

**Part III
Attachment III-G**

LANDFILL GAS MANAGEMENT PLAN

**Pescadito Environmental Resource Center
MSW No. 2374
Webb County, Texas**

PESCADITO
ENVIRONMENTAL RESOURCE CENTER

Initial Submittal March 2015
Revised September 2015

**Prepared for:
Rancho Viejo Waste Management, LLC
1116 Calle del Norte
Laredo, TX 78041**

**Prepared by:
CB&I Environmental and
Infrastructure, Inc.**



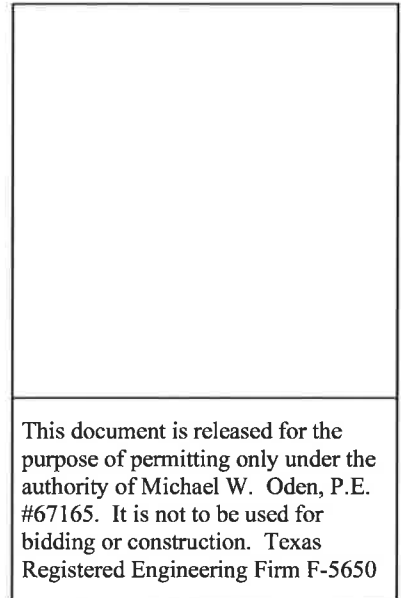
**12005 Ford Rd, Suite 600
Dallas, TX 75234**

This document is released for the purpose of permitting only under the authority of Michael W. Oden, P.E. #67165. It is not to be used for bidding or construction. Texas Registered Engineering Firm F-5650

Table of Contents

1.0	INTRODUCTION - §330.371(a).....	1
2.0	METHANE MONITORING PROGRAM - §330.371(b)	3
2.1	Site Conditions.....	3
2.2	Accommodations for Pipelines.....	4
2.3	Monitoring Frequency	5
3.0	ACTION PLAN - §330.371(c-d).....	6
3.1	Immediate Actions to Protect Human Health	6
3.2	Verification Procedures	8
3.3	Action to Be Taken within Seven Days.....	9
3.4	Action within 60 Days	10
3.5	Alternative Schedules for Demonstrating Compliance.....	10
4.0	LANDFILL GAS PROGRAM IMPLEMENTATION - §330.371(e)-(f)	11
5.0	LANDFILL GAS MANAGEMENT PLAN - §330.371(g).....	12
5.1	General.....	12
5.2	Landfill Gas Collection and Control System.....	12
5.3	Landfill Gas Wells	13
5.4	Landfill Gas Header System	14
5.5	Landfill Gas Flare	14
5.6	Landfill Gas System Maintenance.....	15
5.7	Backup Plan	15
6.0	Perimeter and Continuous Monitoring Network - §330.371(h-i)	17
6.1	Perimeter Monitoring.....	17
6.2	Gas Monitoring Probe Placement	17
6.3	Gas Monitoring Probe Construction.....	18
6.4	Inspection and Maintenance	19
6.5	Monitoring Equipment.....	19
6.6	Gas Monitoring Probe Sampling Procedures.....	20
6.7	Building/Structure Monitoring.....	21
6.8	Utility Trench Vent Monitoring.....	22

Appendix III-G.1 Figures



2.0 METHANE MONITORING PROGRAM - §330.371(b)

RVWM will establish a routine methane monitoring program at the PERC landfill to make sure the methane concentrations do not exceed 1.25% by volume in facility structures or 5% by volume at the facility boundary, as discussed in Section 1.0 above. This program will be based on establishing a series of monitoring probes or other methane detection devices and checking the methane concentration (if any) in these monitoring systems on a periodic basis.

2.1 Site Conditions

In developing this methane monitoring system, a number of site-specific factors were considered. The type and frequency of monitoring has been based on these factors, which are discussed below.

Soil Conditions – Soil conditions at the site were thoroughly explored and tested by licensed professional geoscientists and geotechnical engineers. Their findings and conclusions are presented in the Geology Report in Part III (Attachment III-E). These findings clearly state that this landfill is located in a predominantly clay-rich subsurface environment with overall low transmissive characteristics. Occasional lenses or layers of somewhat coarser-grained materials, where present, would provide a preferential flow path for subsurface gas migration.

Hydrogeologic Conditions – The Geology Report also describes the hydrogeologic conditions at the site. Exploration of the site found that groundwater exists within the upper 160 feet below grade, but further studies indicate that this groundwater appears to be perched, or isolated, within the slightly more porous sediments while the surrounding clay limits the movement of groundwater. Excavation for the landfill is expected to result in dewatering or draining these small water-bearing lenses or layers that may extend outward from the excavation.

Hydraulic Conditions – The site is located in a semi-arid area with limited rainfall and a high evaporation rate. The relocation of surface ponds will remove local recharge in the vicinity of the landfill and decrease moisture conditions immediately beneath the site. This will result in a more efficient environment for monitoring potential landfill gas. Therefore, hHydraulic conditions at the site will change somewhat with the development of the landfill. Several existing livestock watering tanks within the proposed landfill footprint will eventually be

replaced with tanks farther away. A series of detention or conveyance channels around the perimeter will drain the site. These features are not expected to result in local recharge of the shallow groundwater system. There are no impacts to landfill gas monitoring anticipated from these hydraulic conditions.

Location of Facility Structures – Proposed facility structures and the property boundary will not interfere with the landfill gas monitoring system, as shown on Figure III-G.1-1.

Utility Lines and Pipelines – No existing or proposed utility lines will impact the landfill gas monitoring system. Several pipeline easements and/or pipelines exist on the landfill footprint. All of these are for oil or gas gathering lines. See Figure 1 in Appendix III-G.1 (III-G.1-1). None of the lines are believed to be transmission lines. Gathering lines typically move produced hydrocarbons from the many wellheads in an oil or gas production field to some central “gathering” point, such as storage tanks or transmission lines. There are no gathering points on the landfill site. Typically, easements and lease agreements for oil and gas production allow the landowner to relocate active pipelines at his expense. Also, when pipelines are no longer being used, they are considered abandoned, whereby the easement becomes void and the pipeline may be removed.

Buried pipelines at or adjacent to a landfill are a concern because the trench created for the pipeline can become a conduit for landfill gas migration. Such trenches characteristically do not achieve a permeability that is as low as surrounding undisturbed soil. Therefore, special attention will be given at the facility to locate and manage pipelines and pipeline easements at this site, to protect the interests of the pipeline owners or operators, to provide safety to landfill construction workers, and to effectively monitor the site for gas migration.

The types of monitoring to be used at the facility are discussed below in Section 6.

2.2 Accommodations for Pipelines

The following steps will be taken to implement landfill gas monitoring with respect to pipelines:

1. The facility owner or operator will have the location of all pipeline easement boundaries at the site marked by placing stakes or other markers at the property and landfill footprint boundaries; these markers will be incorporated into the system of site markers,

2. The owners or operators of all pipelines on the facility will be required to physically mark the actual locations of all of their pipelines in the area described above, whether such pipelines were installed in an easement or not,
3. PERC will require the owner or operator of all pipelines on site to declare which pipelines are active and which are no longer used and thus are abandoned,
4. PERC will cause all abandoned pipelines to be removed at some time prior to construction of the landfill in that area of the site,
5. PERC will cause a notation to be placed in the deed records of Webb County, or other similar place, to state that every specific easement for abandoned pipelines is vacated or nullified, and will place a similar notation in the Site Operating Record,
6. Where pipelines remain at or adjacent to the landfill, the PERC owner or operator will install a gas monitor vent into the backfill around the pipe near the property boundary, and
7. Where pipelines have been removed, the trench area will be over-excavated to undisturbed soil and backfilled with well-compacted clay for a distance of at least 10 feet along the axis of the pipeline from the facility boundary.

2.3 Monitoring Frequency

Landfill gas monitoring will be performed a minimum of four times per year on a calendar quarter basis.

6. Flare with temperature thermocouples and pilot for destruction of the gas; and
7. Miscellaneous electrical controls for automatic startup and shutdown, and monitoring equipment.

5.6 Landfill Gas System Maintenance

Routing Inspection and Maintenance for the gas collection system will include:

1. Balancing the well field to maximize gas quality and flow at least monthly in compliance with the New Source Performance Standards (NSPS), if applicable;
2. Checking the liquid levels in condensate sumps at least monthly. This is accomplished indirectly by confirming that there is no reduction of flow or line pressure loss through the sump;
3. Checking condensate sump pumps for leaks and verifying that a vacuum is present at least monthly; and
4. Checking the blower-flare station components as needed.

5.7 Backup Plan

The backup plan, in the event of possible failure or inadequate performance of the GCCS, will consist of an evaluation of the system and implementation of measures to restore the system to an acceptable level of performance. The evaluation will be based on data collected during the operation/performance of the in-place gas collection system until such time as a potential inadequacy is determined. The following is a back-up plan to be used if monitoring probes or continuous monitoring devices, if installed, become unusable or inoperative.

5.7.1 Stationary Perimeter Probes

1. Upon approval of a permit modification by the TCEQ, damaged or inoperative perimeter probes or trench vents will be repaired or replaced.
2. Within 30 days of completion of the replacement probe, an installation report including boring logs and construction details will be submitted to TCEQ.

3. Should a monitoring event occur prior to replacement of a damaged probe, this will be noted in the records of the monitoring event. Additionally, portable gas detection devices along with barhole probes will be used adjacent to the damaged probe or trench vent until they can be replaced. The probe will be repaired or replaced as quickly as possible (pending a permit medication approval), follow-up monitoring of that probe will be completed, and the results will be placed in the Site Operating Record. TCEQ will be notified as in Item 2, above.

5.7.2 Continuous Monitoring Devices

1. Should a continuous monitoring device become damaged or inoperative, it will be repaired within 30 days or replaced within 60 days of the determination.
2. While the continuous monitor is being repaired or replaced, a portable gas indicator will be used on a monthly basis.