the methane concentration in the landfill gas at the main header is not less than 35% CH<sub>4</sub> by volume (dry basis). The permit holder shall monitor the landfill gas from the main header for oxygen and methane on a monthly basis to demonstrate compliance with this part.

- OEW-6, OEW-10, OEW-11, OEW-13, OEW-14, OEW-HA, OEW-HB, EW-9, EW-15, EW-16, EW-26, EW-27, EW-29, EW-29A, EW-31, EW-32, EW-32A, EW-33, EW-33A, EW-35, EW-36, EW-36A, EW-38, EW-40, EW-41, EW-42A, EW-43, EW-51, and EW-58.
- iii. This subpart applies to vaults containing gas collection system equipment, where the top of the vault is located at or near the surface of the landfill. The vault shall be monitored at both 1 cm from the vault (for comparison to the component leak limit of Regulation 8-34-301.2) and 2 inches above the vault (for comparison to the surface leak limit of Regulation 8-34-303).
- (a) If during an inspection the District's monitored readings show compliance with both the component leak limit and the surface leak limit, the vault and components within shall be deemed to be in compliance with Regulations 8-34-301.2 and 8-34-303. No further testing is necessary.
- (b) If the District's monitored readings show an excess of either the component leak limit or the surface leak limit, the operator shall comply with the Regulation 8-34-415 Repair Schedule for Landfill Surface Leak Excesses, until the source of the leak can be identified. The vault shall be opened and allowed to air out for at least 10 minutes. The collection system components within the vault shall be re-monitored at 1 cm from the components and the landfill surface surrounding the vault shall be re-monitored at 2 inches above the surface.
- (c) If the re-monitoring (after airing the vault for 10 minutes) shows no component leaks and no surface leaks, the vault and components within shall be deemed to be in compliance with Regulations 8-34-301.2 and 8-34-303.
- (d) If the re-monitoring shows a component leak, or the operator's further evaluation determines that the source of the emissions excess was a collection system component, then a violation of 8-34-301.2 shall be deemed to have occurred; and the operator shall take all necessary corrective action and shall comply with all applicable reporting requirements.
- (e) If the re-monitoring shows a surface leak but not a component leak, the operator shall continue to comply with all applicable provisions of the Regulation 8-34-415 Repair Schedule for Landfill Surface Leak Excesses.

Part 2b: The Authority to Construct # 27401 expired in September 2003. All wells that were installed under this Authority to Construct have already been included in Part 2a. This application number (2244) and the newly authorized well installations (46 vertical wells) are described in Part 2b.

Part 3a: The District is proposing to clarify the meaning of "operated continuously" to include compliance with the alternative wellhead limits in Part 3b as well as the definition in Regulation 8-34-219.

Part 3b: As allowed by Regulation 8-34-305, the District is proposing to establish alternative operating levels for specific gas collection system components from the limits in 8-34-305.2-4. The listed components have experienced difficulty in complying with the 8-34-305 wellhead limits. In some cases, the problem components are located in shallow refuse areas. In other cases, wells have been replaced with new wells and now have overlapping areas of influence. The Permit Holder will continue to monitor these components on a monthly basis in order to identify any non-functioning or redundant components and to determine which wells or collectors should be capped and removed from Part 2a.

- (i) The District has proposed an alternative temperature limit of 140 °F for 13 components that have been intermittently operating above 55 °C. This proposed limit is the same as alternative wellhead temperature limits that are in effect at other landfill sites. No subsurface fires have occurred at any of these sites.
- (ii) The District has proposed to use limits on the oxygen and methane content in the main landfill gas header in place of the oxygen content limit for 29 components. The proposed text is similar to the condition text used at other sites with alternative oxygen limits. The listed components have experienced prolonged periods of time where the oxygen concentration has been above the 8-34-305.4 oxygen concentration limit, but the Permit Holder has found no evidence of subsurface fires. The Permit Holder has made numerous attempts to correct these problems by adjusting the vacuum, repairing seals around well casings, eliminating surface cracks, and replacing components, but the Permit Holder has been unsuccessful in maintaining compliance with both the oxygen limit and the vacuum requirement. While these individual components may have oxygen levels exceeding 5%, the flow rate from these components is small compared to the total amount of gas being collected. Therefore, the overall amount of air intrusion into the landfill is expected to be minimal and is not expected to cause subsurface fires or significantly impede the anaerobic decomposition process. The proposed limits on oxygen content and methane content at the main header will ensure that the flare can be operated properly and that the higher oxygen levels at some wells do not cause excessive air intrusion into the landfill as a whole. The District has proposed monthly monitoring of the methane and oxygen content at the main header to ensure compliance with these header limits. Monthly monitoring is an adequate frequency for demonstrating compliance with these header limits, because it is consistent with the current monthly monitoring schedule for the wellhead limits that these header limits are replacing.
- (iii) The subpart clarifies the applicable requirements (surface leak limit versus component leak limit) for surface level vaults that contain landfill gas collection system components. These vaults can trap small amounts of landfill gas and cause higher methane content readings than would otherwise be recorded, if the component were not located in a vault. Also, it is often difficult to determine the source of a leak into these vaults. The District has developed standard text to clarify the applicable requirements for these vaults and identify the appropriate monitoring procedures. The District is proposing to add this standard text to Part 3b(iii) at the applicant's request.

### Section VII Applicable Limits and Compliance Monitoring Requirements

The applicable limits and monitoring requirements necessary to demonstrate compliance with Regulation 8, Rule 34 and other applicable requirements were discussed in detail in the Statement of Basis for the initial MFR Permit for this site (see Application # 2630). The proposed changes to Condition # 818, Part 2 do not affect any of the applicable limits or monitoring requirements identified in Table VII-A of the final MFR Permit. The proposed changes to Condition # 818, Part 3 are reflected in Table VII-A, as identified below.

The permit holder will continue to monitor the wellheads for gauge pressure, landfill gas temperature and oxygen, on a monthly basis, pursuant to Regulation 8-34-505. The permit holder will also continue to maintain records of all wellhead monitoring events, excesses, and repairs pursuant to Regulation 8-34-501.9. These monitoring and record keeping requirements are adequate methods of demonstrating compliance with the alternative wellhead limits described in Condition # 818, Part 3.

**Table VII – A**  
**Applicable Limits and Compliance Monitoring Requirements**  
**S-1 VASCO ROAD LANDFILL WITH GAS COLLECTION SYSTEM**  
**AND A-3 LANDFILL GAS FLARE**

Type of Limit	Citation of Limit	FE Y/N	Future Effective Date	Limit	Monitoring Requirement Citation	Monitoring Frequency (P/C/N)	Monitoring Type
TOC (Total Organic Compounds Plus Methane)	BAAQMD 8-34-301.2	Y		1000 ppmv as methane (component leak limit)	BAAQMD 8-34-501.6 and 503 <u>and</u> BAAQMD Condition # 818, Part 3biii	P/Q	Quarterly Inspection of collection and control system components with OVA and Records
TOC	BAAQMD 8-34-303	Y		500 ppmv as methane at 2 inches above surface	BAAQMD 8-34-415, 416, 501.6, 506 and 510 <u>and</u> BAAQMD Condition # 818, Part 3biii	P/M, Q, and E	Monthly Visual Inspection of Cover, Quarterly Inspection with OVA of Surface, Various Reinspection Times for Leaking Areas, and Records
Wellhead Pressure	BAAQMD 8-34-305.1	Y		< 0 psig	BAAQMD 8-34-414, 501.9 and 505.1	P/M	Monthly Inspection and Records
Temperature of Gas at Wellhead	BAAQMD 8-34-305.2	Y		< 55 °C <sub>a</sub> <u>except for components identified in Condition # 818, Part 3bi</u>	BAAQMD 8-34-414, 501.9 and 505.2	P/M	Monthly Inspection and Records
<u>Temperature of Gas at Specified Well-heads</u>	<u>BAAQMD Condition # 818, Part 3bi</u>	<u>Y</u>		<u>140 °F</u>	<u>BAAQMD 8-34-414, 501.9 and 505.2</u>	<u>P/M</u>	<u>Monthly Inspection and Records</u>
Gas Concentrations at Wellhead	BAAQMD 8-34-305.3 or 305.4	Y		N <sub>2</sub> < 20% <b>OR</b> O <sub>2</sub> < 5% <sub>a</sub> <u>except for components identified in Condition # 818, Part 3bii</u>	BAAQMD 8-34-414, 501.9 and 505.3 or 505.4	P/M	Monthly Inspection and Records

**Table VII – A  
Applicable Limits and Compliance Monitoring Requirements  
S-1 VASCO ROAD LANDFILL WITH GAS COLLECTION SYSTEM  
AND A-3 LANDFILL GAS FLARE**

Type of Limit	Citation of Limit	FE Y/N	Future Effective Date	Limit	Monitoring Requirement Citation	Monitoring Frequency (P/C/N)	Monitoring Type
<u>Gas Concentrations at Header</u>	<u>BAAQMD Condition # 818, Part 3bii</u>	<u>Y</u>		<u>O<sub>2</sub> &lt; 5%</u> <u>CH<sub>4</sub> &gt; 35%</u>	<u>BAAQMD 8-34-414 and 8-34-501.4 and BAAQMD Condition # 818, Part 3bii</u>	<u>P/M</u>	<u>Monthly Inspection and Records</u>

Section VIII Test Methods

The test methods that are approved for demonstrating compliance with the Regulation 8-34-305 wellhead limits will be used to demonstrate compliance with the alternative wellhead limits in Condition # 818, Part 3. Table VIII Test Methods will be modified as shown below to reflect this change.

**Table VIII  
Test Methods**

Applicable Requirement	Description of Requirement	Acceptable Test Methods
BAAQMD 8-34-305.1	Wellhead Gauge Pressure	APCO Approved Device
BAAQMD 8-34-305.2	Wellhead Temperature	APCO Approved Device
BAAQMD 8-34-305.3	Wellhead Nitrogen	EPA Reference Method 3C, Determination of Carbon Dioxide, Methane, Nitrogen, and Oxygen from Stationary Sources
BAAQMD 8-34-305.4	Wellhead Oxygen	EPA Reference Method 3C, Determination of Carbon Dioxide, Methane, Nitrogen, and Oxygen from Stationary Sources
<u>BAAQMD Condition # 818, Part 3b</u>	<u>Alternative Temperature Limit at Wellheads and Alternative Gas Concentration Limits at Header</u>	<u>Landfill Gas Temperature: APCO Approved Device</u> <u>Landfill Gas Methane and Oxygen Limits: EPA Reference Method 3C, Determination of Carbon Dioxide, Methane, Nitrogen, and Oxygen from Stationary Sources</u>

Section IX Permit Shield

No changes to Section IX will be necessary.

Section X Revision History

Section X was added to describe the revision history of the MFR Permit for this site.

**X. REVISION HISTORY**

**Title V Permit Issuance:**

**January , 2004**

**Minor Revision:**

**[insert approval date]**

- Revised Condition # 818, Part 2b to allow the installation of new wells approved pursuant to Application # 2244.
- Revised Condition # 818, Part 3 to clarify applicable limits and establish alternatives to the Regulation 8-34-305 wellhead limits for specific components.
- Revised Tables IV-A, VII-A, and VIII to reflect above revisions to Condition # 818, Part 3.
- Added Section X Revision History and revised subsequent section numbers.

**Section XI Glossary and Section XII Applicable State Implementation Plan**

The section numbers for the Glossary and Applicable State Implementation Plan were revised as shown below.

**XI. GLOSSARY**

**XII. APPLICABLE STATE IMPLEMENTATION PLAN**

**DESIGN PLAN REVIEW**

**Landfill Gas Generation Rates**

EPA’s LANDGEM program was used to determine annual methane generation rates for the Vasco Road Landfill. The input parameters included waste disposal rates supplied by the applicant and AP-42 default values for k (0.02 year<sup>-1</sup> for dry areas) and L<sub>0</sub> (100 m<sup>3</sup>/Mg). For the year 2002, the generation rate was determined to be 890.3 cfm of methane (equivalent to 1781 cfm of landfill gas at 50% methane). The maximum generation rate will be 1394 cfm of methane (2788 cfm of landfill gas at 50% methane) and will occur in 2022.

**Collection System Design**

BAAQMD Regulation 8-34-408 and 40 CFR Part 60.759 describe the design issues that must be addressed in Collection and Control System Design Plans. This section discusses the design requirements for active gas collection systems. The control systems operating and monitoring requirements were discussed in the MFR Permit and Statement of Basis for this site.

**Target Gas Collection Rate**

The gas collection system at this site should ultimately be designed to handle 100% of the peak gas generation rate by 2022. Typically, the gas collection system is expanded or upgraded every two to four years. The gas collection system design rates from 2002 to 2022 are listed below.

## Collection System Design Rates

<u>Year</u>	<u>Landfill Gas, cfm</u>
2002	1781
2004	1918
2008	2139
2012	2344
2016	2533
2020	2706
2022	2788

From AP-42 Chapter 2.4, the average landfill gas collection system efficiency for landfills is 75%. This collection system efficiency is used to establish a target gas collection rate for this site. For year 2002, the target landfill gas collection rate is  $(1781 * 0.75) = 1336$  cfm of landfill gas or 668 cfm of methane.

During 2002, the applicant reported collecting 774,553 M scf/year (an average of 1474 cfm) of landfill gas. From the June 2003 source test, the average methane content for 1475 cfm of landfill gas burned was 36% methane. Using this methane content, the actual collection rate for 2002 is estimated to be 531 cfm of methane. The 2002 actual collection rate is equal to a calculated collection system efficiency of 60%, which is less than the target gas collection efficiency of 75%.

In order to improve the gas collection rate at this site, Republic Services is proposing to install up to 46 additional vertical wells over the next 2-4 years. These wells are expected to collect an additional 15-20 cfm of landfill gas per well or about 690-920 cfm of additional landfill gas (at 50% methane). By 2008, the landfill gas collection rate is expected to increase to at least 1751 cfm of landfill gas (at 50% methane) and the projected collection system efficiency will increase to at least 82%.

The proposed collection system modifications are necessary to improve the gas collection rate and reduce excessive fugitive emissions.

Blowers and Gas Movers

The Vasco Road Landfill's gas collection system is equipped with two 50 hp Lamson blowers (one for primary and one for back-up). Each blower has a maximum capacity of 2350 cfm of gas. A single blower has sufficient capacity to collect all landfill gas that will be generated by this landfill through the year 2012.

From 2013-2030, the landfill gas generation rate will exceed the capacity of a single blower. The existing back-up blower has sufficient capacity to collect all landfill gas that will be generated during 2013-2030, if the existing primary and back-up blowers are operated simultaneously. For the peak gas generation year of 2022, the peak target gas collection rate is  $(2788 \text{ cfm} * 0.75) = 2091$  scfm of landfill gas. A single blower will be able to achieve this minimum gas collection rate. Using only one blower, the gas collection system efficiency will be 84.3% in 2022.

Collection System Density

The area of influence around a gas collection system well (where the well can adequately collect the generated landfill gas) depends on the depth of the refuse and the strength of the vacuum that can be applied to wells without getting excessive air intrusion. Shallow and perimeter wells can typically achieve areas of influence with a radius ranging from 25-75 feet, while deeper interior wells generally have a larger radius of influence ranging from 75-175 feet.

For this site, the gas collection system includes 83 vertical wells with depths ranging from 15-177 feet and 5 horizontal collectors. The distances between the vertical wells range from 160 feet

apart to 440 feet apart, with most wells averaging about 220 feet apart. The average radius of influence is 110 feet, which falls within the normal range discussed above for deeper interior wells.

Republic Services conducted surface emissions monitoring during the fourth quarter of 2002 and the first, second and third quarters of 2003. Republic Services found no excesses of the surface emission leak limit. The District has not documented any violations of the surface emission leak limit since the new limit of 500 ppmv as methane became effective in July 2002. Therefore, the current collection system density is adequate.

Several locations in the active fill areas (within about 650 feet of the northern border and in center of the current refuse areas) appear to lack sufficient collection system density. These areas have been targeted for gas collection system expansion within the next four years. The proposed collection system locations are expected to reduce the average radius of influence to about 80 feet. This should provide adequate collection system density for the currently active fill areas.

#### Construction Materials

All collection system piping, valves, and connectors were constructed from approved materials, mainly HDPE in newer systems and PVC in older piping sections.

#### Other Design Issues

The newer collection system components are equipped with condensate sumps and pumps and a leachate collection and removal system. Condensate and leachate are pumped out whenever necessary, sent to storage tanks (exempt from permit requirements), and then transported to the wastewater treatment plant for treatment or disposal.

The older disposal units do not have leachate collection and removal systems. For the older collection systems, condensate is collected in traps and then reinjected into the landfill. All new collection systems will be equipped with condensate removal pumps.

#### Control System Design

All collected landfill gas from the Vasco Road Landfill is burned in the on-site Landfill Gas Flare (A-3). The flare can burn up to 71 MM BTU/hour or 2381 scfm of landfill gas at 50% methane (497 BTU/scf). This flare has sufficient capacity to handle all landfill gas that can be delivered from a single blower. This flare has sufficient capacity to handle the peak target gas collection rate of 2091 scfm of landfill gas, but not the peak gas generation rate. An additional 12.2 MM BTU/hour of control capacity would be needed to handle the peak gas generation rate. Since the actual gas collection rate is not expected to exceed the capacity of a single blower, additional control capacity is not necessary at this time.

#### Alternative Limits

In a May 2003 Addendum to the Design Plan, Republic Services requested alternatives to several Regulation 8-34-305 wellhead limits. Specifically, the RSV requested an alternative temperature limit of 20 degrees above the baseline temperature for 13 components, an oxygen level of 5% above baseline for 11 components, and an exemption from the oxygen limit for 18 components.

The District has reviewed the data supplied by the applicant and determined that alternative limits are justified for the components identified by RSV, because there is no evidence to suggest that subsurface fires would result from exceeding the 8-34-305 wellhead limits. The affected components are either located in shallow refuse areas or in areas with overlapping coverage from nearby wells. The Permit Holder's attempts to correct the problems have, in many cases, been unsuccessful without discontinuing vacuum altogether. The Permit Holder will continue to

evaluate these wells to determine if any redundant wells should be permanently disconnected or if any poorly performing wells should be replaced.

The District used standard language for alternative wellhead limits that has been approved for other landfill sites to establish appropriate alternative limits and monitoring procedures for this site. Specifically, the District is proposing to establish an alternative wellhead temperature limit of 140 °F (instead of 131 °F) for 13 gas collection system components and to establish a maximum limit of 5% oxygen and a minimum limit of 35% methane at the landfill gas header instead of the current wellhead maximum of 5% oxygen for 29 gas collection system components. The detailed discussion of the District's proposed text was presented above following the proposed permit condition revisions.

## RECOMMENDATION

Staff recommends approval of the Collection and Control System Design Plan for Republic Services' Vasco Road Landfill (Site # A5095), as proposed in the March 2001 Design Plan and May 2003 Addendum to this Design Plan. Staff also recommends approval of an Authority to Construct for the modification described below, approval of a Change of Conditions for Condition # 818, and a significant revision of the MFR Permit for Site # A5095.

- S-1 Vasco Road Landfill with Gas Collection System; abated by A-3 Landfill Gas Flare.**
- **Modification to add up to 46 vertical wells to the gas collection system.**

By: Carol S. Allen  
Senior Air Quality Engineer

January 29, 2004  
Date

CSA:csa

*H:\Pub\_Data\Title\Permit\Evals\A5095A-2244.doc*