Environmental Consultants
and Contractors

2405 140th Avenue, NE
Suite 107
Bellevue, WA 98005-1877

425 746-4600
FAX 425 746-6747
www.scsengineers.com

SCS ENGINEERS

June 19, 2007

File No: 04204027.05

Marc Yalom, R.G., C.Hg.
Manager, Closed Sites
Waste Management
1316 Concannon Blvd
Livermore, CA 94550-6004

Subject: Summary of Completed Work
Landfill Gas System Repairs, Modifications & Investigation
Olympic View Sanitary Landfill

Dear Marc:

The following presents a summary of work conducted over the past 2 months on the landfill gas (LFG) collection/control system at the Olympic View Sanitary Landfill (OVSL). This letter also provides an assessment of current conditions, as well as recommendations for follow up investigations, repairs, modifications and additions.

BACKGROUND EVALUATION

SCS conducted a landfill gas control system evaluation in the early months of 2006. The purpose of the evaluation was to assess the overall effectiveness of the landfill gas control system and to identify issues that could be addressed through repairs or modifications that would improve the effectiveness of the system.

In the evaluation, SCS noted design, construction, and operations and maintenance issues which currently prevent optimal extraction of LFG at the site. SCS estimates that 200 to 400 standard cubic feet per minute (scfm) of LFG (for the year 2006) may not be captured due to system deficiencies.

Inspection of the well heads in January found that the majority (if not all) of well head control assemblies needed to be repaired to allow for accurate flow measurements. These repairs were subsequently performed.

Based on the observed vacuum measurements and noticeable surging, there were also several locations along the conveyance pipe suspected of either being blocked, separated, and/or

pinched. In addition, there are buried lateral connections that are obviously in need of repair because they have been bypassed with aboveground pipe.

SCS also noted that many of the isolation valves buried in vaults were silted in to the degree that the valve handles were almost buried. These existing conditions may result in non-functional valves, seizing of the valve shaft, deteriorating bolts and possible leaks in the future.

Lastly, SCS noted that in certain areas of the site, the current as-built drawings are insufficient for presenting gas pipe information due to the number of redundant pipes shown on the drawings. In these areas, it is not clear which pipe the gas is actually flowing through. For some segments of pipe, it is not clear whether a crossover pipe (redundant pipe for flow reversal) actually exists. This makes troubleshooting pipe obstructions and other conveyance performance problems very difficult.

SUMMARY OF WORK PERFORMED

SCS performed work consisting of investigations, repairs, modifications and additions to the landfill gas control system on the following dates: September 11 through 27, and October 2 though 4, 2006.

Work included replacing well heads and associated flex hose, replacing PVC couplings with HDPE couplings on well heads, investigation/inspection and testing of the conveyance pipe, minor repairs, investigation/inspection of isolation valves, installation of sampling ports along the conveyance pipe, video inspection of gas wells, and video inspection of conveyance pipe.

The results of this work have increased reliability of well monitoring and the ability to balance or "tune" the well field. Flow measurements from the new well heads are significantly more accurate than the old well heads, thereby providing a true indicator of individual well performance. The work has also identified areas for additional gas collection and control, such as connecting existing pipes/horizontal wells currently not connected to the system and modifying existing well connections that are problematic. The work has also provided a means for sampling along the header pipe for troubleshooting and evaluating the conditions of the buried valves and actuators. The investigative work identified problem areas in need of repairs and inspection as summarized at the end of this letter. The following presents a task by task summary of the activities.

Task 1 & 2 Replacement of LFG Well Heads and Associated Flex Hose

Objective

SCS replaced the existing well heads with new well heads for the purpose of providing reliable, accurate monitoring which allows for proper assessment of individual well performance. In particular, there was a need for more accurate flow measurements.

Activity

SCS replaced all existing well heads manufactured by CES Landtec (having Accu-Flo pitot tubes) with WMI style well heads manufactured by Shaw LFG Specialties (having orifice plates). At the request of WMI, SCS installed quick-connect sampling ports on the well heads in lieu of the standard hose barb sampling ports. SCS also replaced the flex hose with new flex hose at the well head connections.

At LCO-2, in addition to installing a new well head, the pipe connections to the leachate cleanout and header pipe were replaced with HDPE connections for a secure, air tight seal. Until this time, LCO-2 had never had flow measurements because this well head did not have an inline flow measurement device.

As part of well head replacement, SCS made adjustments to the valve positions and orifice plate sizes for each well head to ensure the new wells were operating at the same flow as the existing wells. SCS installed the new well heads with an orifice plate of appropriate diameter to match existing flow while maintaining a differential pressure between 0.5 and 3.0 inches of water column (in. H_2O) per WMI guidance documents.

To match existing flow rates, SCS was given the most recent monitoring results from the LFG system operations contractor, Shaw Emcon/OWT (see attached Table 1). The monitoring results provided in Table 1 indicate the well field is not balanced. Numerous wells exhibit flows with methane outside the normal operating range of 48 to 52 percent by volume.

During replacement, it was noticed the flows from the existing wells did not correspond to the provided tabulated values. To ensure SCS was replacing wells without changing the flows, SCS took flow and gas composition measurements from the existing well heads to confirm actual flows (see Table 2). SCS then replaced and adjusted the new well heads to match those flows measured before replacement. Flow and gas composition values were recorded again after the new wells were installed and adjusted (see Table 3). It should be noted that measurements on existing wells and new wells still yield unbalanced well field conditions.

SCS provided a copy of the new well GEM ID files to the LFG system operations contractor for future well field monitoring and adjustments. Photos of new and old well heads are attached to this report.

Results

This work has provided reliable, accurate monitoring for proper assessment of individual well performance. The measurement in flow accuracy is apparent when comparing the sum of the flows from the individual wells with the flow at the flare station (from both Table 1 and Table 3). Table 1 has a summation of flows of 1,292 scfm while the flare station is measuring approximately 790 scfm during the same monitoring period. This means the summation of flows from the old well heads is off by 63 percent of the flow measured at the flare station. Keep in mind the flare station flow accuracy was confirmed last February.

Table 3 has a summation of flows of 729 scfm while the flare station is measuring 808 scfm during the same monitoring period. This means the summation of flows from the new well heads is within 10 percent of the flow measured at the flare station.

Even though flow accuracy has improved, there is still a need to optimize gas extraction by balancing the well field. Numerous wells exhibit flows with methane outside the normal operating range of 48 to 52 percent by volume.

Task 3 – Replacement of PVC Couplings

SCS replaced all existing PVC couplings on vertical HDPE well heads with HDPE electro-fusion couplings for the purpose of providing sealed connections to prevent air intrusion into the well head.

Task 4 –Conveyance Pipe Repair Identification

Objective

SCS investigated the conveyance pipe at select locations in an attempt to locate pipe that may be blocked or partially blocked by condensate and determine the cause of such obstruction. From the previous evaluation, a segment of header pipe and four lateral pipes were identified as potentially having obstructions or partial obstructions.

Activity

SCS originally intended to excavate and expose the pipe and install temporary sampling ports to identify specific segments of conveyance pipe in need of repair.

Upon initiation of investigation activities, it was apparent that all gas pipes in the Phase 1 and Phase 2 areas of the landfill were buried below the cover system in the waste mass. The intended approach of excavating and exposing pipe for sample ports was not feasible due to associated disruption of the cover system and excavation into waste.

In lieu of this approach, SCS: a) took pressure measurements at well heads near the header pipe and lateral pipes; b) took measurements at newly installed sampling ports; c) tested condensate drain traps; and d) performed a video inspection to locate pipe with obstructions and identify the cause of obstructions. Figure 1 shows the location of pressure measurements, condensate drain traps, and segments of pipe inspected by video camera.

SCS measured pressure (i.e., system vacuum) at select locations along and near the header pipe to identify segments of lower vacuum indicating problems of pipe obstruction. Low pressures and surging pressures were observed along segments of the header pipe near the condensate traps on the west side and east side of Phase 2 (near HGW-3W and LCO-10). Low pressure was also observed at VGW-32 and VGW-58. Table 4 provides a list of monitoring results and comments relative to each location.

SCS also tested the two condensate drain traps to see if the traps were allowing liquid to drain from the traps. One condensate trap is located near HGW-3W (CT-1) and the other near VGW-

42 (CT-2). Water was poured into the trap and visually observed to drain into the leachate sump riser pipes. Condensate from CT-1 drains into the southern leachate sump riser, which is further away than the nearest leachate sump riser. The condensate trap near LCO-9 (CT-3) was not tested because the drain was not accessible.

SCS conducted video inspection of condensate drains traps CT-1 and CT-3 and the lateral pipes to VGW-32 and VGW-58. Results are discussed below. Table 5 provides a list of observations from video inspection activities. A video DVD was previously provided to WM.

It should be noted that the LFG system was operating at a significantly lower vacuum (-25 in H_2O) from the time of our initial investigation back in January (-50 in. H_2O). This is important because problems associated with condensate obstructions are more severe with higher operating vacuums.

Results

The above activities found a partial condensate obstruction of the header pipe at CT-1. Water is backing up into the header pipe at this location when operating under a vacuum of -22.5 in. H_2O at the flare station. Since there is adequate drainage from this condensate trap, this indicates that there is not enough elevation difference between the invert of the header pipe and the invert of the discharge pipe from the trap. This partial obstruction becomes greater when the system is operated at higher vacuums and causes reduced vacuum distribution to lateral pipes and associated wells in the vicinity (VGW-42, 43, 44, 45, 46, 47, 48, 49, 54, 55, 56, 67, HGW-1W, 2W, and 3W). This can result in less extraction (i.e., less flow) of landfill gas from affected wells.

Also, surging pressure was noted near CT-3; however, it does not seem to be significantly impacting pressure distribution to the wells in this vicinity. Surging in this area may also be attributed to very shallow sloped header pipe with condensate flow in the reverse direction of gas flow.

Inspection also identified a blocked pipe on the lateral to VGW-58 near the junction of the header pipe. The obstruction is due to a crimped pipe and causes reduced vacuum distribution to wells VGW-58, VGW-59 and VGW-64. This can result in less extraction (i.e., less flow) of landfill gas from affected wells.

In addition to this, inspection identified a blocked pipe on the lateral to VGW-32. The obstruction is due to condensate and causes reduced vacuum distribution to wells VGW-32 and VGW-69. This can result in less extraction (i.e., less flow) of landfill gas from affected wells.

Task 5 – Repair Conveyance Pipe

The purpose of this task was to address minor amounts of unanticipated work that needed immediate attention. Work carried out under this task consisted of installing isolation valve vaults and covers, repairing a broken 2 inch saddle connection at LCO-3, and installing HDPE fittings for pipe connections to LCO-2.

Isolation valve vaults and covers were installed soon after inspection of the valves because the original vaults and covers were found to be damaged. Replacements were needed to complete earthwork activities immediately and reduce exposure to storms and erosion.

During inspection activities, the 2-inch saddle connection to LCO-3 fell off due to a bad weld. This was immediately repaired.

Also, LCO-2 was constructed of 2-inch PVC pipe with mechanical connections to the HDPE cleanout pipe. Due to the rusted connection and size of the PVC pipe, it was necessary to install a new HDPE saddle of appropriate size to allow for installation of a new well head and provide a secure connection to the cleanout pipe.

Task 6 – Inspection of Isolation Valves

Objective

SCS investigated the conditions of select isolation valves to assess their performance and integrity.

Activities

SCS excavated and exposed 11 of 15 isolation valves and exercised the valves and noted conditions of valves and actuators. Three of the isolation valves (IV-5, 6 & 15) were not accessible because they were buried in waste below the cover system of the Phase 1 and Phase 2 areas.

Three of the isolation valves examined were identified to be valves to laterals or wells and not actually isolation valves for the main conveyance pipe (IV-7, IV-12 and IV-13). Isolation valve IV-7 is actually two valves on two 6-inch diameter PVC pipes which connect to the header pipe. Isolation valve IV-12 and IV-13 are actually a 3-inch valve and a ½-inch sampling port on a 3-inch lateral pipe that connects to the 10-inch cross over header pipe.

The remaining 8 valves examined were IV-1, 2, 4, 8, 9, 10, 11, & 14. Most of the valves were silted-in with the actuator completely buried. The valve handles were barely exposed at most locations. Seven of the valve vault lids were observed to be damaged. Prior to excavation, the valves were exercised to see if they had full operating range and if they turned freely. Upon excavation and exposure, the valves were examined for corrosion and other damage/deterioration. Table 6 provides a list of observations from isolation valve inspections. Photos are also attached.

Results

The above activities identified that there are only 12 isolation valves, not 15. Three of the valves were mislabeled on the as-built drawings and are actually valves to lateral pipes or horizontal wells.

All of the isolation valves were found to be in working condition with the exception of one isolation valve (IV-10). The actuator for IV-10 seized due to rust. When the actuator was

dismantled, it was found to be full of water. This actuator was lubricated and restored to working condition. Nine of the 12 isolation valves have buried actuators. The buried actuators are not rated for buried service. As such they are susceptible to internal corrosion associated with water intrusion.

Four of the 12 valves were noted to be "catching" when exercised. This could be caused by debris in the pipe or shifting of the flange connections. The buried valves inspected were found to have stainless steel bolts in good condition. The flanges were generally good to slightly rusted. The valve bodies were not disassembled, so gaskets were not inspected. No air leaks were noticed during inspection activities.

Task 7 – Conveyance Pipe Sample Port Installation

Objective

SCS installed sampling ports along the header pipe for the purpose of diagnosing well field problems such as air leaks and condensate blockage.

Activities

SCS designed and installed sampling ports at select locations where major lateral pipes connect to the header pipe and at select locations along the header pipe. The buried sampling ports were constructed of HDPE fittings and set in concrete vaults for protection. Above ground sampling ports were installed at riser pipes along the header. Sampling results at some of these locations are found in Table 4. Photographs of the new sampling ports were previously provided to WM.

Results

The sampling ports provided pressure measurements along the head to assist in finding condensate or other pipe obstructions. The sampling ports also identified segments of pipe and wells that are contributing to air leaks in the system. Gas measurements at the sampling port by IV-2 found 12 to 17 percent oxygen for this segment of pipe, while the adjacent sampling port by IV-10 only had 1.5 percent oxygen. It is not known how much gas is flowing through this segment as there is currently no means of getting a flow measurement at these locations.

Task 8 – Vertical Gas Well Video Inspection

Objective

SCS conducted video camera inspection of select gas wells for the purpose of determining the performance and integrity of the wells.

Activities

SCS performed down-hole camera inspection of 19 vertical well casings believed to be pinched, contain water obstruction, and/or be separated. SCS inspected vertical gas wells 1, 2, 14, 16, 19, 21, 23, 29, 30, 31, 36, 37, 47, 50, 52, 53, 61, 66, and 70. SCS also performed video inspection on horizontal gas wells HGW-6 and 7 as well as leachate cleanouts LCO-3 and 4.

SCS found many of the wells to have obstructions due primarily to collapsed or crimped pipe. Table 7 provides a list of observations from video inspection activities. A video DVD was previously provided to WM.

Results

The above activities have found substantial obstructions in 12 of the 19 vertical gas wells. All of these obstructions were due to collapsed or crimped pipe. The majority of these obstructions (7 of 12) were above the perforated pipe, thus restricting flow substantially.

Results also found a substantial obstruction in 1 of the 4 horizontal gas wells. This obstruction was due to collapsed corrugated pipe (HGW-7). Partial obstructions due to water were found in two of the horizontal gas wells.

These obstructions result in reduced gas collection system efficiency. The percentage of substantial obstruction found in the wells brings to question the performance of wells that were not inspected.

Task 9 – Confirm Actual Conveyance Pipe Routes

Objective

SCS's goal was to clarify as-built conditions for the conveyance pipe and wells. The primary interest was to determine which pipes were functioning at locations where multiple lateral pipes intersect a single well (VGW-29, 30, 36R, 37R, 35R, 34R, 31, 33R, and 32R). Also of interest was locating where cross over headers intersect the perimeter header.

Activity

SCS originally intended to excavate and expose the pipe and install temporary sampling ports to identify specific segments of conveyance pipe in use.

As mentioned previously, initiation of investigation activities revealed that all the gas pipes in the Phase 1 and Phase 2 areas of the landfill were buried below the cover system in the waste mass. The intended approach of excavating and exposing pipe for sample ports was not feasible due to associated disruption of the cover system and excavation into waste.

In lieu of this approach, SCS utilized video inspection to locate pipes and junctions in an attempt to clarify active pipe and as-built conditions. Figure 1 shows the location of segments of pipe inspected by video camera. Table 5 provides a list of observations from video inspection activities. A video DVD was previously provided to WM.

Results

Video inspection of the riser pipe of wells VGW-32R and 34R found multiple lateral pipe connections to the riser pipe for each well. This suggests that the wells were extended as landfill activities progressed. When the wells were extended, the lateral pipes were re-routed to another location. Instead of abandoning the original pipe, it was extended and re-routed to another tie-in point. Gas well VGW-30 appears to only have one riser connection which routes the lateral

directly to VGW-37R (not to a junction between VGW-37R and 36R). It is still unclear how some of the pipes in this area are tied together and whether these cause any problems.

The original as-built drawings showed two sets of lateral pipes connecting VGW-54 and VGW-55R. Video inspection revealed only one active pipe in this area. Additional video inspection located the intersection of the cross over header pipe with the perimeter header pipe along wells VGW-22, 23, 70, 26, and 28.

Other Observations

The following provides additional observation of the landfill gas control system during the course of field activities at the site.

LCO-X

There appear to be 6 horizontal wells, labeled LCO-X1, X2, X3, X4, X5 and X6, located between isolation valves IV-7 and IV-8. These wells do not have well heads capable of monitoring flow. Also, the valves to these wells are shut off and under pressure. This suggests an additional source for extraction of landfill gas.

IV-7

As mentioned earlier, there are two 6-inch diameter horizontal wells located at IV-7. These wells do not have well heads capable of monitoring flow. The valves are cracked open but the control of flow from these wells has been left unmonitored. There is the potential to extract more gas from these wells also.

LCO-4

As mentioned previously, LCO-4 is not connected to the gas system. The well is under pressure, suggesting an additional source for extraction of landfill gas.

LCO-9

This gas well is blocked with condensate at the well head due to the configuration of the well head pipe. Modifying this well head for a vertical type well head would alleviate the problem of condensate blockage, and thereby increase the ability to extract more landfill gas at this location.

Temporary Above-Ground Pipe

There is currently a temporary 2-inch diameter pipe installed above ground to connect VGW-30 to VGW-29 and VGW-69 to VGW-23. These temporary pipes restrict flow and one is substantially full of condensate. Replacement of these pipes with permanent pipe would allow for extraction of more landfill gas.

LCOs

Many of the leachate cleanout connections have PVC tees at the base of the well heads. These tees are not secure and have potential for air intrusion.

RECOMMENDATIONS FOR ADDITIONAL INVESTIGATION, REPAIRS, MODIFICATIONS, AND/OR ADDITIONS

The following presents recommendations for additional investigation, repair, modifications and/or additions. The recommendations are focused on achieving more efficient gas collection.

Immediate measures to collect and control more landfill gas include:

- Replace two 6-inch valves with two horizontal well heads at IV-7.
- Replace six 4-inch valves with six horizontal well heads at LCO-X1 through X6.
- Install well head at LCO-4 and install branch pipe to tie-in to header.
- Replace LCO-9 with vertical well head .
- Repair blocked lateral pipe from VGW-58 to header.
- Replace temporary above ground PVC pipe from GW-69 to GW-23 with permanent buried HDPE pipe from GW-69 to GW-32R to header.
- Replace condensate trap (CT-1) at header with new trap or condensate pump station
- Replace temporary above ground PVC from GW-30 to GW-29 with permanent buried HDPE pipe.
- Find end of branch pipe to GW-57.
- Perform well field monitoring and balancing.

Additional measures for repair/modifications/additions include:

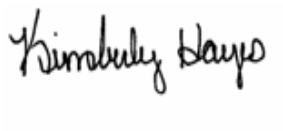
- Replace PVC tees on LCO's with HDPE tees.
- Inspect and repair sunken cover penetration seal at GW-1 and GW-54.
- Install flow monitoring port upstream of sampling ports (7 locations).
- Replace PVC sampling port with HDPE sampling port at IV-12/13.

Additional measures for investigation include:

- Excavate, expose and inspect remaining accessible isolation valves (IV-1 and IV-3).
- Install traffic vaults on IV-2 and IV-9.
- Locate intersection of jumper pipe across Phase 1 between GW-1 and GW-2 to lateral at GW-28.
- Perform video inspection of remaining vertical wells.
- Perform video inspection of select segments of conveyance pipe.
- Perform surface emissions monitoring after an extended GCCS shutdown to identify leaks in the cover system and gas system.
- Perform gas probe monitoring after an extended GCCS shutdown to identify other potential leaks in liner system.
- Measure pressure at wells after an extended GCCS shutdown to assist with identifying high gas producing areas of the landfill.
- Update the GCCS as-built map.

We appreciate having the opportunity to provide the above services and hope you find this of value. If you have any questions, please call us at 425-746-4600.

Sincerely,



Ted Massart
Project Manager
SCS ENGINEERS

Kim Hayes
Project Manager
SCS FIELD SERVICES

Cc: Paul Rosasco
Tony Svorinich

Table L – WELL FIELD MONITORING RESULTS (PROVIDED BY SHAW EMCON/OWT)

DataField CS - GEM Mode Data Output

Device ID	Date/Time	CH4	CO2	O2	Balance	Adj Static	Adj Differe	Adj Flow	Temperature	Chosen Comments
	mm/dd/yy	%	%	%	%	'H20	'H20	Scfm	DegF	
OVSLGW63	9/15/2006 8:56	60.2	39.6	0.2	0	-17.1	0.03	0	64	Water Blockage;
OVSGW25R	9/15/2006 6:21	51.6	37.4	0.4	10.6	-4.3	0.5	50	61	
ovslgw01	9/18/2006 9:18	17.4	14.6	2.6	65.4	0	0	0	60	Closed Well
ovslgw02	9/18/2006 9:15	26.6	15	10	48.4	0	-0.01	0	61	Closed Well
ovslgw03	9/20/2006 8:53	46.4	26.6	0	27	-1.5	0.01	2	56	
ovslgw04	9/20/2006 8:55	35.6	23.6	0	40.8	0.1	0	3	61	
ovslgw05	9/20/2006 8:58	44.5	24.5	0	31	0	0.02	30	59	
ovslgw06	9/20/2006 9:01	42.6	26.3	0	31.1	0	0.01	15	61	
ovslgw07	9/20/2006 9:06	43.2	27.4	0	29.4	0	0.02	5	57	
ovslgw08	9/20/2006 9:21	23	20.8	0	56.2	0	0	0	55	Closed Well
ovslgw09	9/20/2006 9:10	41	13.4	0	45.6	-1.2	0.01	2	66	
ovslgw11	9/20/2006 9:24	27.9	22.8	0	49.3	0	0	0	55	Closed Well
ovslgw12	9/20/2006 9:36	50.5	23.5	0	26	-0.1	0.02	5	66	
ovslgw13	9/20/2006 9:38	43.4	28.2	0	28.4	0	0.02	6	55	
ovslgw14	9/20/2006 8:50	54.9	33	0.2	11.9	-11.2	0.07	6	64	
ovslgw15	9/20/2006 8:43	45.8	30.1	0	24.1	-9.4	0.19	24	68	
ovslgw16	9/15/2006 6:08	45.6	27.1	2.2	25.1	-11.7	0.08	12	54	
ovslgw17	9/15/2006 6:28	9.5	10.1	13.5	66.9	0	-0.06	0	49	Closed Well
ovslgw18	9/15/2006 6:31	39.4	29.7	0.3	30.6	-3	-0.19	0	53	
ovslgw19	9/15/2006 6:45	47.3	29.9	0.2	22.6	-10	0.41	38	56	
ovslgw20	9/15/2006 6:48	52.3	31.3	2.1	14.3	-10.6	0.08	15	55	
ovslgw21	9/15/2006 6:52	52.5	36.5	0.5	10.5	-17.2	0.54	44	51	
ovslgw22	9/15/2006 7:15	55.2	38.8	1.8	4.2	-16.5	0.12	21	53	
ovslgw23	9/15/2006 6:57	54.7	38.8	1.7	4.8	-9.4	0.1	21	56	
ovslgw24	9/15/2006 6:59	41.6	28.8	2.3	27.3	-4.3	0.15	25	59	
ovslgw25	9/15/2006 6:24	51.7	38	0.3	10	-4	0.7	50	69	
ovslgw26	9/15/2006 7:06	51.8	36.7	0.5	11	-6.7	0.32	31	55	
ovslgw27	9/15/2006 6:13	5.6	4.6	17.6	72.2	-2	-0.01	0	49	Closed Well
ovslgw28	9/15/2006 8:29	49.6	35.4	0	15	-2.6	0.1	20	59	
ovslgw29	9/15/2006 8:17	46.8	34.8	0.2	18.2	-3.4	0.1	18	106	
ovslgw30	9/15/2006 8:01	57.3	41.3	1	0.4	-2.1	0.1	20	53	
ovslgw31	9/15/2006 8:04	56.3	40.1	1.3	2.3	-13.8	0.1	20	52	
ovslgw32	9/15/2006 7:13	48.4	31.7	4.5	15.4	0	0.01	9	51	Water Blockage;
ovslgw33	9/15/2006 7:19	0.4	0.6	20.3	78.7	0	-0.02	0	50	Closed Well
ovslgw34	9/15/2006 7:21	0.1	0.1	20.7	79.1	-6.8	0.05	13	49	Need to replace valve, closed well
ovslgw35	9/15/2006 7:27	54.5	34	1.3	10.2	-15.7	0.01	3	51	
ovslgw36	9/15/2006 7:53	53.9	36.3	0.9	8.9	-7.6	0.07	19	55	
ovslgw36	9/15/2006 7:54	53.9	36.3	0.9	8.9	-12.7	0.13	19	55	
ovslgw37	9/15/2006 8:20	49	34.6	1.5	14.9	-5.7	0.12	22	55	
ovslgw38	9/20/2006 8:39	27.6	22.1	3.4	46.9	-21.2	0.07	16	57	
ovslgw39	9/15/2006 6:36	0.4	0.3	20.2	79.1	-4.5	0.2	19	49	Need to replace valve, closed well
ovslgw40	9/15/2006 6:39	58.8	40.7	0.5	0	-2.8	0.03	4	50	
ovslgw40	9/15/2006 9:28	7.1	18	2.5	72.4	0	0.02	9	59	
ovslgw41	9/15/2006 6:42	32.5	10.8	11.2	45.5	-1.4	0.03	8	50	Need to replace valve
OVSLGW43	9/15/2006 9:23	44.1	27.2	0.3	28.4	-5.4	0.06	14	59	
OVSLGW44	9/15/2006 9:19	57.2	30.5	0.4	11.9	-2.6	0.01	2	60	
OVSLGW45	9/15/2006 9:12	33	22.7	0.5	43.8	-1.8	0.02	5	56	
OVSLGW46	9/15/2006 9:09	7.1	5.4	17	70.5	-1.9	0.04	10	57	Need to replace valve, closed well
OVSLGW47	9/15/2006 9:07	37.2	28.3	1.3	33.2	-4.4	0.13	21	61	
OVSLGW48	9/15/2006 8:24	46.9	31.9	0.1	21.1	-6.4	0.58	48	72	
OVSLGW48	9/15/2006 9:16	45.4	30.9	1	22.7	-6.3	0.49	45	71	
OVSLGW49	9/15/2006 7:57	60.2	37.6	0.5	1.7	-2.4	0.06	10	73	
OVSLGW50	9/18/2006 8:47	41.9	27.9	2.5	27.7	-18.9	0.05	9	69	
OVSLGW51	9/18/2006 8:09	53.5	34	0.2	12.3	-4.6	0.11	15	74	
OVSLGW53	9/15/2006 8:52	58.8	38.5	0.6	1.9	-17	0.12	19	61	
OVSLGW54	9/15/2006 7:31	0.6	1.5	19.8	78.1	0	0	0	50	Closed Well
OVSLGW55	9/15/2006 7:34	48.1	32.4	0.3	19.2	-9.7	0.16	25	64	
OVSLGW56	9/15/2006 8:36	54.8	36	0	9.2	-7.2	1.48	76	88	
OVSLGW58	9/18/2006 7:52	57	36.6	1.1	5.3	-0.7	-0.44	0	81	Water Blockage;
OVSLGW59	9/15/2006 8:59	59.7	40.2	0.1	0	-2.6	0.06	13	61	
OVSLGW60	9/18/2006 7:55	52.7	33.8	2.4	11.1	-17.1	0.22	31	70	
OVSLGW61	9/18/2006 7:59	40.2	28.1	3.5	28.2	-11.7	0.15	22	116	
OVSLGW62	9/18/2006 8:02	58.1	37.5	1	3.4	-18.4	0.09	15	67	
OVSLGW65	9/18/2006 8:05	59.3	37.9	0.6	2.2	-18.3	0.09	16	68	
OVSLGW66	9/15/2006 8:49	59.2	40.8	0	0	-17	0.13	19	68	
OVSLGW67	9/15/2006 8:45	55.7	37.3	0	7	-12.5	0.3	35	56	
OVSLGW67	9/15/2006 8:45	55.7	37.3	0	7	-12.5	0.29	33	70	

DataField CS - GEM Mode Data Output

Device ID	Date/Time	CH4	CO2	O2	Balance	Adj Static	Adj Differe	Adj Flow	Temperature	Chosen Comments
	mm/dd/yy	%	%	%	%	"H20	"H20	Scfm	DegF	
OVSLGW68	9/15/2006 7:24	46.9	32.7	2	18.4	-2.9	0.2	20	66	
* OVSLGW69	9/15/2006 7:09	56.1	36.6	0.2	7.2	-7.8	0.28	34	63	
OVSLGW69	9/15/2006 7:09	56.1	36.6	0.2	7.2	-8.1	0.35	34	63	
OVSLGW70	9/15/2006 7:03	51.9	37.7	0	10.4	-9	0.23	30	73	
ovslhc1E	9/18/2006 8:51	0	0.2	20.5	79.3	0	0	0	60	Closed Well
ovslhc1W	9/15/2006 9:30	48.1	35.5	0.4	16	-3.2	0.18	26	62	
ovslhc2E	9/18/2006 8:44	36	28.1	2.3	31.6	-18.4	0.11	52	88	
ovslhc2W	9/15/2006 9:32	0.9	2.2	18.3	78.6	-1.7	0.01	4	57	
ovslhc3E	9/18/2006 8:32	60.5	37.1	0.2	2.2	-0.2	0.04	9	60	
ovslhc3W	9/15/2006 9:34	26.9	26.1	1.2	45.8	0	-0.02	0	59	
ovslLC01	9/20/2006 8:30	0	0	21	79	0	0	0	58	Closed Well
ovslLC02	9/20/2006 8:34	46.6	32.6	1	19.8	-2.9	0.01	9	53	
OVSLLC10	9/18/2006 8:28	46.5	27.1	3.7	22.7	-9.2	0.13	23	60	
OVSLLC11	9/18/2006 8:23	51	30.5	4	14.5	-0.1	0.05	11	59	
ovsllco3	9/18/2006 9:08	42.2	30	1.3	26.5	-4.4	0.64	47	65	
ovsllco5	9/18/2006 9:02	39.8	24.4	3.6	32.2	-3.8	0.02	5	60	
ovsllco6	9/18/2006 9:00	42.3	30.2	1.3	26.2	-4	0.16	26	64	
ovsllco7	9/18/2006 8:54	2.9	19.6	13.4	64.1	0	-0.04	0	60	Closed Well
ovsllco8	9/18/2006 8:42	23.5	16.7	10.1	49.7	0	0	0	62	Closed Well
ovsllco9	9/18/2006 8:37	27.2	19.7	7.3	45.8	0	0	0	65	Closed Well

TOTAL FLOW FROM WELLS = 1292

FLOW AT FLARE ~ 800

* Duplicate gas well measurement not included

Table 2 Well Field Monitoring Results for Landfill Gas Control System
Old Well Heads (with ACCU-FLO Pitot Tubes)
(grouped by vertical wells, horizontal wells & leachate trenches)
Olympic View Landfill
Waste Management Incorporated

SCS Engineers
04204027.05

Date: 22, 26 & 27 Sept-06 and 2, 3, & 4 Oct-06
Starting Time: 11:18 2-Oct
Finishing Time: 17:23 4-Oct
Monitored by: E. Sonsthagen
Instruments: GEM-2000
Calibration Date: 2, 3, & 4 Oct-06

(1) Location Refer. Design.	Time	(2) Temp. T (Deg. F.)	(3) System Pressure P (sys) (in. W.C.)	(4) Static Pressure P (sta) (in. W.C.)	Diff Pressure P (dif) (in. W.C.)	Flow Q (scfm)	(5) Valve Position VP (# of turns)	Gas Composition: Methane CH4 (% Vol.)	Carbon Dioxide CO2 (% Vol.)	Oxygen O2 (% Vol.)	Water Vapor H20 (vap) (% Vol.)	Nitrogen N2 (tot) (% Vol.)
FL-Inlet						788	WO					
BL-Inlet							T					
MS- Inlet	07:24	41	N/A	-20.2			?	40.0	28.9	2.3	0.9	27.9
VGW-1	8:01	43	-20.5	-0.4	-0.004	0	?	13.9	12.5	6.3	0.9	66.4
VGW-2	7:53	51	-20.3	-0.7	0.001	2	T	4.2	2.6	19.6	1.2	72.4
VGW-3	12:10	68	-20.9	-1.3	0.162	1	?	50.8	27.1	0.0	2.3	19.8
VGW-4	15:03	76	-24.4	-0.1	0.885	3	?	18.9	16.2	8.4	3.0	53.5
VGW-5	15:33	69	-23.8	-0.1	0.005	4	?	41.5	24.5	0.0	2.4	31.6
VGW-6	15:24	72	-23.9	-0.9	20.908	14	?	17.3	14.8	6.7	2.6	58.6
VGW-7	15:43	67	-23.5	-0.1	0.005	4	?	39.1	26.4	0.0	2.2	32.3
VGW-8	8:46	45	-20.1	-0.7	-0.006	0	T	19.9	15.4	6.0	1.0	57.7
VGW-9	15:49	75	-23.6	-0.5	0.008	6	T	36.8	14.6	0.0	2.9	45.7
VGW-10	8:57	58	-20.2	-1.4	0.007	5	?	26.3	21.4	0.0	1.6	50.7
VGW-11	9:11	58	-20.2	-2.5	0.006	5	T	32.6	21.4	0.0	1.6	44.4
VGW-12	8:32	69	-20.0	-1.6	0.006	5	T	48.9	24.0	0.0	2.4	24.7
VGW-13	12:01	69	-20.0	-0.7	0.000	1	T	24.9	24.2	0.0	2.4	48.5
VGW-14	14:52	79	-23.3	-5.8	2.912	5	T	35.1	23.7	4.3	3.4	33.5
VGW-15	16:40	79	-19.8	-4.6	0.001	2	T	48.6	31.8	0.0	3.3	16.3
VGW-16	13:08	93	-18.8	-7.0	0.010	6	T	51.2	29.3	0.0	5.3	14.2
VGW-17	16:44	88	-19.4	0.0	0.002	3	?	8.2	7.8	14.5	4.4	65.1
VGW-18	17:05	83	-19.5	-1.3	0.002	0	T	32.8	25.8	4.3	3.8	33.3
VGW-19	15:08	101	-19.3	-9.9	0.017	8	?	42.2	29.2	0.2	6.8	21.6
VGW-20	15:26	102	-18.8	-13.6	0.006	5	T	52.0	32.5	0.0	7.0	8.5
VGW-21	17:35	86	-18.7	-18.4	0.019	8	?	0.8	0.5	20.9	4.3	73.5
VGW-22	15:58	94	-18.7	-18.7	-0.013	0	?	54.4	41.8	0.9	5.6	0.0
VGW-23	9:13	96	-18.1	-5.7	0.007	5	?	56.3	41.7	0.0	5.8	0.0
VGW-24	16:25	104	-18.2	-1.7	0.008	5	T	54.0	35.5	0.0	7.2	3.3
VGW-25R	13:43	126	-19.9	-2.7	-0.037	0	T	44.0	32.5	1.7	13.6	8.2
VGW-25	13:38	127	-18.2	-1.3	0.502	45	T	52.3	40.6	0.0	13.9	0.0
VGW-26	7:43	114	-17.8	-7.0	0.178	26	T	43.8	34.7	0.2	9.8	11.5
VGW-27	16:53	88	-19.5	-3.2	-0.009	0	T	11.5	7.9	14.3	4.5	61.8
VGW-28												
VGW-29												
VGW-30												
VGW-31	7:53	41	-14.8	-14.0	0.014	7	T	21.3	18.4	12.4	0.9	47.0
VGW-32												
VGW-33												
VGW-34	8:46	48	-16.2	-8.3	-0.007	0	T	0.1	0.2	20.6	1.1	78.0
VGW-35	8:56	62	-16.3	-16.2	0.000	1	?	52.8	34.1	0.0	1.9	11.2
VGW-36	8:02	125	-14.7	-11.9	-0.009	0	T	44.7	32.2	1.1	13.5	8.5
VGW-37												
VGW-38	16:52	74	-19.6	-0.4	0.001	2	?	32.2	17.5	4.9	2.8	42.6
VGW-39	16:39	90	-19.5	-0.6	-0.005	0	?	2.7	0.8	20.1	4.7	71.7
VGW-40	14:28	92	-19.9	-3.1	0.010	6	?	54.3	38.8	0.0	5.1	1.8
VGW-41	14:45	98	-19.5	0.0	-0.031	0	?	44.7	14.4	6.3	6.0	28.6
VGW-42												
VGW-43												
VGW-44												
VGW-45												
VGW-46												
VGW-47												
VGW-48												
VGW-49												
VGW-50	13:57	70	-17.9	-0.5	0.001	2	T	62.2	33.6	0.0	2.5	1.7
VGW-51	14:34	113	-18.0	-4.2	0.071	17	?	46.6	31.9	0.0	9.5	12.0
VGW-52												
VGW-53												
VGW-54	8:16	44	-14.2	-13.9	-0.008	0	?	0.1	0.2	21.4	1.0	77.3
VGW-55	8:23	104	-14.7	-6.9	0.083	18	?	43.9	30.5	0.0	7.3	18.3
VGW-56												
VGW-58												

(1) Location Refer. Design.	Time	(2) Temp. T (Deg. F.)	(3) System Pressure P (sys) (in. W.C.)	(4) Static Pressure P (sta) (in. W.C.)	Diff Pressure P (dif) (in. W.C.)	Flow Q (scfm)	(5) Valve Position VP (# of turns)	Gas Composition: Methane CH4 (% Vol.)	Carbon Dioxide CO2 (% Vol.)	Oxygen O2 (% Vol.)	Water Vapor H20 (vap) (% Vol.)	Nitrogen N2 (tot) (% Vol.)
VGW-59												
VGW-60												
VGW-61	15:02	101	-16.8	-14.6	0.215	29	T	44.6	33.0	0.7	6.8	14.9
VGW-62	14:54	91	-17.8	-17.7	0.050	14	T	51.4	37.1	1.7	5.1	4.7
VGW-63												
VGW-64												
VGW-65	14:46	108	-17.8	-17.7	-0.030	0	T	56.9	38.1	0.2	8.5	0.0
VGW-66												
VGW-67												
VGW-68	8:38	118	-17.2	-2.5	0.725	55	T	45.5	33.2	1.0	10.9	9.4
VGW-69	9:04	122	-15.1	-8.5	0.159	25	T	50.3	35.0	0.0	12.3	2.4
VGW-70	16:47	121	-19.0	-3.5	0.025	9	T	49.8	40.1	0.0	11.8	0.0
Total Vertical Wells						353		43.2	31.1	1.7	8.2	16.9
LCT-1	16:08	75	-19.9	-0.1	-0.006	0	?	19.4	14.2	9.8	2.9	53.7
LCT-2	13:45	71	-8.9	-0.4	-0.023	0	?	57.7	37.2	0.0		
LCT-3	12:23	67	-18.9	-0.3	0.000	0	T	43.7	27.9	4.9	2.2	21.3
LCT-4												
LCT-5	12:35	67	-18.2	-0.1	-0.001	0	T	53.0	30.3	1.6	2.2	12.9
LCT-6	12:45	85	-17.8	-0.5	0.042	13	T	56.8	36.8	0.0	4.0	2.4
LCT-7	12:55	70	-18.5	-0.2	-0.001	0	?	2.8	18.2	13.4	2.5	63.1
LCT-8	13:38	70	-18.3	0.1	-0.005	0	T	58.5	39.3	0.0	2.5	0.0
LCT-9												
LCT-10	14:24	70	-17.7	-1.1	0.002	3	T	59.6	33.5	0.0	2.5	4.4
LCT-11	15:11	69	-17.1	-0.4	0.000	1	?	0.1	0.1	21.5	2	75.93
LCT-12												
Total Leachate Collection Trenches						17		54.0	34.1	1.3	3.7	7.1
HGW-1E	13:01	70	-18.3	0.0	-0.002	0	T	0.0	0.5	21.1	2.5	75.9
HGW-1W												
HGW-2E	13:48	75	-18.1	-5.0	0.186	28	T	57.0	40.6	0.0	2.9	0.0
HGW-2W												
HGW-3E	14:14	70	-17.8	-2.1	0.004	4	T	49.2	33.4	3.3	2.5	11.6
HGW-3W												
HGW-6	12:13	64	-19.0	0.3	-0.004	0	?	57.7	37.5	0.0	2.0	2.8
Total Horizontal Wells						32		56.0	39.7	0.4 #	2.9	1.5
Sum of Flows from Wells & Trenches						402		44.6	31.9	1.6	7.5	15.3
Flare						788		0.0	0.0	0.0	0.1	99.9
Flow Difference from Flare Station						51%						

Weather Conditions

Weather (Cloud Cover/Raining/Snowing/Windy): Sunny, Clear

	Beginning	Ending	Average	
Temperature, T (amb):	55.4	64.4	59.9	Deg. F
Wind Speed:	8.1	8.1	8.1	mph
Wind Direction:	22.5	45.0	33.8	Deg.
Barometric Pressure, P (baro):	30.1	30	30.0	in. Hg

24hr Baro.Trend (rising/falling/steady/unsteady): 0

(1) VGW - Vertical Landfill Gas Well
LCT - Leachate Collection Trench
HGW - Horizontal Landfill Gas Well
FL - Flare
BL - Blower
MS - Moisture Separator

(5) C Closed
CR Cracked
T Throttled
WO Wide Open
NC Not Connected
NI Not Installed

(2) At the flare station this value represents the inlet temperature at the flare, the outlet temperature at the blower and the inlet temperature at the moisture separator.

(3) At the well head this value represents the pressure downstream of the control valve.

(4) At the flare station this value represents the inlet pressure to each piece of equipment.
At the well head this value represents the pressure in the well.

(5) At the flare station this value represents the position of the inlet valve for the moisture separator and the outlet valve for the blowers

Table 3 Well Field Monitoring Results for Landfill Gas Control System
New Well Heads (with Orifice Plates)
(grouped by vertical wells, horizontal wells & leachate collection trenches)
Olympic View Landfill
Waste Management Incorporated

SCS Engineers
04204027.05

Date: 2, 3, & 4 Oct-06
Starting Time: 11:18 2-Oct
Finishing Time: 17:23 4-Oct
Monitored by: E. Sonsthagen
Instruments: GEM-2000
Calibration Date: 2, 3, & 4 Oct-06

(1) Location Refer. Design.	Time	(2) Temp. T (Deg. F.)	(3) System Pressure P (sys) (in. W.C.)	(4) Static Pressure P (sta) (in. W.C.)	Diff Pressure P (dif) (in. W.C.)	Flow Q (scfm)	(5) Valve Position VP (# of turns)	*Gas Composition* Methane CH4 (% Vol.)	Carbon Dioxide CO2 (% Vol.)	Oxygen O2 (% Vol.)	Water Vapor H20 (vap) (% Vol.)	Nitrogen N2 (tot) (% Vol.)
FL-Inlet						808	WO					
BL-Inlet							T					
MS- Inlet	07:24	41	N/A	-20.2			?	41.0	29.0	2.4	0.9	26.7
VGW-1	9:37	58	-19.8	-1.0	1.355	2	?	21.2	17.1	0.0	1.6	60.1
VGW-2	8:20	68	-20.3	-1.5	1.378	3	T	7.2	4.4	17.6	2.3	68.5
VGW-3	12:24	68	-20.9	-1.3	0.500	1	?	49.0	26.0	0.1	2.3	22.6
VGW-4	12:33	70	-20.9	-0.4	1.181	3	?	47.5	25.1	14.2	2.5	10.7
VGW-5	12:45	66	-21.1	-0.6	2.846	5	?	40.8	24.2	0.0	2.1	32.9
VGW-6	13:19	69	-19.8	-3.4	1.093	31	?	33.1	24.8	0.0	2.4	39.7
VGW-7	12:53	65	-21.1	-0.5	1.867	4	?	35.6	25.6	0.0	2.1	36.7
VGW-8	9:50	58	-20.2	-0.8	0.533	2	T	29.2	22.2	0.0	1.6	47.0
VGW-9	13:03	79	-21.2	-1.8	2.955	5	T	32.7	15.1	0.0	3.3	48.9
VGW-10	10:44	63	-20.2	-1.4	2.760	5	?	26.1	20.6	0.0	1.9	51.4
VGW-11	10:55	62	-20.3	-2.3	2.798	5	T	34.7	21.5	0.0	1.9	41.9
VGW-12	9:22	69	-19.7	-1.5	2.533	5	T	46.3	22.7	0.2	2.4	28.4
VGW-13	15:32	69	-19.3	-0.4	0.662	2	T	26.4	23.1	0.3	2.4	47.8
VGW-14	13:34	75	-20.0	-4.9	1.946	4	T	49.4	32.5	0.0	2.9	15.2
VGW-15	17:09	73	-20.0	-1.7	0.859	1	T	42.6	27.8	2.0	2.7	24.9
VGW-16	14:16	87	-13.9	-2.1	1.529	4	T	52.8	30.6	0.0	4.3	12.3
VGW-17	12:59	73	-14.9	-14.8	0.007	0	?	18.3	10.5	13.6	2.8	54.8
VGW-18	13:09	74	-15.6	-2.3	-0.001	0	T	12.8	9.5	14.6	2.8	60.3
VGW-19	13:22	96	-15.5	-8.5	0.431	4	?	45.7	29.3	0.0	5.8	19.2
VGW-20	13:31	102	-15.2	-10.1	1.997	4	T	53.0	32.9	0.0	7.0	7.1
VGW-21	13:43	81	-14.8	-10.8	0.503	1	?	49.5	35.8	0.6	3.6	10.5
VGW-22	15:15	84	-15.0	-14.7	0.225	0	?	53.1	40.1	0.8	4.0	2.0
VGW-23	11:29	101	-16.6	-8.6	2.048	4	?	55.9	41.8	0.0	6.7	0.0
VGW-24	13:51	99	-15.0	-1.9	2.027	4	T	53.7	36.4	0.0	6.2	3.7
VGW-25R	12:33	126	-16.7	-2.6	2.424	20	T	45.8	35.2	0.5	13.6	4.9
VGW-25	12:51	130	-12.2	-7.7	5.392	67	T	46.4	34.6	0.2	15.3	3.5
VGW-26	10:22	118	-17.9	-6.1	0.901	27	T	46.8	36.8	0.0	11.0	5.4
VGW-27	12:11	80	-17.7	-2.5	0.002	0	T	2.6	2.2	19.1	3.4	72.7
VGW-28												
VGW-29												
VGW-30												
VGW-31	10:39	72	-16.1	-16.1	0.019	0	T	43.6	32.1	4.6	2.7	17.0
VGW-32												
VGW-33												
VGW-34	11:19	66	-13.4	-13.4	0.006	0	T	0.3	0.8	20.3	2.2	76.4
VGW-35	11:46	74	-13.5	-13.4	0.002	0	?	53.6	34.1	0.1	2.9	9.3
VGW-36	10:51	131	-13.8	-12.2	0.992	12	T	45.3	32.4	0.7	15.9	5.7
VGW-37												
VGW-38	17:18	67	-19.5	-8.6	0.603	1	?	41.6	23.3	0.0	2.3	32.8
VGW-39	14:26	78	-15.7	-9.8	0.800	2	?	54.3	33.3	1.1	3.3	8.0
VGW-40	14:37	88	-15.6	-7.7	1.215	3	?	55.4	37.2	0.1	4.5	2.8
VGW-41	14:54	79	-15.1	-10.1	2.047	3	?	54.2	21.7	0.7	3.4	20.0
VGW-42												
VGW-43												
VGW-44												
VGW-45												
VGW-46												
VGW-47												
VGW-48												
VGW-49												
VGW-50	16:35	76	-17.4	-4.5	0.716	2	T	62.1	32.6	0.0	3.0	2.3
VGW-51	17:18	111	-16.9	-4.4	1.531	16	?	46.3	32.7	0.0	9.0	12.0
VGW-52												
VGW-53												
VGW-54	11:04	68	-14.4	-14.3	0.026	0	?	0.3	0.8	20.2	2.4	76.3
VGW-55	10:58	104	-14.5	-6.7	1.716	17	?	44.1	31.0	0.0	7.3	17.6
VGW-56												
VGW-58												

(1) Location Refer. Design.	Time	(2) Temp. T (Deg. F.)	(3) System Pressure P (sys) (in. W.C.)	(4) Static Pressure P (sta) (in. W.C.)	Diff Pressure P (dif) (in. W.C.)	Flow Q (scfm)	(5) Valve Position VP (# of turns)	Gas Composition: Methane CH4 (% Vol.)	Carbon Dioxide CO2 (% Vol.)	Oxygen O2 (% Vol.)	Water Vapor H20 (vap) (% Vol.)	Nitrogen N2 (tot) (% Vol.)
VGW-59												
VGW-60												
VGW-61	17:43	122	-14.7	-13.8	0.288	15	T	46.4	33.4	0.0	12.5	7.7
VGW-62	17:33	119	-16.8	-13.3	0.891	12	T	55.8	39.7	0.3	11.5	0.0
VGW-63												
VGW-64												
VGW-65	17:24	105	-16.9	-15.4	0.871	2	T	58.3	40.2	0.0	7.7	0.0
VGW-66												
VGW-67												
VGW-68	11:14	124	-14.8	-5.1	3.930	57	T	44.3	31.5	1.5	12.9	9.8
VGW-69	11:38	123	-15.3	-7.4	0.821	26	T	49.6	34.4	0.0	12.6	3.4
VGW-70	14:04	119	-15.3	-4.3	2.026	10	T	50.4	39.1	0.0	11.2	0.0
Total Vertical Wells						391		44.8	31.8	0.6	10.0	13.2
LCT-1	16:26	75	-19.6	0.0	1.735	2	?	14.7	10.3	12.8	2.9	59.3
LCT-2	15:47	77	-19.8	-0.1	2.430	11	?	57.9	37.6	0.0		
LCT-3	15:51	66	-18.7	-0.2	0.007	0	T	58.8	38.1	0.0	2.1	1.0
LCT-4												
LCT-5	16:01	67	-18.4	0.0	0.023	0	T	58.0	37.6	0.0	2.2	2.2
LCT-6	16:18	83	-17.9	-0.3	1.192	14	T	56.8	37.5	0.0	3.8	1.9
LCT-7	16:28	63	-17.9	-17.8	0.004	0	?	1.8	10.2	17.3	2.0	68.7
LCT-8	16:58	66	-17.5	0.2	-0.011	0	T	59.2	39.5	0.0	2.1	0.0
LCT-9												
LCT-10	17:11	64	-16.9	0.0	2.056	4	T	61.5	32.7	0.0	2.0	3.8
LCT-11	09:59	76	-17.5	-1.1	0.014	0	?	52.5	35.4	1.0	3	8.09
LCT-12												
Total Leachate Collection Trenches						31		34.5	21.8	0.8	2.1	5.2
HGW-1E	16:41	63	-17.4	-17.3	0.000	0	T	0.2	0.9	21.4	2.0	75.5
HGW-1W												
HGW-2E	16:53	84	-17.2	-6.8	1.317	25	T	53.1	35.4	0.3	4.0	7.2
HGW-2W												
HGW-3E	17:04	66	-17.3	-1.7	1.671	4	T	48.1	32.4	3.8	2.1	13.6
HGW-3W												
HGW-6	15:43	64	-18.8	0.2	0.713	1	?	58.0	37.2	0.0	2.0	2.8
Total Horizontal Wells						30		52.6	35.1	0.8	# 3.7	7.9
Sum of Flows from Wells & Trenches						452		44.6	31.3	0.6	9.0	12.3
Flare						808		41.0	29.0	2.4	0.9	26.7

Flow Difference from Flare Station 56%

Weather Conditions

Weather (Cloud Cover/Raining/Snowing/Windy): Sunny, Clear

	Beginning	Ending	Average	
Temperature, T (amb):	55.4	64.4	59.9	Deg. F
Wind Speed:	8.1	8.1	8.1	mph
Wind Direction:	22.5	45.0	33.8	Deg.
Barometric Pressure, P (baro):	30.1	30	30.0	in. Hg
24hr Baro.Trend (rising/falling/steady/unsteady):	Steady			

(1) VGW - Vertical Landfill Gas Well
LCT - Leachate Collection Trench
HGW - Horizontal Landfill Gas Well
FL - Flare
BL - Blower
MS - Moisture Separator

(5) C Closed
CR Cracked
T Throttled
WO Wide Open
NC Not Connected
NI Not Installed

(2) At the flare station this value represents the inlet temperature at the flare, the outlet temperature at the blower and the inlet temperature at the moisture separator.

(3) At the well head this value represents the pressure downstream of the control valve.

(4) At the flare station this value represents the inlet pressure to each piece of equipment.
At the well head this value represents the pressure in the well.

(5) At the flare station this value represents the position of the inlet valve for the moisture separator and the outlet valve for the blowers

Table 4 Gas Conveyance Pipe Monitoring & Observations SCS Engineers
Olympic View Landfill 04204027.05
Waste Management Incorporated

Header Pipe Monitoring and General Observations 16-Sep-06

Location	CH_4 (% vol)	CO_2 (% vol)	O_2 (% vol)	Balance Gas (% vol)	Static Pressure (in H_2O)	System Pressure Pressure (in H_2O)		Comments
MS-Inlet	43.5	31.1	2.7	22.2	-22.3	-22.3		
VGW-5	42.1	24.6	0.0	33.4	-1.2	-20.8	+/- 0.5	Surging
VGW-1	4.6	4.0	16.8	74.4	-0.9	-20.9	+/- 0.3	Well off; surging
HGW-1W	44.0	35.7	0.4	19.9	-5.5	-19.1	+/- 0.4	Surging
HGW-3W	26.5	26.6	1.1	45.8	0.0	-19.2	+/- 0.4	Well off; surging
CT-1	0.0	0.0	21.1	78.3		-18.3	+/- 0.4	Surging
VGW-45	30.1	23.3	0.0	46.6	-2.9	-17.5	+/- 0.2	Surging
VGW-42	7.0	20.2	1.1	71.7	-1.8	-18.2	+/- 0.2	Surging
VGW-58	56.6	37.8	0.6	5.0	-3.8	-4.0	+/- 0.2	Surging
VGW-60	51.1	33.9	3.0	11.6	-17.0	-17.0		
VGW-61	35.6	23.9	5.4	33.2	-11.6	-15.3		
LCO-11	0.0	0.0	21.9	78.0	-1.8	-18.0		
VGW-62	58.4	41.4	0.2	0.1	-18.6	-18.7	+/- 0.2	Surging flow
VGW-65	58.9	41.1	0.0	0.0	-18.6	-18.5	+/- 0.1	Surging flow
LCO-10	40.1	26.8	3.4	29.8	-10.5	-17.0	+/- 0.5	Surging
VGW-51	53.1	35.4	0.0	11.6	-4.6	-18.6	+/- 0.1	Surging
HGW-3E	0.0	0.0	21.5	78.5	-1.0	-18.7	+/- 0.1	Surging
LCO-9	59.3	37.5	1.0	2.2	-1.8	-18.4	+/- 0.1	Surging greatly
LCO-8	42.5	26.4	12.3	18.9	-1.8	-18.6	+/- 0.1	
VGW-50	46.2	32.4	0.4	21.1	-17.8	-18.3	+/- 0.1	
HGW-1E	0.0	0.3	21.6	78.1	0.0	-18.6	+/- 0.1	
LCO-3	38.2	27.8	3.2	30.9	-5.6	-18.3	+/- 0.1	
IV-7	15.5	21.7	4.4	58.8		-19.2		
IV-8						-20.1		
LCO-2	30.6	29.4	1.5	38.4	-5.2	-20.4		No orifice plate
IV-10	44.5	31.9	2.1	21.5		-20.7		
IV-2	14.9	12.2	14.0	58.9		-20.7		

Lateral Pipe Monitoring and General Observations 16-Sep-06

Location	CH4	CO2	O2	Bal. Gas	Static Pressure	System Pressure		Comments
MS-Inlet	43.4	32.0	2.0	22.7		-22.5		
IV-2	17.8	14.4	12.0	55.8		-21.3		CH4 varying +/-3%
IV-10	43.7	32.3	1.5	22.5		-21.3		
VGW-24	46.9	33.6	1.7	17.8	-4.5	-29.8		
VGW-21	45.8	33.2	2.2	10.9	-20.7	-20.7		Well watered-in
VGW-40	51.6	40.2	0.0	8.3	-5.9	-22.4	+/- 0.1	
VGW-32	34.0	24.2	8.3	33.5	-0.2	-0.14	+/- 0.3	Water in lateral riser
VGW-26	48.0	37.7	0.0	13.7	-8.7	-21.5	+/- 0.5	Water in lateral
VGW-28	42.7	35.4	0.2	21.7	-3.1	-23.0	+/- 0.1	

VGW - Vertical Landfill Gas Well
LCO - Leachate Cleanout Access Port to Leachate Collection Pipe
HGW - Horizontal Landfill Gas Well
IV - Isolation Valve
CT - Condensate Drain Trap
MS - Moisture Separator

Table 5 Video Observations of Conveyance Pipe & Condensate Traps SCS Engineers

Olympic View Landfill 04204027.05

Waste Management Incorporated

Lateral & Riser Pipe Video Observations

Location	Comments
Riser to LCO-3	9 feet vertical to bottom of header.
Riser to LCO-4	9 feet vertical to lateral junction', Riser 3.5' to grade.
Lateral to LCO-5	Pushed camera down riser and lateral to jumper line and continued to eastern header junction
	(7.75' deep below surface). Staked location of header junction.
Lateral to VGW-28	Pushed camera down riser and lateral 14 feet to junction of lateral & jumper line, continued 159' to the west,
	liquids from 140' to 150'.
Lateral to VGW-30	90° elbow at 8 feet vertical, turned towards VGW37 and pushed camera 134'.
Riser to VGW-32	Minimal vacuum, liquids at 6 feet vertical and lateral junction at 8 feet vertical, can't push camera past 23'.
Riser to VGW-34	Vertical junction at 8 feet, liquids at 21'.
Lateral to VGW-54	90° ell at 8', pushed camera 103' to lateral 55 riser and turned 90° west.
Lateral to VGW-55	Lateral junction at 8 feet vertical, pushed camera westerly 118'.
Lateral to VGW-58	Pushed camera down riser and lateral 70 feet to the north. Lateral pipe crimped approximately 4 feet
	from junction of header pipe. Stake location of blockage.

Condensate Traps Video Observations

Location	Comments
CT - 1 (N)	3' - joint; 15' - lateral junction
CT - 1 (S)	6' - joint; 16' - joint; 20' - lateral junction
CT - 3 (A)	8' - lateral junction; 12' - 90° ell; 15' - 90° ell; 18' liquids
CT - 3 (B)	6' - joint; 10' - joint; 12' - liquids
CT - 3 (C)	4' - joint; 14' - lateral junction; 16' - liquids

All depths are based on top of casing.

VGW - Vertical Landfill Gas Well

LCO - Leachate Cleanout Access Port to Leachate Collection Pipe

HGW - Horizontal Landfill Gas Well

CT - Condensate Drain Trap

Table 6 Isolation Valve Conditions SCS Engineers
Olympic View Landfill 04204027.05
Waste Management Incorporated

Location	Actuator Type	Valve Range	Valve Motion	Bolts	Actuator Body	Comments
IV-1	Buried - Gear	Full	Good	SS		
IV-2	Buried - Gear	Full	Good	SS		
IV-3	Buried - Gear	Full	Good			Valve not exposed for examination
IV-4	Buried - Gear	Full	Good	SS		
IV-5	Above Ground - Gear	Full	Rough/Catches			Valve not exposed for examination
IV-6	Above Ground - Gear	Full	Rough/Catches			Valve not exposed for examination
IV-7						Not an Isolation Valve - 6 inch diameter butterfly valve with hand actuator valve attaches to 6 inch PVC pipe connected to header.
IV-8	Buried - Gear	Full	Rough/Catches	SS	Rusted	
IV-9	Buried - Gear	Full	Good	SS	Rusted	
IV-10	Buried - Gear	No	Sieze	SS	Rusted	Valve is siezed in open position. Water found in actuator body. Lubricated and restored actuator to working condition.
IV-11	Buried - Gear	Full	Good	SS	Rusted	
IV-12						Not an Isolation Valve - 3 inch diameter butterfly valve with hand actuator valve attaches to 3 inch HDPE pipe at junction of 3 inch and 10 inch pipe
IV-13						Not an Isolation Valve - 1/2 inch diameter PVC sample port attaches to 3 inch HDPE pipe at junction of 3 inch and 10 inch pipe
IV-14	Buried - Gear	Full	Good	SS	Rusted	
IV-15	Above Ground - Gear	Full	Rough/Catches			Valve not exposed for examination

Table 7 Video Observations of Gas Wells

SCS Engineers

Olympic View Landfill

04204027.05

Waste Management Incorporated

Location	Obstruction Present Yes / No	Obstruction Substantial or Partial	Type of Obstruction	Total Depth (A) (ft)	Depth to Perforations (A) (ft)	Length of Perforations (A) (ft)	Depth to Obstruction (ft)	Percent Exposed Perforations (B)	Comments
VGW-1	No			NA	21.5	NA	37.3	NA	38.5' to bottom of casing, 3.75' to grade, casing perforations at 21.5', liquids at 37.25'.
VGW-2	No			NA	NA	NA	42.5	NA	45.4' to bottom of casing, 2.4' to grade, liquids at 42.5', casing burned from 8.75' to 10.25'.
VGW-14	No			NA	23.8	NA	39.8	NA	43.25' to bottom of casing, 4.25' to grade, casing perforations at 23.75', liquids at 39.75'.
VGW-16	No			NA	30	NA	57	NA	3.6' to grade, 6" PVC to PE at 10', 6" PE to 4" slotted PE using a PVC concentric reducer at 30', liquids at 57', much at 62'.
VGW-19	Yes	Substantial	crimped pipe	70	25	45	21.7	0%	21.7' to crimped casing.
VGW-21	Yes	Substantial	crimped pipe	70	25	45	29	9%	29.1' to bottom of casing, 2.9' to grade, crimped casing at 29.0'.
VGW-23	Yes	Substantial	crimped pipe	77	28	49	30.5	5%	30.8' to bottom of casing, 3.9' to grade, crimped casing at 30.5'.
VGW-29	Yes	Substantial	crimped pipe	77	28	49	23	0%	Casing crimped at 23', but under vacuum.
VGW-30	Yes	Substantial	crimped pipe	77	28	49	16	0%	4" PVC casing crimped at 16'.
VGW-31	Yes	Substantial	crimped pipe	45	25	20	20	0%	Casing slightly crimped at 8', crimped closed at 20'.
VGW-36	Yes	Substantial	crimped pipe	69	28	41	23	0%	Casing crimped closed at 23'.
VGW-37	Yes	Substantial	crimped pipe	45	25	20	17	0%	Casing crimped closed at 17'.
VGW-47	No			37	20	17	32	71%	Perforations at 24', casing crimped at 31' and 32'.
VGW-50	No			32	20	12	25	42%	29.0' to bottom of casing, perforations started at 20', liquids at 25'.
VGW-52	Yes	Partial	crimped pipe	67	20	47	42.7	48%	42.75' to bottom of casing, 3.0' to grade, liquids at 42.7', crimped casing at 38.75', casing deformed at several locations.
VGW-53	Yes	Substantial	crimped pipe	59	20	39	19	0%	Crimped casing at 19.0'.
VGW-61	Yes	Substantial	crimped pipe	41	20	21	27	33%	Crimped casing at 23' (start of perforation), crimped closed at 27'.
VGW-66	Yes	Substantial	crimped pipe	50	20	30	25	17%	Crimped casing at 25'.
VGW-70	No			97	20	77	102.8	100%	102.75' to bottom of casing, perforations at 30.75', foaming in casing.
LCO-3	No			NA	NA	NA	NA	NA	Pushed camera 133' and could push further.
LCO-4	Yes	Partial	water	NA	NA	NA	NA	NA	Pipe separated from coupling at 31', 38' to 8" tee, liquids from 44' to 49', camera stopped at 65'.
HGW-6	Yes	Partial	water	NA	NA	NA	NA	NA	8' to header, 4' to grade, liquids at 80', can't push camera past 83'.
HGW-7	Yes	Substantial	crimped pipe	NA	NA	NA	NA	NA	Liquids from 15' to 30', ADS pipe at 35' and crushed at 40'.

All depths are based on top of casing.

(A) Source - 2004 As-Built Drawings, Shaw Emcon/OWT

(B) Represents perforated pipe above the obstruction (i.e., unobstructed flow path)

VGW - Vertical Landfill Gas Well

LCO - Leachate Cleanout Access Port to Leachate Collection Pipe

HGW - Horizontal Landfill Gas Well

IV - Isolation Valve

CT - Condensate Drain Trap

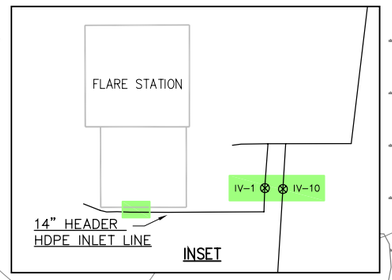
MS - Moisture Separator

GENERAL NOTES

1. FIELD DATA, PROVIDED BY PARAMETRIX, INC. BREMERTON, WA. AND A.C.E., INC., GIG HARBOR, WA.
2. THE ENTIRE LANDFILL IS CLOSED AND CAPPED WITH COVER SYSTEM INCLUDING A GEOMEMBRANE COMPONENT.
3. ALL PIPING IS SDR-17.
4. ALL FITTINGS ARE SDR-11.
5. CONTROL VALVES ARE ASAHI TYPE-75 BUTTERFLY VALVES WITH MANUFACTURED VALVE EXTENSIONS.
6. HEADER PORTION BETWEEN LINE 7A AND LINE 7D WAS REPLACED WITH 370' OF 14" HDPE PIPE. VALVES ON 14" SOUTH HEADER, REPLACE PORTION TO LCO'S HAVE 4' STEM WITH ONE TRANSITION TUBE 4' TO EACH SIDE OF VALVE.
7. HC-7 OR HC-6 IS BELIEVED TO BE LCO-12 TO LEACHATE COLLECTION PIPE.

LEGEND

- 1 — VERTICAL GAS EXTRACTION WELL AND WELL HEAD CONTROL ASSEMBLY
- PLUG AND REDRILLED VERTICAL EXTRACTION WELL
- GAS CONVEYANCE PIPE
- HORIZONTAL GAS EXTRACTION WELL
- HC-1W — WELL HEAD CONTROL ASSEMBLY FOR HORIZONTAL WELL WITH CONDENSATE DRIP LEG
- LCP — LEACHATE COLLECTION PIPE USED FOR GAS EXTRACTION
- LCO-8 — WELL HEAD CONTROL ASSEMBLY FOR LEACHATE PIPE
- GP-8 — SUBSURFACE GAS DETECTION PROBE (GAS PROBE)
- FLANGE
- BLIND FLANGE
- BUTT CAP
- VALVE
- IV-# — ISOLATION VALVE
- PRESSURE MEASUREMENTS
- CONDENSATE TRAP VIDEO INSPECTION LOCATIONS
- CONVEYANCE PIPE VIDEO INSPECTION LOCATIONS



6" DRAIN LINE FROM DRIPLEG TO LEACHATE RISER

4" DISCHARGE INTO NEW CELL LEACHATE SYSTEM

4" ABANDON LINE

CUT POINT 4" ABANDON LINE

8" HDPE LINE

6" HDPE LINE

EXISTING 10" SUBHEADER

LINE 1A
LINE 1B
LINE 1C
LINE 2A
LINE 4A
LINE 4B
LINE 4C
LINE 4D
LINE 4F
LINE 4G
LINE 5A
LINE 7A
LINE 7B
LINE 7C
LINE 7D
LINE 8A
LINE 8B
LINE 8C
LINE 8D
LINE 8E
LINE 8F
LINE 9A
LINE 9B

FLARE STATION
14" HEADER HDPE INLET LINE
SEE INSET
SEE NOTE 6
SEE NOTE 7
OLYMPIC VIEW LANDFILL CONTROL POINT
ELECTRIC MANHOLE
LIMITS OF ROAD
C/L HAUL RD.
OPEN STORAGE
DITCHLINE TYPICAL
SWALE
HIGH POINT
TOP 6" RISER
GAS U/G-T

SCALE (FEET): 0, 100, 200

SHEET TITLE	GAS CONVEYANCE PIPE SYSTEM INVESTIGATION LOCATIONS
PROJECT TITLE	LANDFILL GAS SYSTEM EVALUATION OLYMPIC VIEW LANDFILL
NO. / REVISION / DATE	

WASTE MANAGEMENT, INC.

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.

PROJ. NO.	04204027.05	ACAD FILE:	FIGURE 1
DWN. BY:	LEL	APP. BY:	MV
CHK. BY:	TAM		
DSN. BY:	TAM		

DATE: MAY 2006

SCALE: AS SHOWN

1

GENERAL NOTES

1. FIELD DATA, PROVIDED BY PARAMETRIX, INC. BREMERTON, WA. AND A.C.E., INC., GIG HARBOR, WA.
2. THE ENTIRE LANDFILL IS CLOSED AND CAPPED WITH COVER SYSTEM INCLUDING A GEOMEMBRANE COMPONENT.

LEGEND

- 1 — VERTICAL GAS EXTRACTION WELL AND WELL HEAD CONTROL ASSEMBLY
- PLUG AND REDRILLED VERTICAL EXTRACTION WELL
- HORIZONTAL GAS EXTRACTION WELL
- HC-1W — WELL HEAD CONTROL ASSEMBLY FOR HORIZONTAL WELL WITH CONDENSATE DRIP LEG
- LCP — LEACHATE COLLECTION PIPE USED FOR GAS EXTRACTION
- LCO-8 — WELL HEAD CONTROL ASSEMBLY FOR LEACHATE PIPE
- GP-8 — SUBSURFACE GAS DETECTION PROBE (GAS PROBE)
- LIMITS OF LINER SYSTEM WITH GEOMEMBRANE COMPONENT
- GAS WELL VIDEO INSPECTION LOCATIONS

W.E.T.L.A.N.D., I.N.C.

LIMITS OF REFUSE AND COVER SYSTEM

ELECTRIC MANHOLE

LIMITS OF ROAD

24" CONC PIPE IE=201.48

24" CONC PIPE IE=202.46

18" CMP PIPE IE=201.67

48" CMP PIPE IE=213.95

24" ADS PIPE IE=224.72

24" ADS PIPE IE=222.83

14" ADS PIPE IE=219.22

24" ADS PIPE IE=221.51

12" ADS PIPE IE=287.71

12" ADS PIPE IE=292.21

6" HDPE PIPE

SWALE

DITCHLINE TYPICAL

OLYMPIC VIEW LANDFILL CONTROL POINT 5001 246.160

OPEN STORAGE

AERIAL PHOTO DATE: 5-30-03

SCALES

GP-1 GP-2 GP-3 GP-4 GP-5 GP-6 GP-7 GP-8 GP-9 GP-10 GP-11 GP-12 GP-13 GP-14 GP-15 GP-16

LCO-1 LCO-2 LCO-3 LCO-4 LCO-5 LCO-6 LCO-7 LCO-8 LCO-9 LCO-10 LCO-11

LCO-X1 LCO-X2 LCO-X3 LCO-X4 LCO-X5 LCO-X3B

HC-1E HC-1W HC-2E HC-2W HC-3E HC-3W HC-4 HC-5 HC-6

37R (GW-17) 36R (GW-15) 35R (GW-13) 34R (W-13) 32R (W-11) 21R (W-9) 20R (GW-8)

0 100 200 SCALE (FEET)

NO.	REVISION	DATE

SHEET TITLE: GAS EXTRACTION NETWORK INVESTIGATION LOCATIONS

PROJECT TITLE: LANDFILL GAS SYSTEM EVALUATION OLYMPIC VIEW LANDFILL

WASTE MANAGEMENT, INC.

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.

PROJ. NO.	04204027.05
DSN. BY:	TAM
DWN. BY:	LEL
CHK. BY:	TAM
ACAD FILE:	FIGURE 2
APP. BY:	MV

DATE: MAY 2006

SCALE: AS SHOWN

FIGURE NO. 2

XREF Files: IMAGE Files: wastemanagement.bmp
File: G:\04204027.05\YGURES\NOV 2006\YGURE 2.dwg Layout: wells only User: 1171LEL Nov 07, 2006 - 5:44pm