Report

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Gas Extraction Pilot Study

Sullivan's Ledge Superfund Site
New Bedford, Massachusetts

May 2003

O'BRIEN & GERE ENGINEERS, INC.

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REPORT

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Sullivan's Ledge Superfund Site
New Bedford, Massachusetts

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1. Introduction

1.1 Background

On April 4, 2001, landfill gas screening was performed at the perimeter gas monitoring wells at the Sullivan's Ledge Superfund Site in New Bedford, Massachusetts (Site). The sample results, summarized in a letter to USEPA and MADEP dated April 11, 2001, showed that 13 perimeter gas monitoring wells (of 21 sampled) had post-purge methane concentrations that exceeded 25% of the lower explosive limit (LEL) for methane. Similar results were observed in six wells that were screened on June 26, 2001. The results of that screening were presented in greater detail in a letter dated July 9, 2001.

Based on discussions with USEPA and MADEP, explosive gas screenings were conducted in subsurface structures and buildings on and adjacent to the Site. The results of the screenings (presented in detail in letters dated May 17, May 31, and July 9, 2001) showed non-detect levels of methane in the buildings and structures. Methane and other gases were measured in the landfill gas vents themselves on April 17, 2001. The results (presented in detail in a letter dated May 17, 2001) showed the presence of methane in the existing passive vents.

In accordance with a letter work plan dated July 16, 2001, the Initial Off-Site Soil Gas Survey was performed at the Site on March 12 through March 14, 2002. A total of 33 soil vapor points were installed. The results of the monitoring, summarized in a letter to the agencies dated April 12, 2002, showed that four soil vapor points west of the landfill had methane at 76 to 614 % LEL. These points were bounded to the north and south by monitoring points where no methane was detected. It was also noted that methane was not detected in four soil vapor points located between the landfill and these monitoring points. Three soil vapor points located east of the landfill showed methane at 463 to 734 % LEL. On March 12, 13, and 14, 2002, screening for methane, and other gases, was performed in rooms and common areas at the Day's Inn hotel, at the ground water treatment plant, and in nearby subsurface vaults and catch basins. Methane was not detected at any of the locations screened.

In accordance with a letter dated April 12, 2002, and discussions with USEPA and MADEP at a May 16, 2002 meeting and subsequent conference calls on June 24 and 26, 2002, additional landfill gas investigations were conducted at the Site July 8 through July 11, and July 25, 2002. The program included installing 15 soil vapor points and 10 soil borings (including obtaining one 5 - foot bedrock core and soil samples for grain size analysis), sampling the landfill gas monitoring

wells, and screening adjacent buildings and structures for landfill gas. Additionally, seven vapor samples were collected for volatile organic compound (VOC) analysis, and 15 landfill gas vents were monitored for landfill gas and VOCs. The results of this investigation were summarized in a letter report dated September 3, 2002. Again a significant portion of the soil vapor points, gas monitoring wells, and gas vents indicated methane %LEL in excess of 25%, while the screening results for adjacent buildings and structures continued to be non-detect.

2. Gas Pilot Test

The results of the aforementioned investigations indicated that landfill gas was migrating from the west and east sides of the Sullivan's Ledge Site. The Corrective Action letter submitted to the agencies on October 12, 2002 proposed using a temporary extraction system to induce a vacuum on existing gas vents located on the west side and northeast portion of the site to (1) control the migration of landfill gases, and (2) to evaluate the ability of an extraction system to control landfill gas migration. A gas pilot test was conducted from January 6, 2003 to April 15, 2003. The following is a summary of the implementation and results of the gas pilot test.

2.1 Gas Pilot Test Implementation

The temporary extraction system consisted of a trailer-mounted blower package equipped with a control panel, inlet control valves, sampling ports, discharge stack, and condensate collection pot. The blower was driven by an 8 HP, 460V motor, capable of discharging approximately 200 CFM at a vacuum of 60 inches of water. A three-phase electrical feed was run from the existing lighting panel in the ground water treatment plant to the location of the blower.

Existing gas vents GV-1 and GV-8 were connected to the inlet of the blower using lengths of 6-inch PVC pipe and fittings. Butterfly valves were installed on the piping between the blower and vents to enable balancing of the system, or to allow the blower to operate on either of the vents individually. In addition, vents GV-12, GV-13, and GV-14 were capped to prevent short-circuiting through an existing header connecting those vents to GV-8. Location of the gas vents, header piping and perimeter gas monitoring wells are shown on Figure 1.

Prior to startup of the temporary extraction system, a baseline monitoring round was conducted on December 19, 2002 at perimeter gas monitoring wells GM-2R though GM-17 to provide a data set for use in performance evaluation. The extraction system was started up and checked out on December 20, 2002, then shut down on December 23, 2002 and restarted on January 6, 2003 following a holiday shut down.

2.2 Pilot Test Monitoring

During system startup, vacuum measurements were made at the piping connection to vents GV-8 and GV-1. Measurements of discharge velocity and exhaust gas temperature were also made at the blower discharge stack, to allow the volumetric flow rate to be calculated. The

flow rate and intake vacuum were compared to the performance curve provided by the blower manufacturer to verify proper operation of the system.

After the blower system had been started and operated for one day, a series of vacuum readings and landfill gas measurements were made. Vacuum readings were collected at gas vents GV-1, GV-8, GV-12, GV-13, and GV-14 to assess the extraction system's operating parameters. Vacuum readings were made at other nearby vents, including GV-2, GV-7, GV-9, GV-10, and GV-11, to assess if air was being drawn in, which could have lead to short-circuiting of the system.

At the blower system, exhaust velocity and temperature were monitored, to confirm the air discharge rate from the system. Also, the exhaust gas was screened for landfill gas constituents, using a Landtec Model GEM 500 Gas Extraction Monitor (GEM 500) equipped with a hydrogen sulfide monitoring pod to monitor for methane, % LEL, carbon dioxide, oxygen, and hydrogen sulfide. Monitoring was conducted by connecting flexible tubing to the discharge stack sample port, allowing the internal sample pump in the GEM 500 to withdraw air from the stack. In addition, a photoionization detector (PID) was used to screen the blower discharge for VOCs. Once the instrument readings had stabilized, the data was recorded on field data sheets.

Following the readings at the gas vents and blower system, vacuum readings were taken at gas monitoring wells GM-2R, GM-3R, GM-4R, GM-5, GM-6, GM-7, GM-8, GM-9, GM-10, GM-11, GM-12, GM-14, GM-15, GM-16, and GM-17. At the same time, these wells were monitored for landfill gas, using the GEM 500 and the same protocols as used during the previous site investigations.

The gas vent, blower system, and gas monitoring well readings described above were repeated on the second (01/07/03) and third (01/08/03) days following system startup, and then weekly for the duration of the gas pilot test.

Concurrently with the gas extraction system monitoring, air monitoring was conducted in the breathing zone near the blower system, near the southeast corner of the ground water treatment plant, and at a point approximately 50 feet downwind of the blower discharge. Monitoring was conducted for VOCs, using a PID, and for methane and hydrogen sulfide, using the Landtec GEM 500.

2.3 Operating Modes

The temporary extraction system was initially operated with connections to existing gas vents GV-1 (in the northeast corner of the landfill) and GV-8 (tied via header to vents of the west side of the Site). On February 1, 2003 the valve to GV-8 was closed, as it began to draw water. The pilot study was continued with a single connection at GV-1 from

February 1 to March 15 and at GV-13 from March 15 to March 20 and March 24 to April 15. On April 15, 2003 the valves to vents GV-1 and GV-13 were both opened, and the system is presently operating in that mode.

2.4 Gas Pilot Test Results

The results of the gas extraction pilot test are summarized in this section. Unless otherwise noted, all gas concentrations are reported as percent by volume.

2.4.1 Ambient Air Monitoring

An ambient air monitoring program was conducted throughout the pilot study. The study consisted of weekly measurements taken from the southeast corner of the ground water treatment plant, 50 feet downwind of the unit blower, and in the breathing zone in the vicinity of the blower. After the first week of operation, ambient air methane concentration measurements were consistently non-detect, while H_2S and VOCs were detected on only two occasions (1/20/03 and 4/2/03). In addition, qualitative observations made by field monitoring personnel did not detect objectionable odors (including H_2S) during any of the monitoring events. For a summary of the ambient air monitoring results refer to Table 1.

2.4.2 Gas Extraction System Discharge Monitoring

Gas extraction system discharge stack monitoring results are summarized on Table 2. Discharge rates, from start-up through March 10, ranged from approximately 15 to 30 CFM. Subsequent to the March 10 monitoring event the rate increased to approximately 200 CFM, which is co-incident with the reconfiguration of the system to draw from vent GV-13. The earlier, lower discharge rates may have been due to a system blockage caused by an accumulation of water in vent GV-8. At start-up, methane concentrations were approximately 35%, then gradually declined to 12-18% by March 10; conversely, O_2 concentrations increased from approximately 2% to 6-8% by March 10.

Monitoring events on January 20 and January 21 yielded results which did not conform with these general trends. Specifically, methane concentration ranged from non-detect to 2.3%, carbon dioxide ranged from 0.1 to 2%, O_2 ranged from 17.6 to 20.1% and the extracted gas temperature ranged from 28.3 to 52°F. These erratic measurements were believed to be the result of ice formation in the suction header, which interfered with system operation.

From March 17 to April 15, methane concentrations ranged from 1.4-3.4%, while O_2 concentrations ranged from 14-18%. These results, coupled with the greatly increased discharges rates, suggest that outside air was being drawn into the system (possibly through open vents GV-7, GV-9 and GV-10).

2.4.3 Perimeter Gas Monitoring Well Screening

Results of the screening of perimeter gas monitoring wells are presented in Table 3, and vacuum measurements from selected gas vents are included in Table 4. A summary of key data observations is provided below.

Methane Content

Methane concentrations at perimeter gas monitoring wells GM-2R though GM-17, which were initially observed during the baseline event at levels reaching a maximum of 66.6%, were non-detect for at least the last six monitoring events. During the final monitoring event, monitoring wells GM-19 and GM-20 (in the vicinity of the former Cinema property, remote from the gas extraction points) were the only wells to indicate the presence of methane above the non-detect level. However, both wells showed a significant reduction in methane concentrations with decreases from 10.1% and 2.4% to 0.5% and 0.4%, respectively. The data indicates that the pilot system was effective in mitigating subsurface migration of methane from the landfill. For a summary of methane concentration readings refer to Table 5.

With respect to operating modes, a slight "rebound" in methane concentration was noticed in monitoring wells GM-2R, GM-3R, GM-4R, and GM-7 with the close of the GV-8 valve (and use of only the GV-1 connection). Each well had indicated a non-detect reading prior to the closure of GV-8 on January 28, 2003. However, the single connection at GV-13 on March 17, 2003 returned methane levels at the aforementioned wells to a non-detect status, which was maintained as the valve at GV-1 was reopened.

Other Gases

During the weekly monitoring events, the perimeter wells were also screened for hydrogen sulfide, carbon dioxide, oxygen, and VOCs. Similar to methane, concentrations of hydrogen sulfide and carbon dioxide showed large reductions from the baseline event, reflecting effective control of landfill gas migration. In general, oxygen concentrations varied inversely to methane, suggesting ambient air intrusion as landfill gas was extracted. VOCs were detected sporadically at low concentrations with no clear pattern; from late January through the end of the study VOCs were largely non-detect.

Vacuum Readings

Vacuum readings from existing gas vents are tabulated on Table 4. Vacuum pressures at the well heads of GV-1, GV-8 and GV-13 ranged between 1.25" Hg and 6" Hg. The valve to GV-13 was opened on March 15, however vacuum readings were not recorded until April 15 due to a defective gauge.

Following start-up, vacuum readings at GV-12, GV-13, and GV-14 (all connected to GV-8 via an existing header) were positive ranging from 0.01 to 0.06 inches of water. By January 28 a zero or negative pressure

had been established at all three vents and maintained until March 17, at which time the valve to GV-13 was opened and the vacuum readings at GV-12 and GV-14 dropped to >-1.00 inches of water.

The remaining monitored gas vents, GV-2, GV-7, GV-9, GV-10, and GV-11, all indicated zero or negative pressures for the duration of the pilot test with occasional exceptions. On January 13, GV-9 and GV-10 produced positive vacuum readings of 0.04 and 0.06 inches of water, respectively. Gas vents GV-2 (on January 28 and April 15) and GV-7 (January 28 and March 3) each indicated slight positive vacuum readings twice, while GV-11 indicated positive vacuum readings of 0.02 inches on January 13 and 0.04 to 0.06 inches on April 15.

Initially, vacuum readings at a majority of the perimeter monitoring wells were erratic and did not indicate sustained negative pressures. However, as the test progressed all wells, with the exception of GM-2R and GM-12, were able to sustain a zero or negative pressure for a substantial amount of time. On the final day of testing 15 of the 17 wells indicated a zero or negative pressure. The two wells that indicated a positive pressure were again GM-2R and GM-12, at 0.04 inches of water each. However, it should be noted that methane concentrations at these wells were non-detect for the last month of the pilot test. The negative pressures witnessed across most of the Site indicate that it is possible to produce the required vacuum to control the migration of landfill gases. For a summary of perimeter well vacuum readings refer to Table 5.

3. Corrective Action Conceptual Design

With the pilot study providing confirmation of the ability of an active extraction system to control landfill gas migration, the Sullivan's Ledge Site Group is proceeding with the design of the full scale system. The following is a summary of the conceptual design for the active gas extraction system.

3.1 Extraction System Design

The gas extraction system design consists of extraction wells and header piping connected to a blower package, equipped with a control panel, inlet control valves, sampling ports, discharge stack, and condensate collection pot.

What about 8, 14, 12 The capture zone shows that these will be connected

The extraction system will be connected to existing gas vents GV-1, GV-3, and GV-13, to produce negative pressures in the subsurface on the east, north, and west perimeters of the Site. Based on multiple screening events performed in 2002, gas migration was not observed on the south side of the landfill, and the gas extraction system will not be connected to vent GV-4 on the south perimeter. The inlet of the blower will be connected to these gas vents with 6-inch PVC pipe and fittings. The header piping will be buried below grade, within the barrier protection layer of the landfill cap, above the geomembrane. As in the gas pilot test, vents GV-8, GV-12, and GV-14 will be permanently capped to prevent short-circuiting through an existing header connecting those vents to GV-13. Based on data collected during the pilot study vents GV-2, GV-7, GV-9, and GV-10, will also be capped to prevent air intrusion.

Based on the vacuum readings collected from gas vents and perimeter monitoring wells during the pilot test, the system will be designed to produce an approximate 200-ft radius of influence at each connection. A vacuum does not need to be established at the center of the landfill, since landfill gases moving from the center of the cap towards the east, north, and west site boundaries will encounter the radius of influence of one of the three connections, prior to reaching the limits of the Site. Refer to Figure 2 for the conceptual layout plan of the extraction system components, and depiction of the radii of influence.

To produce this radius of influence, the specified blower will be capable of extracting approximately 200 CFM at a vacuum of 60 inches of water (4.4" of Hg). According to the U.S.A.C.E. Landfill Gas Extraction Design Handbook a typical negative pressure at the well head will range from approximately 10 to 20 inches of water column. Specifications for the blower will be developed as part of the final design. The blower will be tied into the existing programmable logic controller (PLC) of the

groundwater treatment plant, allowing for automated, remote control of the blower.

The blower package will include a condensate collection pot to remove liquids from the extracted landfill gases prior to discharge. Under the control of the PLC, a condensate pump will automatically convey collected liquids from the condensate pot to the on-site groundwater treatment plant where it will be treated and discharged in accordance with the current discharge permit.

The blower package will be situated within a small, insulated, heated pre-fabricated structure located in the vicinity of the groundwater treatment plant near the northwest border of the Site. The structure will be designed to be visually compatible with the existing GWTP building.

The Sullivan's Ledge Site Group will investigate the possibility of running a sample line to this structure that will be connected to the gas monitor installed in the GWTP to detect leaks of methane from the extraction system in real time.

3.2 Landfill Gas Discharge

In the Soil Gas Survey report (June 1995), O'Brien & Gere presented calculations of estimated landfill gas generation rates. Using conservative assumptions, it was estimated that the closed landfill would generate between 25 and 230 CFM of landfill gas. The final design of the landfill closure incorporated passive gas vents to discharge this gas to the atmosphere, untreated.

In July 2002, samples of migrating landfill gas were collected, using Summa canisters, from representative perimeter gas monitoring wells and temporary soil vapor survey points at the Site. Those samples were analyzed for VOCs using Method TO-14. Using the total VOC concentrations from gas monitoring wells GM-2R, GM-5, and GM-20, and the most conservative gas generation rate of 230 CFM, it was estimated that the total VOC discharge from the landfill would be approximately 158 lbs/year. For comparison, air emissions in Massachusetts are regulated under 310 CMR 7.00 (the Massachusetts Air Pollution Control regulations) if they exceed 2,000 lbs/yr, or create an air pollution condition. Based on this calculation, the discharge would be expected to be well below the regulatory threshold.

From January 6 through April 15, 2003, the interim active gas extraction system was operated and monitored at the Site as part of a long-term pilot study. For the first ten weeks of the study, the system was operated at an average discharge rate of approximately 18 CFM, and the average methane concentration in the discharge stack was approximately 16%. For the next five weeks, the system operated at an average discharge rate of approximately 200 CFM, and the average methane concentration in

the stack was approximately 2 percent. With the decline in methane concentration at the higher extraction rate, a corresponding increase in oxygen concentration was observed in the stack discharge. These data suggest that the extraction rate of 200 CFM exceeded the rate of landfill gas generation, and it can be concluded that the actual landfill gas generation is well below 200 CFM.

On April 24, 2003, a Summa canister sample was collected from the discharge of the interim gas extraction system, and analyzed for VOCs using Method TO-14, and for methane, oxygen, nitrogen, carbon dioxide, and carbon monoxide. At them time of sample collection, the stack discharge rate was 192 CFM, and the methane and oxygen concentrations in the stack, measured using field instruments, were 1.1 % and 17.7%, respectively. The results of the Summa canister analysis are presented on Table 6.

The total VOC concentration in the April 2003 stack sample was 0.85 mg/m3. At the 192 CFM gas extraction rate at the time of sampling, the total estimated VOC mass loading from the system would be on the order of 5.4 lbs/yr. Consistent with previous calculations, this discharge would be well below the regulatory level of 2,000 lbs/yr. During the course of the gas extraction pilot test, ambient air monitoring was conducted to confirm that the discharge did not exceed established action levels. In addition, objectionable odors were not detected by field personnel during any of the monitoring events, and no reports of odor conditions were received from the public or from GWTP personnel.

Based on this information, it is concluded that the discharge from the active gas extraction system will be below a level of significant risk to health, safety, public welfare, and the environment. Therefore, the active gas extraction system will not require off-gas treatment. However, the system will be designed so that an off-gas flare could be added to the discharge stack in the future, if required. Because the methane concentrations in the stack are so low, any flare system would require supplemental fuel (in this case, natural gas) for operation.

4. Conclusions

The following conclusions were drawn from data collected during the gas extraction pilot test initiated on December 20, 2002 at the Sullivan's Ledge Superfund Site in New Bedford, Massachusetts:

- An active extraction system is capable of controlling the migration of landfill gases at the Site.

- During the gas extraction pilot test, the occasional freezing of water was witnessed in the suction header piping, valves, and gauges. To prevent this from reoccurring, the permanent system will be housed in a heated enclosure, and the collection piping will be installed approximately 18 inches below ground surface within the barrier protection layer.

- The pilot extraction unit occasionally shut down due to the condensate knockout pot filling with liquid. To prevent this from reoccurring, the permanent system will include a condensate pump to automatically convey collected liquids from the condensate pot to the on-site groundwater treatment plant.

- The discharge from the active gas extraction system will not pose a health risk or public nuisance. Conservative estimates of total annual VOC discharge from the system are orders of magnitude below levels regulated under 310 CMR 7.00, and therefore off-gas treatment is not required or justified.

Table 1
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
Ambient Air Readings

Date	Time	Location	Methane %	Methane % LEL	Carbon Dioxide %	Oxygen %	Hydrogen Sulfide (ppm)	VOCs (ppm)	Barometric Pressure[5]
12/19/02	13:00	Near SVE Vent	ND	ND	0.1	21.9	1.0	0.9	NM
		S.E. Corner WWTP	ND	ND	ND	21.9	ND	0.9	
		50 Feet Downwind of Unit	0.1	1.0	0.1	21.9	1.5	0.9	
12/20/02	12:30	Near SVE Vent	0.1	1.0	0.1	21.5	ND	NM	NM
		S.E. Corner WWTP	NM	NM	NM	NM	NM	NM	
		50 Feet Downwind of Unit	0.1	NM	0.1	21.5	ND	NM	
12/23/02	8:30	Near SVE Vent	ND	ND	ND	22.2	ND	ND	NM
	8:40	S.E. Corner WWTP	0.1	1.0	ND	22.2	ND	ND	
	8:35	50 Feet Downwind of Unit	0.1	1.0	ND	21.5	ND	ND	
12/24/02	9:15	Near SVE Vent	ND	ND	ND	22.2	ND	ND	NM
	9:25	S.E. Corner WWTP	0.1	1.0	ND	22.1	ND	ND	
	9:40	50 Feet Downwind of Unit	0.1	1.0	ND	22.2	ND	ND	
1/6/03	13:28	Near SVE Vent	ND	ND	ND	20.7	ND	2.1	NM
	13:34	S.E. Corner WWTP	ND	ND	ND	20.7	ND	ND	
	13:30	50 Feet Downwind of Unit	ND	ND	ND	20.8	ND	2.1	
1/7/03	10:20	Near SVE Vent	ND	ND	ND	20.9	2.0	ND	NM
	10:40	S.E. Corner WWTP	ND	ND	ND	20.8	3.0	ND	
	10:30	50 Feet Downwind of Unit	ND	ND	ND	21.0	4.0	ND	
1/8/03	12:20	Near SVE Vent	ND	ND	ND	20.9	ND	1.1	NM
	12:10	S.E. Corner WWTP	ND	ND	ND	20.7	ND	1.1	
	12:25	50 Feet Downwind of Unit	ND	ND	ND	21.0	ND	1.1	
1/9/03	10:00	Near SVE Vent	ND	ND	ND	20.4	ND	ND	NM
	10:18	S.E. Corner WWTP	ND	ND	ND	20.3	ND	ND	
	10:10	50 Feet Downwind of Unit	ND	ND	ND	20.1	1.0	ND	
	11:03	Near SVE Vent	ND	ND	ND	20.5	ND	ND	
	11:10	S.E. Corner WWTP	ND	ND	ND	20.2	ND	ND	
	11:05	50 Feet Downwind of Unit	ND	ND	ND	20.1	ND	ND	
	12:10	Near SVE Vent	ND	ND	ND	20.4	ND	ND	
	12:17	S.E. Corner WWTP	ND	ND	ND	20.2	ND	ND	
	12:13	50 Feet Downwind of Unit	ND	ND	ND	20.2	ND	ND	
1/13/03	11:05	Near SVE Vent	ND	ND	ND	20.9	ND	ND	NM
	11:10	S.E. Corner WWTP	ND	ND	ND	20.9	ND	ND	
	11:15	50 Feet Downwind of Unit	ND	ND	ND	21.0	ND	ND	
1/20/03	10:20	Near SVE Vent	ND	ND	ND	20.8	2	ND	29.56" Hg
	10:15	S.E. Corner WWTP	ND	ND	ND	20.9	ND	ND	
	10:18	50 Feet Downwind of Unit	ND	ND	ND	20.9	1	ND	
1/21/03	10:14	Near SVE Vent	ND	ND	ND	20.9	ND	ND	29.56"Hg
	10:08	S.E. Corner WWTP	ND	ND	ND	20.9	ND	ND	
	10:12	50 Feet Downwind of Unit	ND	ND	ND	20.8	ND	ND	
1/28/03	9:40	Near SVE Vent	ND	ND	ND	20.8	ND	ND	30.39"Hg
	9:33	S.E. Corner WWTP	ND	ND	ND	20.9	ND	ND	
	9:38	50 Feet Downwind of Unit	ND	ND	ND	20.9	ND	ND	
2/3/03	10:10	Near SVE Vent	ND	ND	ND	20.8	ND	ND	29.91"Hg
	10:05	S.E. Corner WWTP	ND	ND	ND	20.7	ND	ND	
	10:08	50 Feet Downwind of Unit	ND	ND	ND	20.7	ND	ND	

Table 1 continued
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
Ambient Air Readings

Date	Time	Location	Methane %	Methane % LEL	Carbon Dioxide %	Oxygen %	Hydrogen Sulfide (ppm)	VOCs (ppm)	Barometric Pressure[5]
2/12/03	9:45	Near SVE Vent	ND	ND	ND	20.7	ND	ND	29.62" Hg
	9:35	S.E. Corner WWTP	ND	ND	ND	20.9	ND	ND	
	9:40	50 Feet Downwind of Unit	ND	ND	ND	20.7	ND	ND	
2/19/03	9:05	Near SVE Vent	ND	ND	ND	20.8	ND	ND	30.36" Hg
	8:45	S.E. Corner WWTP	ND	ND	ND	20.9	ND	ND	
	9:00	50 Feet Downwind of Unit	ND	ND	ND	20.9	ND	ND	
2/24/03	9:33	Near SVE Vent	ND	ND	ND	20.7	ND	ND	30.18"Hg
	9:20	S.E. Corner WWTP	ND	ND	ND	20.9	ND	ND	
	9:25	50 Feet Downwind of Unit	ND	ND	ND	20.9	ND	ND	
3/3/03	9:45	Near SVE Vent	ND	ND	ND	20.7	ND	ND	29.97"Hg
	9:35	S.E. Corner WWTP	ND	ND	ND	20.7	ND	ND	
	9:40	50 Feet Downwind of Unit	ND	ND	ND	20.9	ND	ND	
3/5/03	10:05	Near SVE Vent	ND	ND	ND	20.8	ND	ND	29.98"Hg
	10:00	S.E. Corner WWTP	ND	ND	ND	20.9	ND	ND	
	10:08	50 Feet Downwind of Unit	ND	ND	ND	20.9	ND	ND	
3/10/03	10:15	Near SVE Vent	ND	ND	ND	20.9	ND	ND	30.00"Hg
	10:05	S.E. Corner WWTP	ND	ND	ND	20.7	ND	ND	
	10:10	50 Feet Downwind of Unit	ND	ND	ND	20.7	ND	ND	
3/17/03	9:55	Near SVE Vent	ND	ND	ND	20.9	ND	ND	NM
	9:45	S.E. Corner WWTP	ND	ND	ND	20.7	ND	ND	
	9:50	50 Feet Downwind of Unit	ND	ND	ND	20.9	ND	ND	
3/20/03	8:50	Near SVE Vent	ND	ND	ND	20.9	ND	ND	NM
	8:40	S.E. Corner WWTP	ND	ND	ND	20.9	ND	ND	
	8:45	50 Feet Downwind of Unit	ND	ND	ND	20.7	ND	ND	
3/20/03	10:15	Near SVE Vent	ND	ND	ND	20.9	ND	ND	30.06" Hg
	10:05	S.E. Corner WWTP	ND	ND	ND	20.8	ND	ND	
	10:10	50 Feet Downwind of Unit	ND	ND	ND	20.9	ND	ND	
4/2/03	10:50	Near SVE Vent	ND	ND	0.3	20.8	ND	1.6	30.18 "Hg
	10:40	S.E. Corner WWTP	ND	ND	0.3	20.9	ND	ND	
	10:45	50 Feet Downwind of Unit	ND	ND	0.3	20.8	2	ND	
4/7/03	11:35	Near SVE Vent	ND	ND	ND	20.8	ND	ND	30.18" Hg
	11:30	S.E. Corner WWTP	ND	ND	ND	20.9	ND	ND	
	11:38	50 Feet Downwind of Unit	ND	ND	ND	20.7	ND	ND	
4/15/03	10:10	Near SVE Vent	ND	ND	ND	20.9	ND	ND	29.62" Hg
	10:00	S.E. Corner WWTP	ND	ND	ND	20.8	ND	ND	
	10:05	50 Feet Downwind of Unit	ND	ND	ND	20.9	ND	ND	

Notes:
1. Measurements collected on December 19th, 20th, 23rd and 24th of 2002 with a Landtec Model GEM-2000 Gas Extraction Monitor fitted with a hydrogen sulphide pod. Subsequent measurements collected with a Landtec Model GEM-500 Gas Extraction Monitor fitted with a hydrogen sulphide pod.
2. VOC measurements collected with a Thermo Environmental 580S OVM meter.
3. NM = Not measured
4. ND = Not Detected
5. Barometric Pressure readings taken with an electronic altimeter Model EB833, and are expressed in inches of Hg.

Table 2
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
Gas Extraction System Stack (Effluent) Readings

Date	Time	Methane % (1)	Methane % LEL (1)	Carbon Dioxide % (1)	Oxygen % (1)	Hydrogen Sulfide (ppm) (1)	VOCs (ppm) (2)	Temperature °F (3)	Velocity ft per min (fpm)(3)
12/19/02	13:00	34.7	>>>>	13.8	2.1	1.0	NM	70.0	85
12/20/02	12:30	22.1	>>>>	12.9	2.6	1.0	NM	NM	NM
12/23/02	8:50	37.0	>>>>	14.8	0.3	1.0	NM	54.0	75
12/24/02	9:00	17.8	>>>>	12.5	3.8	6.0	ND	64.0	60-85
1/6/03	13:40	19.5	390	13.2	4.0	ND	ND	61.3	204-249
1/7/03	10:15	15.0	290	9.9	6.6	2.0	1.1	59.4	188-240
1/8/03	12:35	19.4	388	11.4	6.2	2.0	1.1	74.9	170-214
1/9/03	10:25	21.8	436	11.6	6.3	3.0	ND	74.4	181-253
1/9/03	11:00	21.7	434	11.7	5.9	2.0	ND	109.3	230-260
1/9/03	12:25	21.3	428	11.8	5.6	2.0	ND	150.7	326-343
1/13/03	10:53	20.4	408	11.1	6.0	1.0	ND	86.2	197-230
1/20/03	10:25	2.3	40	2.0	17.6	4.0	ND	36.4	177-183
1/20/03	12:45	ND	ND	0.3	20.1	3.0	ND	52.0	180-191
1/21/03	10:25	ND	ND	0.1	19.9	ND	ND	28.3	191-204
1/28/03	10:15	6.3	126	6.5	9.8	ND	ND	65.4	150-165
2/3/03	10:15	13.5	270	9.7	7.3	ND	ND	86.0	180-219
2/12/03	9:50	21.1	421	10.4	4.9	ND	ND	67.7	145-172
2/19/03	9:25	7.9	158	6.7	9.5	2.0	ND	49.9	187-216
2/24/03	9:45	12.1	242	10.1	6.5	1	ND	64.3	172-204
3/3/03	9:50	14.1	282	10.2	7.6	1	ND	62	181-202
3/5/03	10:15	14.5	290	10.4	7.5	2	ND	67.8	179-198
3/10/03	10:20	17.7	354	10.7	6.7	1	ND	79.1	191-221
3/17/03	9:50	3.4	68	3	15.4	2	ND	80.5	2480
3/20/03	9:00	2.4	48	3.5	14.4	4	ND	63	2130
3/24/03	11:00	2.0	40	1.7	17.4	ND	ND	81	2240
4/2/03	11:40	2.1	42	2.9	17.1	ND	ND	80.3	2270
4/7/03	11:35	1.4	34	1.9	18.5	ND	ND	60	2670
4/15/03	10:15	2.0	40	2.4	17.6	ND	ND	81.6	2180
4/15/03	14:15	2.0	40	2.7	17	ND	ND	81.9	2190

NOTES:

1. Measurements collected on December 19-24, 2002 with a Landtec Model GEM-2000 Gas Extraction Monitor fitted with a hydrogen sulphide pod. Subsequent measurements collected with a Landtec Model GEM-500 Gas Extraction Monitor fitted with a hydrogen sulphide pod.
2. VOC measurements collected with a Thermo Environmental 580S OVM meter.
3. Effluent temperature and velocity measured on December 19, 20, 23, and 24 using a model 444 Kurz Needle Gauge Air Velocity Meter. Subsequent measurements collected with an electronic VelociCalc model 8345/8346 Air Velocity Meter. Calculations based on measured effluent discharge diameter of 4 inches.
4. >>> = out of range (greater than 100% of LEL).
5. NM = Not measured
6. ND = Not Detected

Table 3
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
Baseline (pre-startup)

Well Location	Time Sampled [1,2]	Methane (%)		Methane (%LEL)		Carbon Dioxide (%)		Oxygen (%)		Hydrogen Sulfide (ppm)		VOCs (ppm)	
		pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge
GM-2R	11:15	66.9	66.6	>>>	>>>	14.6	14.7	ND	ND	1	1	ND	ND
GM-3R	11:05	73.1	73.3	>>>	>>>	9.9	9.9	ND	ND	86	105	ND	ND
GM-4R	11:00	38.7	38.9	>>>	>>>	14.9	14.8	0.3	ND	24	35	ND	ND
GM-5	10:50	49.9	49.5	>>>	>>>	11.4	11.4	ND	ND	28	33	ND	ND
GM-6	10:45	ND	0.1	ND	1	4.0	4.0	13.3	12.8	3	2	0.9	0.9
GM-7	10:40	19.8	19.8	>>>	>>>	17.5	17.5	ND	ND	7	7	ND	0.9
GM-8	10:20	ND	ND	ND	ND	3.3	3.5	19.9	17.6	ND	2	ND	0.9
GM-9	9:55	ND	ND	>>>	ND	0.1	0.1	22.3	22.3	ND	ND	0.9	0.9
GM-10	9:40	24.8	24.8	>>>	>>>	14.9	15.0	ND	ND	ND	ND	2.7	0.9
GM-11	9:35	4.7	3.1	>>>	62	3.9	1.0	12.3	19.8	ND	ND	0.9	0.9
GM-12	9:25	ND	ND	ND	ND	12.8	12.9	0.2	ND	ND	ND	0.9	0.9
GM-13	11:35	ND	ND	ND	ND	8.2	8.3	8.8	8.7	ND	ND	ND	ND
GM-15	11:30	ND	0.4	ND	7	7.1	7.1	3.1	2.8	ND	ND	ND	ND
GM-16	11:25	ND	ND	ND	ND	3.2	3.1	17.4	17.5	ND	ND	ND	ND
GM-17	11:15	11.2	11.0	>>>	>>>	5.0	5.0	ND	ND	2	1	ND	ND

NOTES:

1. Measurements collected on December 19, 2002 with a Landtec Model GEM 2000 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod and Thermo Environmental 580S OVM. Measurements taken before system start-up.as a baseline.
2. Post-purge measurements were collected after 10 minutes of purging. Measurements typically stabilized after 1-2 minutes of purging.
3. >>> = out of range (greater than 100% of LEL)
4. ND = Not detected

Table 3 Continued
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
January 6, 2003

Well Location	Time Sampled (1,2)	Vacuum Reading (5)	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	13:50	+0.03	65.9	>>>	14.3	0.1	3.0	ND
GM-3R	13:55	+0.02	93.8	>>>	6.2	ND	45.0	ND
GM-4R	14:00	+0.03	51.5	>>>	12.2	ND	10.0	ND
GM-5	14:05	+0.03	48.3	964.0	8.3	ND	24.0	ND
GM-6	14:15	0.00	ND	ND	3.8	13.0	5.0	ND
GM-7	14:23	+0.04	23.9	474.0	17.0	ND	7.0	ND
GM-8	14:30	+0.05	ND	ND	3.4	14.0	3.0	ND
GM-9	14:40	0.00	11.1	222.0	16.2	0.3	ND	ND
GM-10	14:48	+0.02	25.6	514.0	12.6	ND	ND	ND
GM-11	14:55	-0.06	11.4	228.0	8.2	2.4	ND	ND
GM-12	15:03	+0.02	ND	ND	11.7	1.5	ND	ND
GM-13	15:10	>+1.0	ND	ND	7.9	9.1	2.0	ND
GM-15	15:15	-0.66	ND	ND	4.7	0.7	3.0	ND
GM-16	15:25	0.00	0.4	8.0	3.5	1.2	2.0	ND
GM-17	15:30	>+1.00	10.7	209.0	5.0	ND	ND	ND

January 7, 2003

Well Location	Time Sampled (1,2)	Vacuum Reading (5)	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	11:20	+0.06	64.4	>>>	14.3	ND	4.0	ND
GM-3R	11:34	+0.04	75.7	>>>	7.5	ND	55.0	ND
GM-4R	11:39	+0.05	49.8	998.0	12.3	ND	8.0	ND
GM-5	11:44	+0.06	47.2	944.0	8.5	ND	26.0	ND
GM-6	11:49	0.00	ND	ND	3.6	13.0	3.0	ND
GM-7	11:56	+0.04	21.2	422.0	16.0	ND	7.0	ND
GM-8	12:02	+0.06	ND	ND	3.2	18.7	2.0	ND
GM-9	12:09	0.00	11.4	226.0	16.3	ND	2.0	ND
GM-10	12:16	+0.03	25.0	500.0	12.0	ND	3.0	ND
GM-11	12:22	+0.02	13.3	262.0	4.9	ND	2.0	ND
GM-12	12:30	0.00	ND	ND	11.5	2.0	2.0	ND
GM-13	12:37	>+1.0	ND	ND	8.0	9.3	2.0	ND
GM-15	12:46	0.00	ND	ND	4.1	0.8	2.0	ND
GM-16	12:52	0.00	0.3	6.0	3.4	1.0	2.0	ND
GM-17	12:58	>+1.00	10.8	214.0	4.9	ND	1.0	ND

NOTES:
1. Measurements collected with a Landtec Model GEM 500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod and Thermo Environmental 580S OVM.
2. Measurements were collected after readings stabilized (1-2 minutes of purging).
3. ND = Not detected
4. >>> = out of range (greater than 100% of LEL).
5. Vacuum readings presented in inches water column (WC). Measurement of zero implies neither a negative or positive vacuum on well.

Table 3 Continued
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
January 8, 2003

Well Location	Time Sampled [1,2]	Vacuum Reading [5]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	12:55	0.00	67.0	>>>	14.3	ND	3.0	ND
GM-3R	13:03	0.00	74.5	>>>	10.5	ND	22.0	ND
GM-4R	13:09	+0.02	49.6	984.0	12.4	ND	6.0	ND
GM-5	13:15	+0.02	48.0	960.0	8.8	ND	26.0	ND
GM-6	13:25	0.00	0.1	2.0	6.4	4.6	ND	ND
GM-7	13:32	0.00	34.5	690.0	17.4	0.2	11.0	ND
GM-8	13:37	+0.03	ND	ND	4.2	9.0	3.0	ND
GM-9	13:45	0.00	10.9	218.0	16.0	0.3	1.0	ND
GM-10	13:52	-0.06	24.1	482.0	12.0	0.4	1.0	ND
GM-11	13:59	-0.04	12.3	262.0	4.7	3.4	1.0	ND
GM-12	14:05	-0.02	ND	ND	5.9	10.8	1.0	ND
GM-13	14:10	0.00	ND	ND	6.6	11.5	1.0	ND
GM-15	14:17	0.00	ND	ND	6.0	ND	8.0	ND
GM-16	14:24	0.00	ND	ND	3.5	4.9	1.0	ND
GM-17	14:30	>+1.00	7.8	156.0	4.1	ND	6.0	ND

January 9, 2003

Well Location	Time	Vacuum Readings [1]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	NM	NM	NM	NM	NM	NM	NM	NM
GM-3R	NM	NM	NM	NM	NM	NM	NM	NM
GM-4R	NM	NM	NM	NM	NM	NM	NM	NM
GM-5	NM	NM	NM	NM	NM	NM	NM	NM
GM-6	NM	NM	NM	NM	NM	NM	NM	NM
GM-7	13:05	0.00	NM	NM	NM	NM	NM	NM
GM-8	13:00	0.00	NM	NM	NM	NM	NM	NM
GM-9	13:03	-0.03	NM	NM	NM	NM	NM	NM
GM-10	12:45	-0.36	NM	NM	NM	NM	NM	NM
GM-11	12:50	-0.46	NM	NM	NM	NM	NM	NM
GM-12	12:55	-0.22	NM	NM	NM	NM	NM	NM
GM-13	13:10	0.00	NM	NM	NM	NM	NM	NM
GM-15	13:15	0.00	NM	NM	NM	NM	NM	NM
GM-16	13:18	0.00	NM	NM	NM	NM	NM	NM
GM-17	13:20	>+1.00	NM	NM	NM	NM	NM	NM

NOTES:
1. Measurements collected with a Landtec Model GEM 500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod and Thermo Environmental 580S OVM.
2. Measurements were collected after readings stabilized (1-2 minutes of purging).
3. ND = Not detected
4. >>> = out of range (greater than 100% of LEL).
5. Vacuum readings presented in inches water column (WC). Measurement of zero implies neither a negative or positive vacuum on well.

Table 3 Continued
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
January 13, 2003

Well Location	Time Sampled [1,2]	Vacuum Readings [5]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	11:45	+0.02	55.4	>>>	14.5	0.2	4.0	ND
GM-3R	11:50	+0.02	36.7	618	12.2	ND	26.0	ND
GM-4R	12:05	+0.02	35.6	714	10.7	1.3	4.0	ND
GM-5	12:10	+0.02	47.1	940	9.8	ND	20.0	ND
GM-6	12:20	0.00	ND	ND	3.6	17.9	ND	3.9
GM-7	12:25	0.00	ND	ND	5.5	13.0	ND	1.5
GM-8	12:30	0.00	ND	ND	3.2	16.5	1.0	1.5
GM-9	13:15	0.00	11.2	224	15.8	ND	1.0	ND
GM-10	13:25	+0.02	1.5	30	10.5	0.9	4.0	ND
GM-11	13:35	+0.02	ND	ND	2.7	16.6	2.0	0.5
GM-12	13:40	-0.08	ND	ND	2.1	18.2	4.0	ND
GM-13	13:45	0.00	ND	ND	6.5	10.8	2.0	ND
GM-15	13:50	+0.02	ND	ND	5.5	1.3	1.0	1.3
GM-16	13:55	0.00	ND	ND	ND	20.4	1.0	ND
GM-17	14:05	+0.10	7.5	150	4.0	ND	3.0	ND

January 21, 2003

Well Location	Time Sampled [1,2]	Vacuum Reading [5]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	NM	NM	NM	NM	NM	NM	NM	NM
GM-3R	NM	NM	NM	NM	NM	NM	NM	NM
GM-4R	NM	NM	NM	NM	NM	NM	NM	NM
GM-5	NM	NM	NM	NM	NM	NM	NM	NM
GM-6	NM	NM	NM	NM	NM	NM	NM	NM
GM-7	NM	NM	NM	NM	NM	NM	NM	NM
GM-8	NM	NM	NM	NM	NM	NM	NM	NM
GM-9	NM	NM	NM	NM	NM	NM	NM	NM
GM-10	NM	NM	NM	NM	NM	NM	NM	NM
GM-11	NM	NM	NM	NM	NM	NM	NM	NM
GM-12	10:30	0.00	ND	ND	4.8	17.2	3.0	ND
GM-13	10:35	0.00	ND	ND	ND	20.5	4.0	ND
GM-15	10:40	0.00	ND	ND	0.9	18.7	5.0	ND
GM-16	10:45	0.00	ND	ND	0.2	20.4	5.0	ND
GM-17	10:50	> -1.00	5.8	118.0	3.2	2.3	4.0	ND

NOTES:
1. Measurements collected with a Landtec Model GEM 500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod and Thermo Environmental 580S OVM.
2. Measurements were collected after readings stabilized (1-2 minutes of purging).
3. ND = Not detected
4. Vacuum readings presented in inches water column (WC). Measurement of zero implies neither a negative or positive vacuum on well.

Table 3 Continued
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
January 28, 2003

Well Location	Time Sampled [1,2]	Vacuum Reading [5]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	11:35	0.0	ND	ND	0.4	20.1	3.0	ND
GM-3R	11:30	0.0	ND	ND	ND	20.7	4.0	ND
GM-4R	11:25	0.0	ND	ND	3.6	12.8	4.0	ND
GM-5	11:20	0.0	10.6	212.0	10.6	0.9	4.0	ND
GM-6	11:15	+0.02	ND	ND	3.6	17.4	3.0	ND
GM-7	11:10	0.0	ND	ND	ND	20.4	3.0	ND
GM-8	11:05	0.0	ND	ND	1.6	17.7	4.0	ND
GM-9	11:00	0.0	ND	ND	0.2	19.9	4.0	ND
GM-10	10:55	+0.04	ND	ND	5.2	10.1	4.0	ND
GM-11	10:50	+0.02	ND	ND	2.3	16.9	4.0	ND
GM-12	10:45	0.0	ND	ND	3.7	18.6	5.0	ND
GM-13	10:40	0.0	ND	ND	6.7	10.4	1.0	ND
GM-15	10:35	0.0	ND	ND	5.5	1.7	1.0	ND
GM-16	10:30	0.0	ND	ND	1.4	19.5	3.0	ND
GM-17	10:25	>-1.0	4.1	82.0	2.8	6.4	3.0	ND

Febuary 3, 2003

Well Location	Time Sampled [1,2]	Vacuum Reading [5]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	10:30	0	11.6	232	9.6	3.3	1	ND
GM-3R	10:35	0	0.1	2	2.9	12.7	1	ND
GM-4R	10:40	0	3.0	60	9.3	0.9	ND	ND
GM-5	10:45	0	13.3	274	8.4	3.5	1	ND
GM-6	10:50	0	ND	ND	0.4	19.9	1	ND
GM-7	10:55	0	0.2	4	4.1	10.7	1	ND
GM-8	11:00	0	ND	ND	2.4	14.0	1	ND
GM-9	11:05	0	ND	ND	ND	20.8	1	ND
GM-10	11:10	-0.06	ND	ND	ND	20.5	1	ND
GM-11	11:15	-0.05	ND	ND	0.7	19.1	1	ND
GM-12	11:20	-0.04	ND	ND	0.8	19.7	1	ND
GM-13	11:25	-0.10	ND	ND	0.2	20.0	1	1.7
GM-15	11:30	-0.01	ND	ND	ND	18.4	1	ND
GM-16	11:35	+0.02	ND	ND	1.3	19.4	1	ND
GM-17	11:40	>-1.00	4.6	92	3.3	1.2	2	ND

NOTES:
1. Measurements collected with a Landtec Model GEM 500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod and Thermo Environmental 580S OVM.
2. Measurements were collected after readings stabilized (1-2 minutes of purging).
3. ND = Not detected
4. Vacuum readings presented in inches water column (WC). Measurement of zero implies neither a negative or positive vacuum on well.

Table 3 Continued
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
February 12, 2003

Well Location	Time Sampled [1,2]	Vacuum Reading [4,5]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide[6] (ppm)	VOCs (ppm)
GM-2R	10:21	+0.02	24.1	484	12.8	0.7	NM	ND
GM-3R	10:35	0.00	8.6	174	10.2	ND	NM	ND
GM-4R	10:44	0.00	9.4	188	10.5	0.4	NM	ND
GM-5	10:55	0.00	3.3	68	9.9	ND	NM	ND
GM-6	11:03	0.00	ND	ND	5.2	9.9	NM	ND
GM-7	11:10	0.00	ND	ND	2.4	17.4	NM	ND
GM-8	11:20	0.00	ND	ND	4.3	10.5	NM	ND
GM-9	11:27	-0.02	ND	ND	6.8	7.7	NM	ND
GM-10	11:40	0.00	ND	ND	1.6	18.6	NM	ND
GM-11	11:52	-0.02	ND	ND	0.7	19.9	NM	ND
GM-12	11:59	0.00	ND	ND	0.2	20.5	NM	ND
GM-13	12:10	-0.04	ND	ND	1.1	19.8	NM	0.2
GM-15	12:17	0.00	ND	ND	2.0	18.1	NM	0.3
GM-16	12:26	+0.06	ND	ND	1.8	19.0	NM	ND
GM-17	12:33	> -1.00	1.9	38	3.2	6.5	NM	ND

February 19, 2003

Well Location	Time Sampled [1,2]	Vacuum Reading [4,5]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	NM	NM	NM	NM	NM	NM	NM	NM
GM-3R	NM	NM	NM	NM	NM	NM	NM	NM
GM-4R	13:00	0.00	6.5	130	11.3	ND	3	ND
GM-5	12:45	0.00	2.8	56	10.7	ND	1	ND
GM-6	12:35	0.00	ND	ND	3.5	13.7	1	ND
GM-7	12:20	0.00	ND	ND	7.6	9.5	1	ND
GM-8	13:25	0.00	ND	ND	4.7	10.1	3	ND
GM-9	9:50	+0.04	ND	ND	ND	20.6	2	ND
GM-10	10:02	0.00	ND	ND	1.6	16.5	ND	ND
GM-11	10:15	0.00	ND	ND	4.7	14.0	4	ND
GM-12	10:23	0.00	ND	ND	2.9	17.5	3	ND
GM-13	10:35	0.00	ND	ND	ND	20.4	4	ND
GM-15	10:45	0.00	ND	ND	0.6	17.3	4	ND
GM-16	10:50	0.00	ND	ND	1.2	19.1	3	ND
GM-17	11:05	>-1.0	0.5	10	2.3	8.6	3	ND

NOTES:
1. Measurements collected with a Landtec Model GEM 500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod and Thermo Environmental 580S OVM.
2. Measurements were collected after readings stabilized (1-2 minutes of purging).
3. ND = Not detected
4. Vacuum readings presented in inches water column (WC). Measurement of zero implies neither a negative or positive vacuum on well.
5. NM = Not measured due to snow/frozen conditions

Table 3 Continued
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
February 24, 2003

Well Location	Time Sampled [1,2]	Vacuum Reading [4,5]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	NM	NM	NM	NM	NM	NM	NM	NM
GM-3R	NM	NM	NM	NM	NM	NM	NM	NM
GM-4R	11:10	0.00	9.7	194	7.3	7.1	3	ND
GM-5	11:04	0.00	25.2	506	8.2	ND	1	ND
GM-6	10:59	0.00	ND	ND	0.4	18.1	1	ND
GM-7	10:56	0.00	14.3	286	6.6	7.0	3	ND
GM-8	10:51	0.00	ND	ND	1.5	15.1	1	ND
GM-9	10:44	+0.02	ND	ND	9.9	5.4	3	ND
GM-10	10:38	+0.04	ND	ND	6.8	1.5	3	ND
GM-11	10:33	-0.08	ND	ND	2.4	4.9	1	ND
GM-12	10:27	0.00	ND	ND	3.7	13.1	4	ND
GM-13	10:17	0.00	ND	ND	0.6	17.7	7	ND
GM-15[6]	10:12	NM	NM	NM	NM	NM	NM	NM
GM-16	10:05	0.00	ND	ND	1.2	18.7	5	ND
GM-17	10:00	-0.30	ND	ND	4.2	ND	3	ND

March 3, 2003

Well Location	Time Sampled [2]	Vacuum Reading [4,5]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	NM	NM	NM	NM	NM	NM	NM	NM
GM-3R	11:40	+0.01	18.8	378	9.8	ND	ND	ND
GM-4R	10:00	0.00	27.0	540	9.4	0.6	4	ND
GM-5	10:07	0.00	5.2	104	6.6	1.2	3	ND
GM-6	10:14	0.00	ND	ND	0.5	19.1	1	ND
GM-7	10:20	0.00	17.1	342	6.9	6.3	2	ND
GM-8	10:26	0.00	ND	ND	1.7	15.0	1	ND
GM-9[6]	11:23	+0.08	ND	ND	3.8	11.5	ND	ND
GM-10	10:35	0.00	ND	ND	6.6	1.9	2	ND
GM-11	10:41	0.00	ND	ND	0.2	19.3	5	ND
GM-12	10:45	0.00	ND	ND	0.1	20.0	3	ND
GM-13[6]	11:12	+0.02	ND	ND	0.4	19.4	1	ND
GM-15[6]	10:53	+0.40	ND	ND	ND	15.0	ND	ND
GM-16[6]	10:39	ND	ND	ND	2.7	16.9	1	ND
GM-17[6]	10:30	ND	ND	ND	2.5	6.1	3	ND

NOTES:
1. Measurements collected with a Landtec Model GEM 500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod and Thermo Environmental 580S OVM.
2. Measurements were collected after readings stabilized (1-2 minutes of purging).
3. ND = Not detected
4. Vacuum readings presented in inches water column (WC). Measurement of zero implies neither a negative or positive vacuum on well. Extremely windy on 02/24/03 so could have had an affect on some of the slight (+) or (-) readings.
5. NM = Not measured due to snow/frozen conditions

Table 3 Continued
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
March 10, 2003

Well Location	Time Sampled (1,2)	Vacuum Reading (4)	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	NM	NM	NM	NM	NM	NM	NM	NM
GM-3R	10:35	0.00	3.3	66	8.3	5.8	1	ND
GM-4R	10:40	0.00	4.3	86	8.5	4.0	1	ND
GM-5	10:45	0.00	1.7	34	4.7	5.7	1	ND
GM-6	10:50	0.00	ND	ND	0.8	19.1	1	ND
GM-7	10:55	0.00	ND	ND	ND	21.0	1	ND
GM-8	11:00	0.00	ND	ND	3.0	13.1	2	ND
GM-9	11:05	0.00	ND	ND	10.9	ND	2	ND
GM-10	11:10	-0.12	ND	ND	0.6	19.9	3	ND
GM-11	11:15	-0.14	ND	ND	2.0	9.3	2	ND
GM-12	11:20	-0.06	ND	ND	0.9	20.6	3	ND
GM-13	11:33	0.00	ND	ND	1.0	19.3	3	ND
GM-15	10:40	-0.70	ND	ND	0.7	9.9	2	ND
GM-16	11:47	0.00	ND	ND	1.5	19.7	2	ND
GM-17	11:56	>-1.00	ND	ND	3.3	5.1	4	ND

March 17, 2003

Well Location	Time Sampled (1,2)	Vacuum Reading (4)	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	NM	NM	NM	NM	NM	NM	NM	NM
GM-3R	10:00	>-1.00	ND	ND	ND	20.4	2	ND
GM-4R	10:05	-0.60	ND	ND	ND	20.5	2	ND
GM-5	10:10	-0.74	ND	ND	ND	20.5	3	ND
GM-6	10:15	-0.08	ND	ND	ND	20.5	2	ND
GM-7	10:20	-0.40	ND	ND	ND	20.5	2	ND
GM-8	10:25	-0.04	ND	ND	ND	20.4	2	ND
GM-9	10:30	-0.44	ND	ND	2.3	18.4	4	ND
GM-10	10:35	-0.24	ND	ND	1.6	18.2	4	ND
GM-11	10:40	-0.20	ND	ND	ND	20.5	3	ND
GM-12	10:45	+0.08	ND	ND	2.5	19.1	2	ND
GM-13	10:50	>+1.00	ND	ND	0.3	18.6	3	ND
GM-15	10:55	+0.08	ND	ND	ND	13.8	4	ND
GM-16	11:00	0.00	ND	ND	ND	0.7	19.7	3	ND
GM-17	11:05	0.00	ND	ND	2.9	1.8	3	ND

NOTES:
1. Measurements collected with a Landtec Model GEM 500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod and Thermo Environmental 580S OVM.
2. Measurements were collected after readings stabilized (1-2 minutes of purging).
3. ND = Not detected
4. Vacuum readings presented in inches water column (WC). Measurement of zero implies neither a negative or positive vacuum on well.
5. NM = Not measured due to snow/frozen conditions

Table 3 Continued
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
March 20, 2003

Well Location	Time Sampled [1,2]	Vacuum Reading [4]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	10:30	+0.08	ND	ND	1.2	18.5	2	NM
GM-3R	10:25	>-1.00	ND	ND	0.1	20.0	2	NM
GM-4R	10:20	-0.58	ND	ND	ND	20.1	2	NM
GM-5	10:16	-0.70	ND	ND	ND	19.9	2	NM
GM-6	10:10	0.00	ND	ND	ND	19.4	3	NM
GM-7	10:04	-0.38	ND	ND	ND	19.5	2	NM
GM-8	9:59	0.00	ND	ND	0.4	19.1	2	NM
GM-9	9:51	-0.40	ND	ND	1.9	18.6	2	NM
GM-10	9:46	-0.28	ND	ND	2.0	17.0	2	NM
GM-11	9:39	-0.20	ND	ND	4.7	4.3	3	NM
GM-12	9:26	+0.06	ND	ND	0.2	18.7	3	ND
GM-13	9:20	-0.06	ND	ND	0.8	16.8	2	ND
GM-15	9:14	0.00	ND	ND	1.3	7.3	3	ND
GM-16	9:07	0.00	ND	ND	1.5	17.9	2	ND
GM-17	9:05	>-1.00	ND	ND	3.3	3.8	3	ND

March 24, 2003

Well Location	Time Sampled [1,2]	Vacuum Reading [4]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	12:27	+0.08	ND	ND	0.3	19.9	1	ND
GM-3R	12:22	>-1.00	ND	ND	ND	20.6	ND	ND
GM-4R	12:16	-0.60	ND	ND	ND	20.7	ND	ND
GM-5	12:10	-0.80	ND	ND	ND	20.6	ND	ND
GM-6	12:04	0.00	ND	ND	ND	20.6	ND	ND
GM-7	11:59	-0.42	ND	ND	ND	20.7	ND	ND
GM-8	11:53	0.00	ND	ND	0.2	20.0	ND	ND
GM-9	11:47	-0.50	ND	ND	4.7	15.2	ND	ND
GM-10	11:41	-0.25	ND	ND	1.7	17.8	ND	ND
GM-11	11:36	-0.30	ND	ND	4.3	1.9	ND	ND
GM-12	11:30	+0.02	ND	ND	0.9	19.8	ND	ND
GM-13	11:25	+0.20	ND	ND	1.3	18.1	1	ND
GM-15	11:17	0.00	ND	ND	1.2	6.5	1	ND
GM-16	11:12	0.00	ND	ND	2.7	7.7	1	ND
GM-17	11:05	>-1.00	ND	ND	2.5	3.1	ND	ND

NOTES:
1. Measurements collected with a Landtec Model GEM 500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod and Thermo Environmental 580S OVM.
2. Measurements were collected after readings stabilized (1-2 minutes of purging).
3. ND = Not detected
4. Vacuum readings presented in inches water column (WC). Measurement of zero implies neither a negative or positive vacuum on well.
5. NM = Not measured due to PID malfunction

Table 3 Continued
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
April 2, 2003

Well Location	Time Sampled [1,2]	Vacuum Reading [4]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	11:10	-0.10	ND	ND	1.9	19.0	ND	ND
GM-3R	11:20	>-1.00	ND	ND	ND	20.6	ND	ND
GM-4R	11:25	-0.68	ND	ND	ND	20.6	ND	ND
GM-5	11:30	>-1.0	ND	ND	ND	20.8	ND	ND
GM-6	11:35	-0.01	ND	ND	ND	20.8	ND	2.0
GM-7	11:40	-0.52	ND	ND	ND	20.9	ND	ND
GM-8	11:45	-0.02	ND	ND	0.9	20.4	ND	ND
GM-9	11:48	-0.64	ND	ND	ND	20.7	ND	ND
GM-10	12:00	-0.36	ND	ND	0.4	20.7	ND	ND
GM-11	12:05	-0.40	ND	ND	0.6	20.2	1.0	ND
GM-12	12:10	-0.14	ND	ND	0.6	20.6	1.0	ND
GM-13	12:15	0.00	ND	ND	1.8	18.6	1.0	ND
GM-15	12:20	+0.02	ND	ND	1.4	11.0	ND	ND
GM-16	12:25	0.00	ND	ND	3.5	10.1	ND	ND
GM-17	12:30	-0.94	ND	ND	1.8	13.0	ND	ND
GM-19	12:35	+0.04	10.1	200	0.1	15.8	ND	ND
GM-20	12:40	0	2.4	48.0	2.1	11.6	1.0	ND

April 7, 2003

Well Location	Time Sampled [1,2]	Vacuum Reading [4]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	11:55	+0.01	ND	ND	0.3	20.6	ND	ND
GM-3R	12:00	-2.0	ND	ND	ND	20.5	ND	ND
GM-4R	12:05	-0.7	ND	ND	0.3	20.5	ND	ND
GM-5	12:10	-0.94	ND	ND	ND	20.5	ND	ND
GM-6	12:20	-0.02	ND	ND	ND	20.5	ND	ND
GM-7	12:25	-0.48	ND	ND	ND	20.5	ND	ND
GM-8	12:30	-0.01	ND	ND	0.6	20.4	ND	ND
GM-9	12:35	-0.44	ND	ND	0.3	20.6	ND	NM
GM-10	12:45	-0.30	ND	ND	0.7	20.2	ND	NM
GM-11	12:50	-0.38	ND	ND	0.3	20.3	ND	NM
GM-12	12:55	-0.16	ND	ND	0.3	20.3	ND	NM
GM-13	12:58	0.00	ND	ND	0.3	20.4	ND	NM
GM-15	13:05	0.00	ND	ND	2.2	13.9	ND	NM
GM-16	13:10	+0.01	ND	ND	3.4	15.2	ND	NM
GM-17	13:15	-1.0	ND	ND	2.4	10.4	ND	NM
GM-19	13:20	-1.0	5.0	96	0.2	18.3	ND	NM
GM-20	13:25	+0.02	1.0	20.0	1.3	16.6	ND	NM

NOTES:
1. Measurements collected with a Landtec Model GEM 500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod and Thermo Environmental 580S OVM.
2. Measurements were collected after readings stabilized (1-2 minutes of purging).
3. ND = Not detected
4. Vacuum readings presented in inches water column (WC). Measurement of zero implies neither a negative or positive vacuum on well.
5. NM = Not measured due to PID malfunction

Table 3 Continued
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
April 15, 2003

Well Location	Time Sampled [1,2]	Vacuum Reading [4]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	11:55	slight +	ND	ND	1.5	18.7	ND	ND
GM-3R	11:50	-1.50	ND	ND	ND	20.8	ND	ND
GM-4R	11:45	-0.78	ND	ND	ND	20.8	ND	ND
GM-5	11:40	-1.00	ND	ND	ND	20.8	ND	ND
GM-6	11:35	0.00	ND	ND	ND	20.2	ND	ND
GM-7	11:30	-0.52	ND	ND	ND	20.8	ND	ND
GM-8	11:25	0.00	ND	ND	0.3	20.7	ND	ND
GM-9	11:20	-0.64	ND	ND	0.4	20.3	ND	ND
GM-10	11:15	-0.28	ND	ND	1.6	17.8	ND	ND
GM-11	11:10	-0.30	ND	ND	1.5	16.4	ND	ND
GM-12	11:00	+0.06	ND	ND	1.7	19.6	ND	ND
GM-13	10:50	slight (+)	ND	ND	1.8	17.6	ND	ND
GM-15	10:40	+0.04	ND	ND	2.6	11.2	ND	0.3
GM-16	10:30	0.00	ND	ND	3.6	7.2	ND	0.5
GM-17	10:20	+0.40	ND	ND	2.7	6.3	ND	1.0
GM-19	10:10	-1.00	1.3	26	ND	20.1	ND	ND
GM-20	10:00	0.00	0.4	8.0	0.2	19.1	ND	ND

April 15, 2003

Well Location	Time Sampled [1,2]	Vacuum Reading [4]	Methane (%)	Methane (%LEL)	Carbon Dioxide (%)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
GM-2R	14:20	+0.04	ND	ND	1.6	18.9	ND	0.2
GM-3R	14:22	-1.25	ND	ND	ND	20.8	ND	ND
GM-4R	14:25	-0.78	ND	ND	ND	20.7	ND	ND
GM-5	14:27	-0.98	ND	ND	ND	20.8	ND	ND
GM-6	14:30	slight (-)	ND	ND	0.1	20.8	ND	ND
GM-7	14:32	-0.50	ND	ND	ND	20.8	ND	ND
GM-8	14:35	0.00	ND	ND	0.5	20.4	ND	ND
GM-9	14:37	-0.62	ND	ND	1.7	18.9	ND	ND
GM-10	14:40	-0.22	ND	ND	0.2	20.5	ND	ND
GM-11	14:42	-0.26	ND	ND	ND	20.7	ND	ND
GM-12	14:45	+0.04	ND	ND	1.5	20.0	ND	ND
GM-13	14:58	0.00	ND	ND	1.5	18.0	ND	ND
GM-15	14:55	-0.20	ND	ND	0.6	20.0	ND	ND
GM-16	14:53	0.00	ND	ND	3.4	8.6	ND	ND
GM-17	14:50	-1.00	ND	ND	2.6	6.4	ND	ND
GM-19	14:48	-0.48	0.5	10.0	ND	20.4	ND	ND
GM-20	14:45	0.00	0.4	8.0	0.2	18.8	1.0	ND

NOTES:
1. Measurements collected with a Landtec Model GEM 500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod and Thermo Environmental 580S OVM.
2. Measurements were collected after readings stabilized (1-2 minutes of purging).
3. ND = Not detected
4. Vacuum readings presented in inches water column (WC). Measurement of zero implies neither a negative or positive vacuum on well.
5. NM = Not measured due to PID malfunction
6. Valve to GV-1 opened at 12:40.

Table 4a
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
Gas Vent Vacuum Readings
Tied/Capped Wells

Well Location	Date	Vent Configuration	Time	Vacuum Reading [1]
GV-1	1/8/03	Tied Into System	12:00	3" Hg
	1/9/03	Tied Into System	11:00	4"Hg
	1/13/03	Tied Into System	11:00	4" Hg
	1/20/03	Tied Into System	12:30	3"Hg
	1/21/03	Tied Into System	10:55	3"Hg
	1/28/03	Tied Into System	9:45	Gauge Frozen
	2/3/03	Tied Into System	10:20	3"Hg
	2/12/03	Tied Into System	9:50	3" Hg
	2/19/03	Tied Into System	11:15	3" Hg
	2/24/03	Tied Into System	9:50	3"Hg
	3/3/03	Tied Into System	9:50	3"Hg
	3/10/03	Tied Into System	12:15	3"Hg
	3/17/03	Not Connected	11:25	Not connected
	3/20/03	Tied Into System	10:20	0"Hg
	3/24/03	Valve Closed	12:20	0"Hg
	4/2/03	Valve Closed	14:10	0"Hg
	4/7/03	Valve Closed	14:33	0"Hg
	4/15/03	Valve Closed	12:00	0" Hg
	4/15/03	Valve opened	12:40	1.0" Hg
GV-8	1/8/03	Tied Into System	12:00	3" Hg
	1/9/03	Tied Into System	12:00	6" Hg
	1/13/03	Tied Into System	11:00	3.5" Hg
	1/20/03	Tied Into System	12:30	0" Hg
	1/21/03	Tied Into System	NM	NM
	1/28/03	Tied Into System	9:45	Gauge Frozen
	2/3/03	Tied Into System	10:20	Valve closed
	2/12/03	Tied Into System	NM	Valve closed
	2/19/03	Tied Into System	11:15	Valve closed
	2/24/03	Tied Into System	9:50	Valve closed
	3/3/03	Tied Into System	9:50	Valve closed
	3/10/03	Tied Into System	12:15	Valve closed
	3/17/03	Permanently Capped	11:25	>-1.00
	3/20/03	Permanently Capped	10:25	>-1.00
	3/24/03	Permanently Capped	12:25	>-1.00
	4/2/03	Permanently Capped	14:05	+ 0.04 (water in vent)
	4/7/03	Permanently Capped	14:20	-0.08
	4/15/03	Permanently Capped	12:05	0.00
	4/15/03	Permanently Capped	14:55	0.00

Table 4a
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
Gas Vent Vacuum Readings
Tied/Capped Wells

Well Location	Date	Vent Configuration	Time	Vacuum Reading [1]
GV-13	1/6/03	Permanently Capped	11:35	+0.03
	1/6/03	Permanently Capped	14:09	+0.04
	1/7/03	Permanently Capped	11:44	+0.03
	1/8/03	Permanently Capped	13:20	+0.03
	1/9/03	Permanently Capped	10:35	0.00
	1/9/03	Permanently Capped	11:20	0.00
	1/9/03	Permanently Capped	12:35	(-0.02) to (+0.02)
	1/13/03	Permanently Capped	12:15	+0.08
	1/21/03	Permanently Capped	NM	NM
	1/28/03	Permanently Capped	12:20	-0.70
	2/3/03	Permanently Capped	12:05	0.00
	2/12/03	Permanently Capped	13:32	-0.04
	2/19/03	Permanently Capped	13:15	0.00
	2/24/03	Permanently Capped	11:14	0.00
	3/3/03	Permanently Capped	10:15	0.00
	3/10/03	Permanently Capped	12:39	-0.04
	3/17/03	Tied Into System	11:25	0"Hg
	3/20/03	Tied Into System	10:17	0"Hg
	3/24/03	Tied Into System	12:20	0"Hg
	4/2/03	Tied Into System	14:05	0"Hg
	4/7/03	Tied Into System	15:30	0"Hg
	4/15/03	Tied Into System	12:00	1.25" Hg
	4/15/03	Tied Into System	14:48	1.25" Hg

[1] Vacuum reading in inches of water, unless otherwise noted.

Table 4b
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
Gas Vent Vacuum Readings
Temporarily Capped Wells

Well Location	Date	Time	Vacuum Reading (1)
GV-2	1/13/03	15:00	-0.10
	1/21/03	11:00	0.00
	1/28/03	13:00	slight (+)
	2/3/03	12:35	0.00
	2/12/03	14:10	0.00
	2/19/03	NM	NM
	2/24/03	11:25	0.00
	3/3/03	11:05	0.00
	3/10/03	12:40	0.00
	3/17/03	11:23	0.00
	3/20/03	10:27	0.00
	3/24/03	12:40	0.00
	4/2/03	14:00	-0.10
	4/7/03	14:35	-0.04
	4/15/03	12:16	0.00
	4/15/03	14:05	slight (+)
GV-7	1/13/03	14:45	-0.02
	1/21/03	11:05	0.00
	1/28/03	13:05	slight (+)
	2/3/03	12:30	0.00
	2/12/03	14:04	-0.10
	2/19/03	NM	NM
	2/24/03	11:29	0.00
	3/3/03	11:12	slight (+)
	3/10/03	12:21	-0.18
	3/17/03	11:20	-0.08
	3/20/03	10:35	-0.06
	3/24/03	12:46	-0.04
	4/2/03	14:05	-0.36
	4/7/03	14:30	-0.24
	4/15/03	12:19	-0.12
	4/15/03	15:00	-0.08
GV-9	1/13/03	15:05	+0.04
	1/21/03	11:10	0.00
	1/28/03	13:10	0.00
	2/3/03	12:10	0.00
	2/12/03	13:58	0.00
	2/19/03	NM	NM
	2/24/03	11:34	0.00
	3/3/03	11:17	0.00
	3/10/03	12:27	0.00
	3/17/03	11:30	-0.08
	3/20/03	10:40	-0.08
	3/24/03	12:51	-0.06
	4/2/03	13:55	-0.18
	4/7/03	14:55	-0.06
	4/15/03	12:22	0.00
	4/15/03	15:10	0.00

Well Location	Date	Time	Vacuum Reading (1)
GV-10	1/13/03	15:10	+0.06
	1/21/03	11:20	0.00
	1/28/03	13:15	0.00
	2/3/03	12:15	0.00
	2/12/03	13:52	0.00
	2/19/03	NM	NM
	2/24/03	11:37	0.00
	3/3/03	11:24	0.00
	3/10/03	12:33	0.00
	3/17/03	11:35	-0.06
	3/20/03	10:46	-0.08
	3/24/03	12:55	-0.04
	4/2/03	13:50	-0.18
	4/7/03	14:50	-0.16
	4/15/03	12:27	-0.08
	4/15/03	15:15	-0.02
GV-11	1/13/03	15:15	+0.02
	1/21/03	11:25	0.00
	1/28/03	13:20	0.00
	2/3/03	12:20	0.00
	2/12/03	13:45	0.00
	2/19/03	NM	NM
	2/24/03	11:41	0.00
	3/3/03	11:31	0.00
	3/10/03	12:35	0.00
	3/17/03	11:40	-0.08
	3/20/03	10:53	-0.04
	3/24/03	13:00	-0.08
	4/2/03	13:45	-.004
	4/7/03	14:45	-0.01
	4/15/03	12:32	+0.04
	4/15/03	15:08	+0.06

Notes:
1. Readings are expressed as inches of water column. Measurement of zero implies neither a negative or positive vacuum on well.
2. NM = Not Measured due to weather conditions

Table 4c
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
Gas Vent Vacuum Readings
Permanently Capped Wells

Well Location	Date	Vent Configuration	Time	Vacuum Reading [1]
GV-12	1/28/03	Permanently Capped	9:45	Gauge Frozen
	1/6/03	Permanently Capped	13:53	+0.05
	1/7/03	Permanently Capped	11:24	+0.06
	1/8/03	Permanently Capped	13:00	+0.05
	1/9/03	Permanently Capped	10:30	0.00
	1/9/03	Permanently Capped	11:15	0.00
	1/9/03	Permanently Capped	12:30	(-0.02) to (+0.02)
	1/13/03	Permanently Capped	11:25	+0.06
	1/21/03	Permanently Capped	NM	NM
	1/28/03	Permanently Capped	12:00	-0.60
	2/3/03	Permanently Capped	12:00	0.00
	2/12/03	Permanently Capped	13:35	-0.04
	2/19/03	Permanently Capped	13:10	0.00
	2/24/03	Permanently Capped	11:08	0.00
	3/3/03	Permanently Capped	9:55	0.00
	3/10/03	Permanently Capped	12:37	-0.1
	3/17/03	Permanently Capped	11:45	>-1.00
	3/20/03	Permanently Capped	10:15	>-1.00
	3/24/03	Permanently Capped	12:30	>-1.00
	4/2/03	Permanently Capped	11:55	>-1.00
	4/7/03	Permanently Capped	14:40	-0.60
	4/15/03	Permanently Capped	12:13	0.00
	4/15/03	Permanently Capped	14:53	0.04
GV-14	1/6/03	Permanently Capped	11:40	+0.01
	1/6/03	Permanently Capped	14:34	+0.04
	1/7/03	Permanently Capped	12:04	+0.02
	1/8/03	Permanently Capped	13:40	+0.02
	1/9/03	Permanently Capped	10:40	0.00
	1/9/03	Permanently Capped	11:25	-0.03
	1/9/03	Permanently Capped	12:40	(-0.04) to (-0.08)
	1/13/03	Permanently Capped	12:30	+0.05
	1/21/03	Permanently Capped	NM	NM
	1/28/03	Permanently Capped	12:15	-0.61
	2/3/03	Permanently Capped	12:10	0.00
	2/12/03	Permanently Capped	13:28	0.00
	2/19/03	Permanently Capped	13:20	-0.06
	2/24/03	Permanently Capped	11:19	0.00
	3/3/03	Permanently Capped	10:30	0.00
	3/10/03	Permanently Capped	12:41	0.00
	3/17/03	Permanently Capped	11:50	>-1.00
	3/20/03	Permanently Capped	10:10	>-1.00
	3/24/03	Permanently Capped	12:35	>-1.00
	4/2/03	Permanently Capped	11:50	>-1.00
	4/7/03	Permanently Capped	14:25	+0.92
	4/15/03	Permanently Capped	12:09	-8.50
	4/15/03	Permanently Capped	14:50	-8.00

[1] Vacuum reading in inches of water.

Table 5
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
Methane and Vacuum Readings Summary

Well Location	Date	Vacuum (inches water)	Methane (%)
GM-2R	12/19/02	NM	66.6
	12/20/02	NM	65.5
	12/23/02	0.00	65.4
	12/24/02	0.00	65.5
	01/06/03	+0.03	65.9
	01/07/03	+0.06	64.4
	01/08/03	0.00	67.0
	01/09/03	NM	NM
	01/13/03	+0.02	55.4
	01/28/03	0.00	ND
	02/03/03	0.00	11.6
	02/12/03	+0.02	24.1
	02/19/03	NM	NM
	02/24/03	NM	NM
	03/03/03	NM	NM
	03/05/03	NM	NM
	03/10/03	NM	NM
	03/17/03	NM	NM
	03/20/03	+0.08	ND
	03/24/03	+0.08	ND
	04/02/03	-0.10	ND
	04/07/03	+0.01	ND
	04/15/03	slight +	ND
	04/15/03	+0.04	ND
GM-3R	12/19/02	NM	66.6
	12/20/02	NM	73.0
	12/23/02	0.00	60.9
	12/24/02	0.00	61.0
	01/06/03	+0.02	93.8
	01/07/03	+0.04	75.7
	01/08/03	0.00	74.5
	01/09/03	NM	NM
	01/13/03	+0.02	36.7
	01/28/03	0.00	ND
	02/03/03	0.00	0.1
	02/12/03	0.00	8.6
	02/19/03	NM	NM
	02/24/03	NM	NM
	03/03/03	NM	NM
	03/05/03	+0.01	18.8
	03/10/03	0.00	3.3
	03/17/03	>-1.00	ND
	03/20/03	>-1.00	ND
	03/24/03	>-1.00	ND
	04/02/03	>-1.0	ND
	04/07/03	-2.0	ND
	04/15/03	-1.50	ND
	04/15/03	-1.25	ND
GM-4R	12/19/02	NM	38.9
	12/20/02	NM	45.1
	12/23/02	-0.05	34.9
	12/24/02	-0.07	33.9
	01/06/03	+0.03	51.5
	01/07/03	+0.05	49.8
	01/08/03	+0.02	49.6
	01/09/03	NM	NM
	01/13/03	+0.02	35.6
	01/28/03	0.00	ND
	02/03/03	0.00	3
	02/12/03	0.00	9.4
	02/19/03	0.00	6.5
	02/24/03	0.00	9.7
	03/03/03	0.00	27
	03/05/03	NM	NM
	03/10/03	0.00	4.3
	03/17/03	-0.60	ND
	03/20/03	-0.58	ND
	03/24/03	-0.60	ND
	04/02/03	-0.68	ND
	04/07/03	-0.70	ND
	04/15/03	-0.78	ND
	04/15/03	-0.78	ND

Well Location	Date	Vacuum (inches water)	Methane (%)
GM-5	12/19/02	NM	49.5
	12/20/02	NM	45.5
	12/23/02	0.00	51.0
	12/24/02	0.00	50.9
	01/06/03	+0.03	48.3
	01/07/03	+0.06	47.2
	01/08/03	+0.02	48.0
	01/09/03	NM	NM
	01/13/03	+0.02	47.1
	01/28/03	0.00	10.6
	02/03/03	0.00	13.3
	02/12/03	0.00	3.3
	02/19/03	0.00	2.8
	02/24/03	0.00	25.2
	03/03/03	0.00	5.2
	03/05/03	NM	NM
	03/10/03	0.00	1.7
	03/17/03	-0.74	ND
	03/20/03	-0.70	ND
	03/24/03	-0.80	ND
	04/02/03	>-1.0	ND
	04/07/03	-0.94	ND
	04/15/03	-1.00	ND
	04/15/03	-0.98	ND
GM-6	12/19/02	NM	0.1
	12/20/02	NM	0.3
	12/23/02	0.00	0.1
	12/24/02	0.00	0.2
	01/06/03	0.00	ND
	01/07/03	0.00	ND
	01/08/03	0.00	0.1
	01/09/03	NM	NM
	01/13/03	0.00	ND
	01/28/03	+0.02	ND
	02/03/03	0.00	ND
	02/12/03	0.00	ND
	02/19/03	0.00	ND
	02/24/03	0.00	ND
	03/03/03	0.00	ND
	03/05/03	NM	NM
	03/10/03	0.00	ND
	03/17/03	-0.08	ND
	03/20/03	0.00	ND
	03/24/03	0.00	ND
	04/02/03	-0.01	ND
	04/07/03	-0.02	ND
	04/15/03	0.00	ND
	04/15/03	slight -	ND
GM-7	12/19/02	NM	19.8
	12/20/02	NM	28.7
	12/23/02	0.00	16.0
	12/24/02	0.00	15.9
	01/06/03	+0.04	23.9
	01/07/03	+0.04	21.2
	01/08/03	0.00	34.5
	01/09/03	0.00	NM
	01/13/03	0.00	ND
	01/28/03	0.00	ND
	02/03/03	0.00	0.2
	02/12/03	0.00	ND
	02/19/03	0.00	ND
	02/24/03	0.00	14.3
	03/03/03	0.00	17.1
	03/05/03	NM	NM
	03/10/03	0.00	ND
	03/17/03	-0.40	ND
	03/20/03	-0.38	ND
	03/24/03	-0.42	ND
	04/02/02	-0.52	ND
	04/07/03	-0.48	ND
	04/15/03	-0.52	ND
	04/15/03	0.00	ND

Table 5
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
Methane and Vacuum Readings Summary

Well Location	Date	Vacuum (inches water)	Methane (%)
GM-8	12/19/02	NM	ND
	12/20/02	NM	6.1
	12/23/02	-0.05	0.1
	12/24/02	0.00	0.1
	01/06/03	+0.05	ND
	01/07/03	+0.06	ND
	01/08/03	+0.03	ND
	01/09/03	0.00	NM
	01/13/03	0.00	ND
	01/28/03	0.00	ND
	02/03/03	0.00	ND
	02/12/03	0.00	ND
	02/19/03	0.00	ND
	02/24/03	0.00	ND
	03/03/03	0.00	ND
	03/05/03	NM	NM
	03/10/03	0.00	ND
	03/17/03	-0.04	ND
	03/20/03	0.00	ND
	03/24/03	0.00	ND
	04/02/03	-0.02	ND
	04/07/03	-0.01	ND
	04/15/03	0.00	ND
	04/15/03	0.00	ND
GM-9	12/19/02	NM	ND
	12/20/02	NM	4.3
	12/23/02	0.00	9.0
	12/24/02	0.00	9.2
	01/06/03	0.00	11.1
	01/07/03	0.00	11.4
	01/08/03	0.00	10.9
	01/09/03	-0.03	NM
	01/13/03	0.00	11.2
	01/28/03	0.00	ND
	02/03/03	0.00	ND
	02/12/03	-0.02	ND
	02/19/03	+0.04	ND
	02/24/03	+0.02	ND
	03/03/03	NM	NM
	03/05/03	+0.08	ND
	03/10/03	0.00	ND
	03/17/03	-0.44	ND
	03/20/03	-0.40	ND
	03/24/03	-0.50	ND
	04/02/03	-0.64	ND
	04/07/03	-0.44	ND
	04/15/03	-0.64	ND
	04/15/03	-0.62	ND
GM-10	12/19/02	NM	24.8
	12/20/02	NM	20.9
	12/23/02	-0.15	20.0
	12/24/02	-0.20	21.2
	01/06/03	+0.02	25.6
	01/07/03	+0.03	25.0
	01/08/03	-0.06	24.1
	01/09/03	-0.36	NM
	01/13/03	+0.02	1.5
	01/28/03	+0.04	ND
	02/03/03	-0.06	ND
	02/12/03	0.00	ND
	02/19/03	0.00	ND
	02/24/03	+0.04	ND
	03/03/03	0.00	ND
	03/05/03	NM	NM
	03/10/03	-0.12	ND
	03/17/03	-0.24	ND
	03/20/03	-0.28	ND
	03/24/03	-0.25	ND
	04/02/03	-0.36	ND
	04/07/03	-0.30	ND
	04/15/03	-0.28	ND
	04/15/03	-0.22	ND

Well Location	Date	Vacuum (inches water)	Methane (%)
GM-11	12/19/02	NM	3.1
	12/20/02	NM	17.1
	12/23/02	-0.10	0.1
	12/24/02	-0.05	0.2
	01/06/03	-0.06	11.4
	01/07/03	+0.02	13.3
	01/08/03	-0.04	12.3
	01/09/03	-0.46	NM
	01/13/03	+0.02	ND
	01/28/03	+0.02	ND
	02/03/03	-0.05	ND
	02/12/03	-0.02	ND
	02/19/03	0.00	ND
	02/24/03	-0.08	ND
	03/03/03	0.00	ND
	03/05/03	NM	NM
	03/10/03	-0.14	ND
	03/17/03	-0.20	ND
	03/20/03	-0.20	ND
	03/24/03	-0.30	ND
	04/02/03	-0.40	ND
	04/07/03	-0.38	ND
	04/15/03	-0.30	ND
	04/15/03	-0.26	ND
GM-12	12/19/02	NM	ND
	12/20/02	NM	0.1
	12/23/02	-0.10	ND
	12/24/02	-0.05	ND
	01/06/03	+0.02	ND
	01/07/03	0.00	ND
	01/08/03	-0.02	ND
	01/09/03	-0.22	NM
	01/13/03	-0.08	ND
	01/21/03	0.00	ND
	01/28/03	0.00	ND
	02/03/03	-0.04	ND
	02/12/03	0.00	ND
	02/19/03	0.00	ND
	02/24/03	0.00	ND
	03/03/03	0.00	ND
	03/05/03	NM	NM
	03/10/03	-0.06	ND
	03/17/03	+0.08	ND
	03/20/03	+0.06	ND
	03/24/03	+0.02	ND
	04/02/03	-0.14	ND
	04/07/03	-0.16	ND
	04/15/03	+0.06	ND
	04/15/03	+0.04	ND
GM-13	12/19/02	NM	ND
	12/20/02	NM	6.0
	12/23/02	0.00	0.1
	12/24/02	0.00	ND
	01/06/03	>+1.0	ND
	01/07/03	>+1.0	ND
	01/08/03	0.00	ND
	01/09/03	0.00	NM
	01/13/03	0.00	ND
	01/21/03	0.00	ND
	01/28/03	0.00	ND
	02/03/03	-0.10	ND
	02/12/03	-0.04	ND
	02/19/03	0.00	ND
	02/24/03	0.00	ND
	03/03/03	NM	NM
	03/05/03	+0.02	ND
	03/10/03	0.00	ND
	03/17/03	>+1.00	ND
	03/20/03	-0.06	ND
	03/24/03	+0.20	ND
	04/02/03	0.00	ND
	04/07/03	0.00	ND
	04/15/03	slight +	ND
	04/15/03	0.00	ND

Table 5
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
Methane and Vacuum Readings Summary

Well Location	Date	Vacuum (inches water)	Methane (%)
GM-15	12/19/02	NM	0.4
	12/20/02	NM	ND
	12/23/02	-0.15	0.1
	12/24/02	-0.20	ND
	01/06/03	-0.66	ND
	01/07/03	0.00	ND
	01/08/03	0.00	ND
	01/09/03	0.00	NM
	01/13/03	+0.02	ND
	01/21/03	0.00	ND
	01/28/03	0.00	ND
	02/03/03	-0.01	ND
	02/12/03	0.00	ND
	02/19/03	0.00	ND
	02/24/03	NM	NM
	03/03/03	NM	NM
	03/05/03	+0.40	ND
	03/10/03	-0.70	ND
	03/17/03	0.08	ND
	03/20/03	0.00	ND
	03/24/03	0.00	ND
	04/02/03	+0.02	ND
	04/07/03	0.00	ND
	04/15/03	+0.04	ND
	04/15/03	-0.20	ND
GM-16	12/19/02	NM	ND
	12/20/02	NM	ND
	12/23/02	-0.05	0.1
	12/24/02	-0.05	ND
	01/06/03	0.00	0.4
	01/07/03	0.00	0.3
	01/08/03	0.00	ND
	01/09/03	0.00	NM
	01/13/03	0.00	ND
	01/21/03	0.00	ND
	01/28/03	0.00	ND
	02/03/03	+0.02	ND
	02/12/03	+0.06	ND
	02/19/03	0.00	ND
	02/24/03	0.00	ND
	03/03/03	NM	NM
	03/05/03	0.00	ND
	03/10/03	0.00	ND
	03/17/03	0.00	ND
	03/20/03	0.00	ND
	03/24/03	0.00	ND
	04/02/03	0.00	ND
	04/07/03	+0.01	ND
	04/15/03	0.00	ND
	04/15/03	0.00	ND

Well Location	Date	Vacuum (inches water)	Methane (%)
GM-17	12/19/02	NM	11.0
	12/20/02	NM	10.8
	12/23/02	+1.00	10.7
	12/24/02	+1.05	10.9
	01/06/03	>+1.00	10.7
	01/07/03	>+1.00	10.8
	01/08/03	>+1.00	7.8
	01/09/03	>+1.00	NM
	01/13/03	+0.10	7.5
	01/21/03	>-1.00	5.8
	01/28/03	>-1.00	4.1
	02/03/03	>-1.00	4.6
	02/12/03	>-1.00	1.9
	02/19/03	>-1.00	0.5
	02/24/03	-0.30	ND
	03/03/03	NM	NM
	03/05/03	0.00	ND
	03/10/03	>-1.00	ND
	03/17/03	0.00	ND
	03/20/03	>-1.00	ND
	03/24/03	>-1.00	ND
	04/02/03	-0.94	ND
	04/07/03	-1.0	ND
	04/15/03	+0.40	ND
	04/15/03	-1.00	ND
GM-19	4/2/03	+0.04	10.1
	4/7/03	-1.0	5.0
	04/15/03	-1.00	1.3
	04/15/03	-0.48	0.5
GM-20	4/2/03	0.00	2.4
	4/7/03	0.02	1.0
	04/15/03	0.00	0.4
	04/15/03	0.00	0.4

Notes:
1. Measurements collected on December 19th, 20th, 23rd and 24th 2002 with a Landtec Model GEM-2000 Gas Extraction Monitor fitted with a hydrogen sulphide pod. Subsequent measurements collected with a Landtec Model GEM-500 Gas Extraction Monitor fitted with a hydrogen sulphide pod.
2. Measurements were collected after readings stabilized (1-2 minutes of purging).
3. Vacuum readings taken with a magnahelic gauge and expressed in inches of water column.
4. Measurement of zero implies neither a negative or positive vacuum on well.
5. ND = Not detected
6. NM = Not measured due to weather conditions

Table 6
Sullivan's Ledge Superfund Site
Gas Extraction System Monitoring
Air Data

Volatile Organics by TO-14

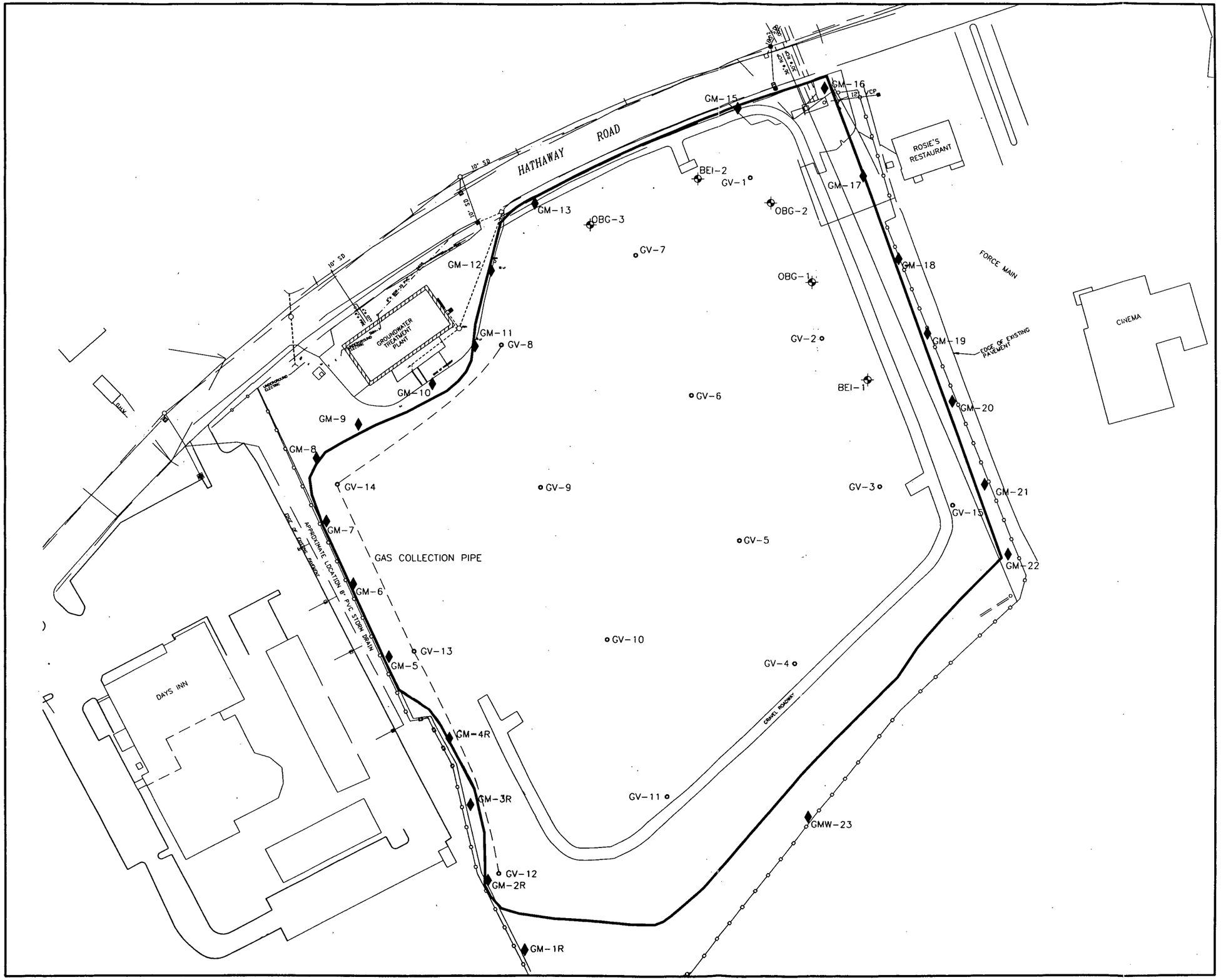
Benzene	60.1	ug/m3
Cyclohexane	438	ug/m3
Trichloroethylene	42.3	ug/m3
m/p-Xylene	3.3	ug/m3
Ethylbenzene	3.1	ug/m3
n-Heptane	264	ug/m3
Toluene	18.9	ug/m3
Tetrachloroethylene	11.2	ug/m3
cis-1,2-Dichloroethylene	10.6	ug/m3

	Gas Analysis by C3	***Field Screening***
Nitrogen	71 %	NM
Oxygen	22 %	17.7 %
Carbon Dioxide	2.3 %	1.9 %
Methane	1.8 %	1.1 %
Carbon Monoxide	ND %	NM

Note: Summa canister collected from stack on 4/24/03: Initial vacuum on canister 30"Hg @12:41, final vacuum on canister 2.5Hg @ 13:41. Summa submitted for TO-14 and C-3 analysis.

FIGURES

FIGURE 1



LEGEND

- GAS VENT
- GAS MONITORING WELL
- GAS COLLECTION PIPE
- PROPERTY BOUNDARY
- LIMITS OF CAP

SULLIVAN'S LEDGE
SUPERFUND SITE
NEW BEDFORD, MASS.

GAS VENT AND MONITORING WELL LOCATION PLAN

120 0 120

SCALE IN FEET

FILE NO. 5509.28602.094
APRIL 2003

O'BRIEN & GERE ENGINEERS INC.

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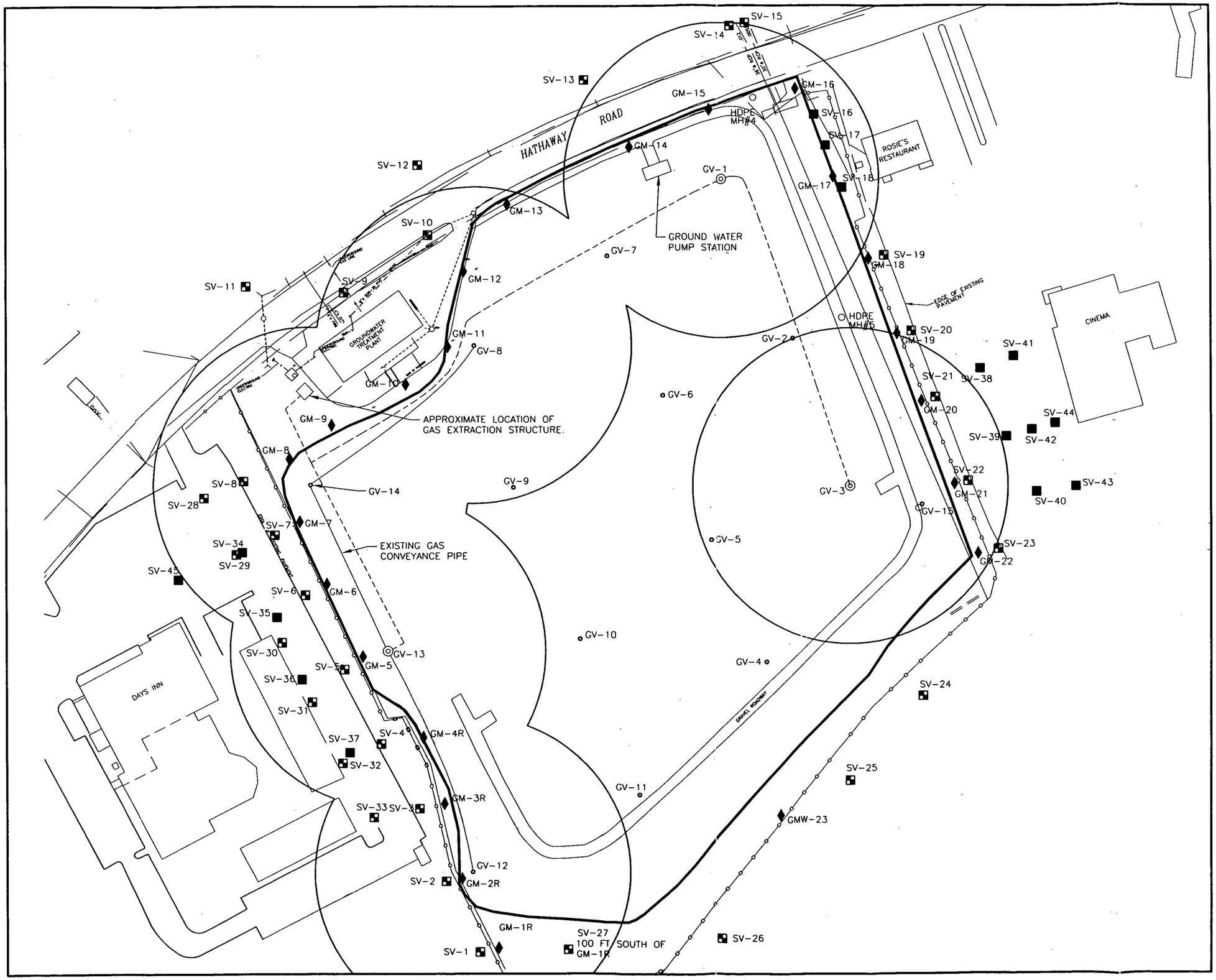
PLOT DATE: 5/7/03

FIGURE 2



LEGEND

GV-7 ○	PASSIVE GAS VENT
SV-20 ■	PREVIOUS SOIL VAPOR PROBE (MARCH 2002)
SV-38 ■	ADDITIONAL SOIL VAPOR PROBE (JULY 2002)
GM-12 ♦	GAS MONITORING WELL
GV-3 ◎	GAS VENT TO BE MODIFIED INTO A GAS EXTRACTION WELL
— — —	PROPOSED GAS COLLECTION PIPE HEADER SYSTEM
—o—o—	PROPERTY BOUNDARY
▬	LIMITS OF CAP

SULLIVAN'S LEDGE
SUPERFUND SITE
NEW BEDFORD, MASS.

GAS EXTRACTION SYSTEM CONCEPTUAL LAYOUT

120 0 120
SCALE IN FEET

FILE NO. 5509.28602.103
APRIL 2003

O'BRIEN & GERE ENGINEERS INC.

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PLOT DATE: 5/7/03

O'BRIEN & GERE
ENGINEERS, INC.

May 8, 2003

Mr. David O. Lederer
Remedial Project Manager
U.S. Environmental Protection Agency (HBO)
Region 1
1 Congress Street, Suite 1100
Boston, MA 02114-2023

Re: Sullivan's Ledge Superfund Site
Gas Extraction Pilot Study

File: 5509/28602 #2

Dear Dave:

Please find enclosed for your review our Report on the Gas Extraction Pilot Study conducted at the Sullivan's Ledge Superfund Site. The report includes a summary of the pilot test data collected from January through April 2003, and a description of the conceptual design for a full scale gas extraction system. Please contact me if you have any questions concerning this document.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC

James R. Heckathorne, PE
Vice President

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Enclosure

cc: E. Vaughn, S. Wood, S. Alfonse, D. Dwight, E. Bertaut, J. Shanahan

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