TERRA
▲ ENGINEERING & CONSTRUCTION CORPORATION ▲
ENVIRONMENTAL REMEDIATION
MUNICIPAL & UTILITY CONSTRUCTION
SPECIALTY EARTHWORK

February 9, 1995

Wisconsin Department of
Natural Resources
Environmental Response and
Repair Section
Bureau of Solid and Hazardous
Waste Management
101 South Webster Street,
GEF II, SE/3
Madison, Wisconsin 53707

Attn: Ms. Theresa Evanson

Re: Operation and Maintenance
Summary - January 1995
Landfill Gas and Leachate
Extraction System
Refuse Hideaway Landfill -
Middleton, Wisconsin
Terra Job # 468

Dear Ms. Evanson:

This letter summarizes operation and maintenance (O&M) activities performed by Terra Engineering & Construction Corporation (Terra), during the month of January 1995 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by Al's Modern Sewer Service to the Madison Metropolitan Sewerage District Treatment facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
December 29, 1994 (2)	2,835 Gallons
January 6, 1995	2,349 Gallons
January 9, 1995	2,532 Gallons
January 11, 1995	2,051 Gallons
January 12, 1995	2,572 Gallons
January 17, 1995	2,648 Gallons
January 27, 1995	5,214 Gallons
January 31, 1995	3,614 Gallons
Total	23,815 Gallons

(1) Based on liquid level measurements at the collection tank.

(2) Two loads not reported on December Monthly Report

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WEEKLY/MONTHLY MONITORING SCHEDULE

Weekly/Monthly monitoring of the landfill gas and leachate extraction system was performed on the following dates:

January 4, 1995	Weekly
January 12, 1995	Weekly
January 16, 1995	Weekly
January 26, 1995	Weekly
February 2, 1995	Monthly Leachate Head/ Gas Probe Monitoring
February 3, 1995	Weekly/Monthly Gas Well Monitoring

On February 2, 1995, during a scheduled site visit, the flare was observed to be down. The alarm system had been disarmed on December 10, 1995 due to recurring vacuum loss alarms. Based on the temperature recorder tape, the flare had been down approximately 0.5 hours. The flare was re-started prior to obtaining monthly leachate head levels, however the vacuum alarm could not be re-set. No other alarm conditions were observed during the month of January 1995.

Other Work Performed

Following the monthly leachate head monitoring, the leachate extraction system control panels at gas wells GW-5, GW-9 and GW-11 were inspected.

The decision to inspect the panels was based on pump hour meter readings, the relatively high leachate heads, and the fact that no pumping could be observed when the controls were re-set.

The pump "run-on" at gas well GW-5 may be due to broken or deteriorated discharge hose as the control panel inspection shows that the pump is in working order.

In December 1994, the pump in gas well GW-9 was in working order, following the installation of a new electrical junction box, Franklin Starter and a Torque Arrestor. Tests on the panel indicate that the start windings in the pump may be failing. This is based on the "motor lead wire resistance" readings observed while conducting the Troubleshooting Test Procedures described in the Grundfos Stainless Steeler Institute Troubleshooting Lab. Removing the pump and bench testing is the only way to check and correct the problem.

The same tests were performed at Gas Well GW-11 and similar results were observed. The pump will have to be removed in order to inspect the start windings and motor leads.

We will keep you updated on the condition of the leachate extraction pumps.

There was an increase in the vacuum to the well field with out any changes made to the branch control butterfly valves. The increase in vacuum first occurred at the end of September 1994, when a change (decrease) was made to the vacuum at the southern branch (refer to summary September 1994).

In an effort to increase gas flow and possibly correct the vacuum loss alarms the vacuum to the North and Central Branches of the well field was reduced from -29 inches water column (in. W.C.) to -22 and -18 in. W.C. respectively. Following this adjustment, the well field adjustments were made (see table 1). The results of these adjustments increased the gas flow to the flare from approximately 280 cubic feet per minute (cfm) to approximately 320 cfm, this also increased the methane flow to the flare from approximately 145 cfm to 169 cfm.

The results of the adjustments are determined from the sum of the individual gas well flows and the measured percent methane at each gas well. These are only estimates and are used only to determine if changes made are having a positive effect on the system.

The quarterly leachate analytical sample was obtained on January 18, 1995. The results are pending and will be forwarded to Madison Metropolitan Sewerage District and a copy to the WDNR upon receipt.

Conclusion

The butterfly branch vacuum control valves will be periodically adjusted in an attempt to maintain consistent vacuum and possibly correct the vacuum loss alarm condition. The butterfly valves do not offer the best control of vacuum to the well field. If problems develop with the vacuum control, the possibility of installing gate valves on each branch could be considered.

Prior to performing any repair work to the leachate extraction pumps, we will contact you for approval.

If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

Kirk Solberg,
Environmental Geologist

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TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: FEBRUARY 3, 1995
Temperature: 33 °F at 11:00
Barometric pressure: 29.85 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: GEM 500 / GM 190
Date Gas Detector last calibrated: Factory calibrated: MAY 1994 (4)
Velometer Model No./Serial No.: Alnor 6000AP / 526 57
Date Velometer last calibrated: Factory calibrated: JAN '95

WELL (1)	PH	PW	TEMP. (°F)	METHANE (%CH4)	OXYGEN (%O2)	CARBON DIOXIDE (%CO2)	BALANCE %	GAS VELOCITY	TOTAL FLOW (CFM)	METHANE FLOW (CFM)	ADJUSTED VELOCITY (FPM)
GW-1	-18.0	0.0	37.2	10.6	18.2	12.5	58.7	0	0	0	Closed
GW-2	-18.0	0.0	38.5	8.7	19.5	7.4	64.4	0	0	0	Closed
GW-3	-18.0	0.0	59.3	54.9	0.0	36.6	8.7	1400	63.0	34.6	NC
GW-4(1)	-19.0	0.0	72.1	50.0	0.0	33.7	16.6	200	9.0	4.5	200 → 600
GW-5(1)	-20.0	-18.0	73.5	44.1	2.9	32.2	21.2	600	27.0	11.9	600 → 200
GW-6	-18.0	0.0	56.0	55.3	0.0	40.9	4.0	0	0	0	0 → 400
GW-7(1)	-16.5	-16.5	56.0	52.8	0.0	38.3	9.3	700	31.5	16.6	NC
GW-8(1)	-16.5	-12.5	84.0	58.1	0.0	41.7	0.2	350	15.8	9.2	350 → 600
GW-9(1)	-15.0	-15.0	76.4	57.8	0.0	36.9	5.2	200	9.0	5.2	200 → 400
GW-10	-22.0	0.0	90.0	54.0	0.0	39.9	6.4	200	9.0	4.9	200 → 500
GW-11(1)	-20.0	-20.0	57.3	60.2	0.0	35.2	4.9	400	18.0	10.8	NC
GW-12(1)	-20.0	-1.0	107.6	49.5	0.0	34.1	16.9	1000	45.0	22.3	NC
GW-13	-20.0	-20.0	80.0	47.1	0.0	38.3	15.2	1200	54.0	25.4	1200 → 900

Notes:

(1) Wells with leachate extraction pump and controls.
(2) Percent CH_4 (methane).
(3) Gas flow (cfm) is calculated by multiplying the gas velocity (fpm) by 0.045 ft^2 for 3-inch diameter PVC pipe.
(4) Calibration checked: 1-26-95
99% CH_4 read _____ % CH_4
2.5% CH_4 read _____ % CH_4
15% CO_2 read _____ % CO_2

4% O_2 → 4.4%
96% Bal → 95.6%

50% CH_4 → 49.6%
35% CO_2 → 34.7%
15% Bal → 15.7%
0.6% O_2

15% CH_4 → 14.2%
15% CO_2 → 14.8%
70% Bal → 70.1%
0.9% O_2

NA Not Available or Not Applicable
NC No Change

REFUSE\kaj03.tab

TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: FEBRUARY 2, 1995
Temperature: 31 °F at 1130
Barometric pressure: 29.90 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: GEM500/6M190
Date Gas Detector last calibrated: Factory calibrated: MAY 1994 (4)

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4 (1) (% LEL)	O_2 (%)
G-1S	0.0	0.0	0	22.0
G-1D	0.0	0.0	0	22.0
G-6	0.0	0.0	0	22.0
G-8	0.0	0.0	0	22.1
G-9	0.0	0.0	0	22.2
G-10	0.0	0.0	0	22.0
GP-11S	0.0	0.0	0	21.9
GP-11D	0.0	0.0	0	21.9
GPW-1S	0.0	0.0	0	20.4
GPW-1M	Slight +	0.0	0	19.3
GPW-1D	Slight +	0.0	0	18.4
Speedway Building (2)	NA	0.0	0	22.0
Speedway Building (3)	NA	0.0	0	22.0

Notes:

(1) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).
(2) Readings obtained from the northeast corner of the interior of the scale house.
(3) Readings obtained from interior of Mechanic's shop.
(4) See calibration data on Table 1.
NA Not Available or Not Applicable.

TABLE 3

REFUSE HIDEAWAY LANDFILL
MONTHLY BRANCH AND FLARE MONITORING INFORMATION
Date: FEBRUARY 3, 1995

	Pressure (in. W.C.)	CH_4[1] (%)	O_2 (%)	Gas Velocity (fpm)	Flow[2] (cfm)	Flow[3] (scfm)	Gas Temp	Valve Setting (fraction open)
Branch Monitoring Station								
North Branch	-22.0	50.4	0.0	1100	85.8	85.5	42.0	5/13
Central Branch	-18.0	54.2	0.2	600	46.8	47.1	41.5	4/13
South Branch	-22.5	49.9	0.8	1250	97.5	98.4	40.2	4/13
Flare Inlet Pipe								
Port A	+2.5							N/A
Port B	+2.5	50.9	0.3	1700	314.5	323.6	57.1	full
Port C	+1.5							N/A

Notes:

(1) Percent CH_4 (methane).
(2) Gas velocity is converted to gas flow by multiplying fpm x 0.185 @ 6-inch HDPE and fpm x 0.078 @ 4-inch PVC.
(3) Flows have been converted to standard conditions of 70°F and 406.9 inches water.
NA Not applicable.

TABLE 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION
Date: FEBRUARY 2, 1995

Well	LEACHATE HEAD [2] (ft)			Current Pump Hours		Previous Pump Hours		Elapsed Pump Hours	
	Gas Well Depth	Depth to Leachate	Leachate Head	Total Hours	Time[3]	Total Hours	Time[3]	Total Hours	Pump Hours
GW-1	51.7	48.8	2.9						
GW-2	53.3	48.5	4.8						
GW-3	57	56.0	1.0						
GW-4[1]	65	56.2	8.8	3144.2	9:45	3124.2	12:00	1557	20.0
GW-5[1]	70	54.9	15.1	6134.5	9:30	45828	11:55	1557	1551.7
GW-6	36	34.7	1.3						
GW-7[1]	60	60.0	0.0	1395.5	8:45	1389.0	10:57	1557	6.5
GW-8[1]	69	69.0	0.0	15202.5	8:45	14901.7	11:03	1557	300.8
GW-9[1]	66	45.8	20.2	10798.1	9:00	10798.1	11:45	1557	0.0
GW-10	70	63.8	6.2						
GW-11[1]	65	45.4	19.6	2754.8	8:45	2754.8	11:39	1557	0.0
GW-12[1]	81	81.0	0.0	6268.7	8:45	6244.5	11:34	1557	24.2
GW-13[1]	69	62.5	6.5	2846.5	9:00	2751.9	11:16	1557	94.6

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Gas wells retro-fitted with threaded ports on risers October 1992. Leachate levels measured from retro-fitted port on gas well riser. Gas well depths obtained from Construction Observation Report, November, 1990 and Operation and Maintenance Manual, November 1991.
(3) Time of hour meter reading was recorded on 11-29-94 and 2-2-95.
Shaded areas do not have reportable information.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: JANUARY 1995

Alarm Dates	Alarm Cause	Solution (hours flare not operational)
02/02/94	FLAME FAILURE. CAUSE NOT DETERMINED. ALARMS DISARMED.	TERRA PERSONNEL ON-SITE. RE-START BLOWER/FLARE ALARMS REMAIN DISARMED. (0.5 HRS)

TABLE 6

REFUSE HIDEAWAY LANDFILL
SUMMARY OF WEEKLY MONITORING INFORMATION
Date: JANUARY 1995

Description	Date: 1-4-95				Date: 1-12-95				Date: 1-16-95				Date: 1-26-95				Date: 2-3-95			
	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)
Branch Monitoring Station																				
North Branch	6/13	-28.0	46.9	0.7	6/13	-27.0	49.8	0.6	6/13	-28.0	50.8	0.8	6/13	-29.0	47.5	0.0	5/13	-22.0	50.4	0.0
Central Branch	6/13	-28.0	49.8	1.0	6/13	-27.0	52.4	1.2	6/13	-29.0	54.5	1.0	6/13	-29.0	51.4	0.2	4/13	-18.0	54.2	0.2
South Branch	5/13	-21.0	45.1	2.4	5/13	-21.0	47.5	2.1	5/13	-23.0	51.5	2.0	5/13	-23.5	48.6	1.4	6/13	-22.5	49.9	0.8
Blower Inlet Pipe																				
Inlet Port A		-30.0	NA	NA		-28.0	49.6	1.4		-30.0	50.0	1.4		-30.0	48.8	0.5		-30.0	50.9	0.2
Inlet Port B		-30.0				-30.0				-31.0				-31.0				-31.0		
Outlet Port A		+4.0				+4.0				+4.0				+4.0				+3.5		
Flare Inlet Pipe																				
Sample Port A		NA				+2.5				NA				NA				+2.5		
Sample Port B		NA	47.2	1.5		+2.5	49.4	1.5		+3.0	51.3	1.3		+2.0	48.9	0.7		+2.5	50.9	0.3
Sample Port C		NA				+1.5				NA				NA				+1.5		
Flare Temperature (°F)	1480				1483				1500				1450				1500			
Flare Flow (cfm/scfm)	277.5/NA				268/279				NA				259/268				314/323			

Notes:

(1) Percent CH_4 (methane).
NA Not Available or Not Applicable.
Shaded areas do not have reportable information.

TERRA
▲ ENGINEERING & CONSTRUCTION CORPORATION ▲
ENVIRONMENTAL REMEDIATION
MUNICIPAL & UTILITY CONSTRUCTION
SPECIALTY EARTHWORK

March 8, 1995

Wisconsin Department of
Natural Resources
Environmental Response and
Repair Section
Bureau of Solid and Hazardous
Waste Management
101 South Webster Street,
GEF II, SE/3
Madison, Wisconsin 53707

Attn: Ms. Theresa Evanson

Re: Operation and Maintenance
Summary - February 1995
Landfill Gas and Leachate
Extraction System
Refuse Hideaway Landfill -
Middleton, Wisconsin
Terra Job # 468

Dear Ms. Evanson:

This letter summarizes operation and maintenance (O&M) activities performed by Terra Engineering & Construction Corporation (Terra), during the month of February 1995 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by Al's Modern Sewer Service to the Madison Metropolitan Sewerage District Treatment facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
February 3, 1995	4,345 Gallons
February 3, 1995	4,249 Gallons
February 7, 1995	4,533 Gallons
February 7, 1995	5,257 Gallons
February 9, 1995	3,471 Gallons
February 17, 1995	4,214 Gallons
February 28, 1995	3,625 Gallons
Total	29,694 Gallons

(1) Based on liquid level measurements at the collection tank.

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MADISON, WI 53704-6795
608/221-3501 PHONE
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WEEKLY/MONTHLY MONITORING SCHEDULE

Weekly/Monthly monitoring of the landfill gas and leachate extraction system was performed on the following dates:

February 10, 1995	Weekly
February 14, 1995	Weekly
February 24, 1995	Weekly
March 3, 1995	Weekly/Monthly Leachate Head/ Gas Probe Monitoring Monthly Gas Well Monitoring

On February 23, 1995, during a scheduled site visit, the flare was observed to be down. The alarm system had been disarmed on December 10, 1995 due to recurring vacuum loss alarms. Based on the temperature recorder tape, the flare had been down approximately 26 hours. The flare was re-started to obtaining monthly leachate head levels, however the vacuum alarm could not be re-set. No other alarm conditions were observed during the month of February 1995.

Other Work Performed

On February 9, 1995, the pump control panel and pumps at gas wells GW-5, GW-9 ad GW-11 were inspected.

The pump at GW-5 appears to be in working order. The pump was inspected based on leachate head information and the lack of leachate pumped from the well when the pump was activated. The pump was re-installed and the controls re-set.

The break in the discharge hose at GW-9 was discovered. On March 3, 1995, new discharge hose was installed. The pump was set approximately 2 feet above the bottom of the well. The pump was activated and leachate was heard flowing through the above ground discharge hose. The pump hour meter can now be checked to determine if it is in working order.

The Coyote pump control at GW-11 was found to be faulty. A Motor Minder pump control has been purchased for replacement. The installation of the Motor Minder pump control is pending.

General Observations

The vacuum loss condition remains in alarm. Daily phone calls are made to the Autodialer in order to check the status of the system. Attempts to re-set the alarm have been unsuccessful. It should be noted that the gas wells have been inspected and no major leaks have been discovered. It is suspected

that the freeze/thaw characteristic of our typical winter weather has affected the reliability of the vacuum switches.

The flow control valve at gas well GW-9 was opened following the installation of the previously mentioned pump and discharge hose. The gate valve had to be opened to the full open position in order to register a vacuum at the well. This could be due to a "clogged" valve or GW-9 is producing a large quantity of gas, periodic checks of the well vacuum will be performed and the flow will be adjusted accordingly

No adjustments were made to the well field during monthly monitoring. Refer to Table 1.

All gas probe readings indicated 0.0% methane.

If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

Kirk Solberg

Kirk Solberg,
Environmental Geologist

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: MARCH 3, 1995
Temperature: 32 °F at 1100
Barometric pressure: 30.16 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: GEM 500 GM190
Date Gas Detector last calibrated: Factory calibrated: MAY '94 (4)
Velometer Model No./Serial No.: ALNOR 6000AP/ 52697
Date Velometer last calibrated: Factory calibrated: JAN 95

WELL (1)	PH	PW	TEMP. (°F)	METHANE (%CH4)	OXYGEN (%O2)	CARBON DIOXIDE (%CO2)	BALANCE %	GAS VELOCITY	TOTAL FLOW (CFM)	METHANE FLOW (CFM)	ADJUSTED VELOCITY (FPM)
GW-1	-17	0	46.1	10.4	18.2	12.7	58.7	0	0	0	closed
GW-2	-17	0	47.3	9.3	19.3	10.2	61.2	0	0	0	closed
GW-3	-17.0	-1.0	58.6	54.0	0.8	36.6	8.0	850	38.25	20.7	NC
GW-4(1)	-17.0	-5.0	60.0	42.4	1.0	34.7	21.6	500	22.5	9.5	NC
GW-5(1)	-16.0	-16.0	64.9	44.3	3.4	35.1	16.1	750	33.75	14.9	NC
GW-6	-18.0	-2.0	50	47.7	0.2	37.0	15.3	500	22.5	10.7	NC
GW-7(1)	-17.0	-17.0	78	51.9	0.4	36.4	12.4	1000	45.0	23.4	NC
GW-8(1)	-18.0	-18.0	88	55.7	1.2	40.2	2.2	500	22.5	12.5	NC
GW-9(1)	-14.0	-13.0	93.1	60.0	0.2	39.8	0.0	550	24.75	14.9	NC
GW-10	-20.0	-4.0	106.7	40.3	0.0	32.0	27.4	550	24.75	10.0	NC
GW-11(1)	-20.0	-20.0	75.3	60.7	0.5	36.7	2.4	650	29.25	17.8	NC
GW-12(1)	-20.0	-2.0	106.5	47.5	0.3	34.8	17.9	800	36.0	17.1	NC
GW-13	-19.0	-18.0	82.2	49.0	0.2	36.9	13.5	800	36.0	17.6	NC

Notes:

(1) Wells with leachate extraction pump and controls.
(2) Percent CH_4 (methane).
(3) Gas flow (cfm) is calculated by multiplying the gas velocity (fpm) by 0.045 ft^2 for 3-inch diameter PVC pipe.
(4) Calibration checked: MARCH 3, 1995
99% CH_4 read _____ % CH_4
2.5% CH_4 read _____ % CH_4
15% CO_2 read _____ % CO_2

4% O_2 → 3.2
96% BAL → 96.8

50% CH_4 → 49.3%
35% CO_2 → 36.4%
15% BAL → 14.5%

15% CH_4 – 15.0%
15% CO_2 – 15.6%
70% BAL – 69.4%

NA Not Available or Not Applicable
NC No Change

TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: MARCH 3, 1995
Temperature: 32 °F at 11⁰⁰
Barometric pressure: 30.16 inches Hg
Monitored by: K. Solbers
Gas Detector Model No./Serial No.: GEM500/GM190
Date Gas Detector last calibrated: Factory calibrated: MAY '94 (4)

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4 (1) (% LEL)	O_2 (%)
G-1S	0.0	0.0	0	22.0
G-1D	0.0	0.0	0	22.1
G-6	0.0	0.0	0	21.6
G-8	0.0	0.0	0	21.9
G-9	0.0	0.0	0	18.5
G-10	0.0	0.0	0	21.7
GP-11S	0.0	0.0	0	21.9
GP-11D	0.0	0.0	0	21.9
GPW-1S	0.0	0.0	0	20.0
GPW-1M	0.0	0.0	0	19.0
GPW-1D	0.0	0.0	0	19.7
Speedway Building (2)	NA	0.0	0	22.4
Speedway Building (3)	NA	0.0	0	22.4

Notes:

(1) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).
(2) Readings obtained from the northeast corner of the interior of the scale house.
(3) Readings obtained from interior of Mechanic's shop.
(4) See calibration data on Table 1.
NA Not Available or Not Applicable.

TABLE 3

REFUSE HIDEAWAY LANDFILL
MONTHLY BRANCH AND FLARE MONITORING INFORMATION
Date: MARCH 3, 1995

	Pressure (in. W.C.)	CH_4[(1)] (%)	O_2 (%)	Gas Velocity (fpm)	Flow[(2)] (cfm)	Flow[(3)] (scfm)	Gas Temp	Valve Setting (fraction open)
Branch Monitoring Station								
North Branch	-21.0	47.1	0.0	1100	85.8	86.5	42.8	5/13
Central Branch	-19.0	51.6	0.1	600	46.8	47.1	46.5	4/13
South Branch	-20.0	43.9	1.7	1750	136.5	138.2	41.9	6/13
Flare Inlet Pipe								
Port A	+2.5							N/A
Port B	+2.5	46.1	0.7	2200	407	420.7	60.0	Full
Port C	+1.5							N/A

Notes:

(1) Percent CH_4 (methane).
(2) Gas velocity is converted to gas flow by multiplying fpm x 0.185 @ 6-inch HDPE and fpm x 0.078 @ 4-inch PVC.
(3) Flows have been converted to standard conditions of 70°F and 406.9 inches water.
NA Not applicable.

TABLE 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION
Date: March 3, 1995

Well	LEACHATE HEAD [2] (ft)			Current Pump Hours		Previous Pump Hours		Elapsed Pump Hours	
	Gas Well Depth	Depth to Leachate	Leachate Head	Total Hours	Time[3]	Total Hours	Time[3]	Total Hours	Pump Hours
GW-1	51.7	48.8	2.9						
GW-2	53.3	49.5	3.8						
GW-3	57	56.1	0.9						
GW-4[1]	65	56.9	8.1	3189.1	11:12	3144.2	9:45	~ 696	44.9
GW-5[1]	70	61.2	8.8	6134.9	11:06	6134.5	9:30	~ 696	0.4
GW-6	36	34.7	1.3						
GW-7[1]	60	60.0	0.0	1398.2	10:40	1395.5	8:40	~ 696	2.7
GW-8[1]	69	52.3	16.7	15889.5	10:39	15202.5	8:45	~ 696	687
GW-9[1]	66	41.7	24.3	10798.1	10:59	10798.1	8:50	~ 696	0
GW-10	70	63.6	6.4						
GW-11[1]	65	46.5	18.5	2754.8	11:00	2754.8	8:55	~ 696	0
GW-12[1]	81	66.4	14.6	6276.7	10:55	6268.7	8:55	~ 696	8.0
GW-13[1]	69	61.0	8.0	3502.2	10:49	2846.5	9:00	~ 696	655.7

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Gas wells retro-fitted with threaded ports on risers October 1992. Leachate levels measured from retro-fitted port on gas well riser. Gas well depths obtained from Construction Observation Report, November, 1990 and Operation and Maintenance Manual, November 1991.
(3) Time of hour meter reading was recorded on February 2, 1995 and March 3, 1995.
Shaded areas do not have reportable information.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: FEBRUARY 1995

Alarm Dates	Alarm Cause	Solution (hours flare not operational)
02/23/95	FLAME FAILURE. CAUSE NOT DETERMINED. ALARMS DISARMED.	TERRA PERSONNEL ON-SITE. RE-START BLOWER/FLARE 2/24/95 ALARMS REMAIN DISARMED. (APPROX. 26.0 HRS)

TABLE 6

REFUSE HIDEAWAY LANDFILL
SUMMARY OF WEEKLY MONITORING INFORMATION
Date: FEBRUARY 1995

	Date: 2-10-95				Date: 2-14-95				Date: 2-24-95				Date: 3-3-95				Date:			
Description	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)
Branch Monitoring Station																				
North Branch	5/13	-20.5	46.0	0.3	5/13	-19.0	47.2	0.0	5/13	-21.0	56.3	0.0	5/13	-21.0	47.1	0.0				
Central Branch	4/13	-18.5	50.0	0.2	4/13	-19.0	49.6	0.1	4/13	-19.0	58.2	0.0	4/13	-19.0	51.6	0.1				
South Branch	6/13	-21.5	40.7	2.2	6/13	-23.0	40.5	2.3	6/13	-22.0	46.1	2.1	6/13	-20.0	43.9	1.7				
Blower Inlet Pipe																				
Inlet Port A		-29.0	46.3	0.7		-30.0	45.1	0.8		-30.0	53.5	1.1		-30.0	46.9	0.5				
Inlet Port B		-30.0				-30.5				-31.0				-30.5						
Outlet Port A		+3.5				+3.5				+3.5				+4.0						
Flare Inlet Pipe																				
Sample Port A		+2.0				NA				+2.5				+2.5						
Sample Port B		+2.0	45.6	0.8		+2.5	44.1	1.1		+2.0	52.2	0.8		+2.5	46.1	0.7				
Sample Port C		+1.5				+1.5				+1.0				+1.5						
Flare Temperature (°F)	1530°				1500				1550				1500							
Flare Flow (cfm/scfm)	166.5/168.4				333/332.6				370/333.1				407/420.7							

Notes:

(1) Percent CH_4 (methane).
NA Not Available or Not Applicable.
Shaded areas do not have reportable information.

TERRA
▲ ENGINEERING & CONSTRUCTION CORPORATION ▲
ENVIRONMENTAL REMEDIATION
MUNICIPAL & UTILITY CONSTRUCTION
SPECIALTY EARTHWORK

April 5, 1995

Wisconsin Department of
Natural Resources
Environmental Response and
Repair Section
Bureau of Solid and Hazardous
Waste Management
101 South Webster Street,
GEF II, SE/3
Madison, Wisconsin 53707

Attn: Ms. Theresa Evanson

Re: Operation and Maintenance
Summary - March 1995
Landfill Gas and Leachate
Extraction System
Refuse Hideaway Landfill -
Middleton, Wisconsin
Terra Job # 468

Dear Ms. Evanson:

This letter summarizes operation and maintenance (O&M) activities performed by Terra Engineering & Construction Corporation (Terra), during the month of March 1995 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by Al's Modern Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
March 14, 1995	3,468 Gallons
March 15, 1995	2,038 Gallons
Total	5,506 Gallons

(1) Based on liquid level measurements at the collection tank.

2201 VONDRON ROAD
MADISON, WI 53704-6795
608/221-3501 PHONE
608/221-4075 FAX

WEEKLY/MONTHLY MONITORING SCHEDULE

Weekly/Monthly monitoring of the landfill gas and leachate extraction system was performed on the following dates:

March 9, 1995	Weekly, Annual Leachate Sample Obtained
March 16, 1995	Weekly
March 24, 1995	Weekly
March 31, 1995	Weekly/Monthly Leachate Head/ Gas Probe Monitoring Monthly Gas Well Monitoring

On Wednesday March 15, 1995, Ms. Theresa Evanson of the WDNR called to inform us that the flare was not operational. Based upon the temperature recorder tape, the flare had gone down on Wednesday March 15th at approximately 2:00 am.

The cause of the shut down could not be determined. No alarm was alerted as the alarms have remained disarmed due to the continued vacuum loss alarms.

The flare was re-started on Thursday March 16th during a scheduled weekly site visit. The blower and flare were allowed to run for approximately one hour prior to obtaining weekly readings at the blower/flare.

Other Work Performed

On March 9, 1995, the Annual leachate sample was obtained. The analytical results are pending and will be forwarded to the Madison Metropolitan Sewerage District and a copy to the Wisconsin Department of Natural Resources (WDNR) upon receipt.

On March 13, 1995, a new Motor Minder pump control unit was installed in gas well GW-11. The pump was turned on at this time.

A check of the pump hour meter at gas well GW-9 was performed and the meter found to be faulty. A new hour meter and contactor were purchased and installed on March 31, 1995.

On March 16, 1995 the flare was observed to be down as Ms. Evanson had reported. In an attempt to determine the cause of the shut down, the thermocouple was inspected. The thermocouple appeared to be in good condition as there was little to no corrosion of the sensing wires.

The four (4) vacuum switches were also inspected. Each switch was found to have corroded "contact blocks". The corrosion appears to have been caused by water and/or methane gas seeping into the switch.

The wires to the contact block on each vacuum switch were disconnected in order to allow for the re-arming of the alarm system, however prior to re-arming the system, a vacuum loss alarm condition was indicated. The vacuum loss alarm condition was indicated as a result of the wires making contact with the vacuum switch NEMA enclosure. The alarm system remained disarmed.

The following options were proposed to the WDNR to remediate the continued vacuum loss condition:

1) Purchase & install new vacuum switches.
2) Purchase new contact blocks for the existing switches.
3) Leave vacuum switches out of service and install a single vacuum switch between the blower and the branch valves.
4) By pass the vacuum switches at the control panel and leave vacuum switches out of service.

Options 1 and 2 were not accepted as they were somewhat costly and current landfill gas extraction systems have omitted vacuum switches from the branches due to high maintenance.

Option 3 was not accepted as the pipe run length between the blower and the branch valve is too short, and therefore to close to the blower for a vacuum switch to effectively sense a vacuum loss due to a break in the system.

Option 4 was accepted and Mr. John Gwinn of Linklater Corporation was contacted for instructions on how to effectively by-pass the vacuum switches at the control panel.

On March 31, 1995, the vacuum switches alarm was by-passed by installing a "Jumper Wire" in the control panel from port #1 to port #34 from the field. The system, which had been temporarily shut down was re-started and the alarms re-armed.

General Observations

During the monthly monitoring event, a small amount of methane was detected at gas probes GP-9, GP-11 shallow and deep (GP-11s and GP11d) See Table 2. This is the first detection of methane at GP-9. Subsequent gas probe readings may show this reading to be erroneous. Gas probes GP-11s and GP-11d have historically contained methane.

The pump hour meter in gas well GW-8 indicates continuous run-on. The pump hour meter gas well GW-12 shows zero hours run during the past month. (Previous monthly readings indicated 8 hours of pumping) An inspection of the hour meter wiring and contractors will be scheduled for GW-8 and GW-12. We will keep you updated on this.

Valve adjustments were made to three (3) gas wells during the monthly monitoring event. (See Table 1) The gas flow was reduced in two wells (GW-5 and GW-12) due to the presence of oxygen. The flow was increased at gas well GW-8 due to continued high methane content.

Methane odors were detected west of gas well GW-5 during the monthly monitoring event. As previously reported, there is a near by area of stressed vegetation likely due to gas seep.

Other than the localized area of stressed vegetation near gas well GW-5, the cap appears to be in good condition. There is some standing water in the area of gas well GW-9, however this is somewhat of a low-spot and the water will likely evaporate.

If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

Kirk Solberg

Kirk Solberg,
Environmental Geologist

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: MARCH 1995

Alarm Dates	Alarm Cause	Solution (hours flare not operational)
03/15/95	FLAME FAILURE. CAUSE NOT DETERMINED. ALARMS DISARMED.	RE-START BLOWER/FLARE 3/16/95 ALARMS REMAIN DISARMED. (APPROX. 32.0 HRS)
03/31/95	MANUAL SHUT DOWN TO INSTALL VACUUM SWITCH BY PASS.	RE-START BLOWER/FLARE 3/31/95. ALARMS RE-ARMED.

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: MARCH 31, 1995
Temperature: 41 °F at 1100
Barometric pressure: 30.07 inches Hg
Monitored by: K. Solberg / J. Falbo
Gas Detector Model No./Serial No.: GEM 500 / GM 140
Date Gas Detector last calibrated: Factory calibrated: MAY '94 (3)
Velometer Model No./Serial No.: Alnor 6000AP / 526917
Date Velometer last calibrated: Factory calibrated: JAN 95

WELL (1)	PH (IN W.C.)	PW (IN W.C.)	TEMP. (°F)	METHANE (%CH4)	OXYGEN (%O2)	CARBON DIOXIDE (%CO2)	BALANCE %	GAS VELOCITY (FPM)	(2) TOTAL FLOW (CFM)	METHANE FLOW (CFM)	ADJUSTED VELOCITY (FPM)
GW-1	-20.0	0	47.2	10.1	18.5	12.7	58.7	0	0	0	Closed
GW-2	-20.0	0	47.0	9.6	19.4	10.0	61.0	0	0	0	Closed
GW-3 2	-20.0	-1.0	60.0	56.2	1.0	36.5	5.5	1250	56.25	31.6	NC
GW-4(1) 8	-19.5	-7.0	58.1	46.8	1.1	34.8	15.1	450	20.25	9.5	NC
GW-5(1) 6	-19.0	-19.0	60.0	45.1	3.9	33.0	19.3	400	18.0	8.1	400 → 200
GW-6 2	-15.0	-1.0	47.0	43.5	0.2	34.9	21.6	200	9.0	3.9	NC
GW-7(1) 6	-15.0	-15.0	63.0	56.1	0.1	37.4	6.3	800	36.0	20.2	NC
GW-8(1) 4	-14.0	-14.0	74.0	62.4	0.8	37.1	0.0	350	15.75	9.8	350 → 600
GW-9(1) 12	-14.5	-14.5	65.0	63.2	0.2	36.5	0.0	600	27.0	17.1	NC
GW-10 3	-21.0	-5.0	104.5	42.3	0.5	33.1	25.1	600	27.0	11.4	NC
GW-11(1) 11	-20.0	-20.0	73.3	65.2	0.5	33.8	0.0	1000	45.0	29.3	NC
GW-12(1) 3	-21.0	-3.0	105.5	35.8	7.0	25.0	33.3	700	31.5	11.3	700 → 600
GW-13 6	-21.0	-18	80.0	53.4	0.5	37.7	8.6	950	42.75	22.8	NC

Notes:
(1) Wells with leachate extraction pump and controls.
(2) Gas flow (cfm) is calculated by multiplying the gas velocity (fpm) by 0.045 ft^2 for 3-inch diameter PVC pipe.
(3) Calibration checked: NA
99% CH_4 read _____ % CH_4
2.5% CH_4 read _____ % CH_4
15% CO_2 read _____ % CO_2

NA Not Available or Not Applicable
NC No Change
PH Header Pressure
PW Well Pressure

REFUSE\kaj03.tab

TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: MARCH 31, 1995
Temperature: 41° F at 1100
Barometric pressure: 30.07 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: GEM 500 / GM 190
Date Gas Detector last calibrated: Factory calibrated: MAY '94 (4)

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4 (1) (% LEL)	O_2 (%)
G-1S	0.0	0.0	0	21.9
G-1D	0.0	0.0	0	22.9
G-6	0.0	0.0	0	23.8
G-8	0.0	0.0	0	23.2
G-9	0.0	0.4	8	22.6
G-10	0.0	0.0	0	23.6
GP-11S	0.0	0.4	8	22.9
GP-11D	0.0	0.3	6	22.6
GPW-1S	0.0	0.0	0	21.3
GPW-1M	0.0	0.0	0	21.2
GPW-1D	0.0	0.0	0	20.1
Speedway Building (2)	NA	NA	NA	NA
Speedway Building (3)	NA	0.0	0	21.9

Notes:

(1) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).
(2) Readings obtained from the northeast corner of the interior of the scale house.
(3) Readings obtained from interior of Mechanic's shop.
(4) See calibration data on Table 1.
NA Not Available or Not Applicable.

TABLE 3

REFUSE HIDEAWAY LANDFILL
MONTHLY BRANCH AND FLARE MONITORING INFORMATION
Date: MARCH 31, 1995

	Pressure (in. W.C.)	CH_4[1] (%)	O_2 (%)	Gas Velocity (fpm)	Flow[2] (cfm)	Flow[3] (scfm)	Gas Temp	Valve Setting (fraction open)
Branch Monitoring Station								
North Branch	-22.0	43.4	0.0	1000	78.0	77.4	48.2	5/13
Central Branch	-19.0	45.9	0.8	650	50.7	51.0	45.1	4/13
South Branch	-23.0	45.6	1.1	1200	93.6	93.4	43.8	9/13
Flare Inlet Pipe								
Port A	+2.5							N/A
Port B	+2.0	45.8	0.7	2150	397.75	404	67.5	Full
Port C	+1.0							N/A

Notes:

(1) Percent CH_4 (methane).
(2) Gas velocity is converted to gas flow by multiplying fpm x 0.185 @ 6-inch HDPE and fpm x 0.078 @ 4-inch PVC.
(3) Flows have been converted to standard conditions of 70°F and 406.9 inches water.
NA Not applicable.

TABLE 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION
Date: MARCH 31, 1995

Well	LEACHATE HEAD [2] (ft)			Current Pump Hours		Previous Pump Hours		Elapsed Pump Hours	
	Gas Well Depth	Depth to Leachate	Leachate Head	Total Hours	Time[3]	Total Hours	Time[3]	Total Hours	Pump Hours
GW-1	51.7	51.7	0.0						
GW-2	53.3	53.3	0.0						
GW-3	57	56.7	0.3						
GW-4[1]	65	57.7	7.3	3250.2	11:15	3189.1	11:12	~671	61.1
GW-5[1]	70	56.6	13.4	6134.9	11:10	6134.9	11:06	~671	0.0
GW-6	36	34.2	1.8						
GW-7[1]	60	52.2	7.8	1403.6	10:30	1398.2	10:40	~671	5.4
GW-8[1]	69	49.0	20.0	16558.8	10:35	15889.5	10:39	~671	669.3
GW-9[1]	66	66.0	0.0	0.1	10:40	10798.1	10:59	~671	0.1
GW-10	70	63.1	6.9						
GW-11[1]	65	62.9	2.1	2798.0	10:50	2754.8	11:00	~671	43.2
GW-12[1]	81	62.4	18.6	6276.7	10:55	6276.7	10:55	~671	0.0
GW-13[1]	69	63.2	5.8	4146.2	10:55	3502.2	10:49	~671	644.0

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Gas wells retro-fitted with threaded ports on risers October 1992. Leachate levels measured from retro-fitted port on gas well riser. Gas well depths obtained from Construction Observation Report, November, 1990 and Operation and Maintenance Manual, November 1991.
(3) Time of hour meter reading was recorded on MARCH 3 and MARCH 31.
Shaded areas do not have reportable information.

GW-5 was turned off for month of March - inspected pump, but didn't change any components. Cyotote controllers may be deteriorating.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: MARCH 1995

Alarm Dates	Alarm Cause	Solution (hours flare not operational)
03/15/95	FLAME FAILURE. CAUSE NOT DETERMINED. ALARMS DISARMED.	RE-START BLOWER/FLARE 3/16/95 ALARMS REMAIN DISARMED. (APPROX. 32.0 HRS)
03/31/95	MANUAL SHUT DOWN TO INSTALL VACUUM SWITCH BY PASS.	RE-START BLOWER/FLARE 3/31/95. ALARMS RE-ARMED.

TABLE 6

REFUSE HIDEAWAY LANDFILL
SUMMARY OF WEEKLY MONITORING INFORMATION
Date: MARCH 1995

Description	Date: 3-9-95				Date: 3-16-95				Date: 3-24-95				Date: 3-31-95				Date:			
	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)
Branch Monitoring Station																				
North Branch	5/13	-22.0	44.2	0.0	5/13	-20.0	58.3	0.2	5/13	-22.0	47.4	0.0	5/13	-22.0	43.4	0.0				
Central Branch	4/13	-18.0	49.6	0.3	4/13	-13.0	55.9	0.0	4/13	-19.0	50.4	0.5	4/13	-19.0	45.9	0.8				
South Branch	6/13	-22.0	40.4	2.3	5/13	-18.0	53.7	0.3	6/13	-23.0	48.6	0.8	6/13	-23.0	45.6	1.1				
Blower Inlet Pipe																				
Inlet Port A		-31.0	44.4	0.9		-29.0	56.0	0.3		-30.5	48.3	0.3		-29.0	45.9	0.8				
Inlet Port B		-32.0				-30.0				-31.0				-31.5						
Outlet Port A		+4.0				+4.5				+3.5				+3.5						
Flare Inlet Pipe																				
Sample Port A		+2.5				+3.0				+2.5				+2.5						
Sample Port B		+2.5	43.0	1.1		+3.0	55.4	0.1		+2.5	47.7	0.8		+2.0	45.8	0.7				
Sample Port C		+1.75				+2.0				+1.5				+1.0						
Flare Temperature (°F)	1580→1460				1500				1430-1530				1470→1540							
Flare Flow (cfm/scfm)	407/427				425/430				360/369				398/409							

Notes:

(1) Percent CH_4 (methane).
NA Not Available or Not Applicable.
Shaded areas do not have reportable information.

Refuse\forms1.bjh

TERRA
▲ ENGINEERING & CONSTRUCTION CORPORATION ▲
ENVIRONMENTAL REMEDIATION
MUNICIPAL & UTILITY CONSTRUCTION
SPECIALTY EARTHWORK

May 17, 1995

Wisconsin Department of
Natural Resources
Environmental Response and
Repair Section
Bureau of Solid and Hazardous
Waste Management
101 South Webster Street,
GEF II, SE/3
Madison, Wisconsin 53707

Attn: Ms. Theresa Evanson

Re: Operation and Maintenance
Summary - April 1995
Landfill Gas and Leachate
Extraction System
Refuse Hideaway Landfill -
Middleton, Wisconsin
Terra Job # 468

Dear Ms. Evanson:

This letter summarizes operation and maintenance (O&M) activities performed by Terra Engineering & Construction Corporation (Terra), during the month of April 1995 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by Al's Modern Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
April 05, 1995	4,122 Gallons
April 05, 1995	4,472 Gallons
April 17, 1995	4,306 Gallons
April 17, 1995	4,214 Gallons
April 24, 1995	4,569 Gallons
April 25, 1995	4,472 Gallons
Total	26,155 Gallons

(1) Based on liquid level measurements at the collection tank.

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MADISON, WI 53704-6795
608/221-3501 PHONE
608/221-4075 FAX

WEEKLY/MONTHLY MONITORING SCHEDULE

Weekly/Monthly monitoring of the landfill gas and leachate extraction system was performed on the following dates:

April 07, 1995	Weekly
April 12, 1995	Weekly
April 19, 1995	Weekly/Quarterly Leachate Sampling
April 29, 1995	Weekly
May 04, 1995	Weekly/Monthly/Leachate Head/ Gas Probe/Gas Well Monitoring

Other Work Performed

There was a total of six (6) Blower/Flare shut downs during the month of April (See Table 5). All alarms were due to Flame Failures. The cause for the flame failures has not been determined. One possible cause could be low flare inlet pressure which may allow the flame to drop out of sight of the U.V. Sensor causing as the system to shut down.

Possible causes of the decreased flare inlet pressure could be a dry dripleg between the blower and the flare, a leak in the pressure relief valve between the blower and the flare, and/or worn seals in the New York Blower.

A set of replacement seals has been purchased and will be installed during an inspection of the blower components in order to determine the cause for the low flare inlet pressure.

The inspection of the blower will likely occur after the site evaluation visits by Mr. Jim Wheeler of Gas Control Engineering Inc. (Mr. Wheeler's site visits scheduled for May 18, 19 and 22).

The Leachate Extraction pump controls at gas wells GW-8,GW-12 and GW-9 were inspected due to pump hour meter readings. GW-8 indicated continuous run-on pumping. GW-12 showed zero hours pumping and GW-9 showed continued elevated leachate levels.

The results of the inspection indicated that there may be electrical shorts in the wiring to the pumps in GW-8 and GW-12. The pump controls at GW-9 indicate that the pump works, however, no discharge is audible. This may be due to a break in the discharge hose with-in the well. All (3) three pumps will need to be removed for inspection. The Wisconsin Department of Natural Resources (WDNR) has been informed of these findings. The pump pulling and inspection will be scheduled following the site visit by Mr. Jim Wheeler.

The Quarterly Leachate sample was obtained on April 19, 1994. The samples were forwarded to Mid-State Laboratories in Baraboo, Wisconsin. The results are pending and will be forwarded to the WDNR upon receipt.

General Observations

Gas probe readings indicated zero percent (0%) methane at all probes with the exception of gas probe GP-9 which showed 0.1% methane. This gas probe is located to the west of the landfill.

Gas content readings at the blower indicate the presence of oxygen in the Central Branch. The central branch consists of gas wells GW-6, GW-7, GW-8 and GW-9. The source of the oxygen in the central branch (2.2%) has not been determined.

Gas well readings show relatively high methane readings ranging from 40.0% to 60.6% in "active" gas wells [(2)]. Gas Well GW-5 shows the highest percentage of oxygen (4.0%). This maybe due to the shallow lateral wells. This well has not been shut off due to areas of stressed vegetation in the area of gas well GW-5.

No changes were made to the flows from the gas wells during monthly monitoring.

On a occasion, during a site visit to restart the Blower/Flare following a shut down, landfill gas odors are present at the gate to the flare. It is based on this observation that it is suspected that there is a leak in the system between the blower and the flare which maybe causing the low flare inlet pressures. We will keep the WDNR updated on further findings.

If you have any questions or comments regarding this report, please do not hesitate to contact us.

(2) Gas Well GW-1 and GW-2 have been closed due to low methane content.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

Kirk Solberg

Kirk Solberg,
Environmental Geologist

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: MAY 4, 1995
Temperature: 57 °F at 1100
Barometric pressure: 30.10 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: GEM 500 GM 190
Date Gas Detector last calibrated: Factory calibrated: MAY '94
Velometer Model No./Serial No.: ALNOR 6000AP / 52697
Date Velometer last calibrated: Factory calibrated: JAN 95

WELL (1)	PH (IN W.C.)	PW (IN W.C.)	TEMP. (°F)	METHANE (%CH4)	OXYGEN (%O2)	CARBON DIOXIDE (%CO2)	BALANCE %	GAS VELOCITY (FPM)	(2) TOTAL FLOW (CFM)	METHANE FLOW (CFM)	ADJUSTED VELOCITY (FPM)
GW-1	-23.0	0	61.7	10.1	18.5	12.8	58.6	closed	0	0	NC
GW-2	-23.0	0	62.5	11.2	19.2	10.7	58.9	closed	0	0	NC
GW-3	-23.0	-3.0	63.3	54.2	0.0	46.1	0.3	1450	65.25	35.4	NC
GW-4(1)	-23.0	-10.0	65.0	54.1	0.3	45.8	0.0	200	9.0	4.9	NC
GW-5(1)	-22.0	-21.0	60.5	40.0	4.0	32.0	20.6	200	9.0	3.6*	NC
GW-6	-16.0	-1.0	65.3	45.5	0.0	43.9	10.4	200	9.0	4.1	NC
GW-7(1)	-16.0	-16.0	76.6	57.4	0.1	42.3	0.0	600	27.0	15.5	NC
GW-8(1)	-16.0	-16.0	80.6	55.0	0.4	44.5	0.0	200	9.0	4.9	
GW-9(1)	-16.0	-16.0	72.8	57.3	0.1	43.0	0.0	900	40.5	23.2	NC
GW-10	-22.0	-6.0	100.5	41.9	0.0	45.0	13.2	400	18.0	7.5	NC
GW-11(1)	-23.0	-23.0	75.0	60.6	0.1	39.4	0.0	500	22.5	13.6	NC
GW-12(1)	-21.0	-1.0	103.2	54.3	0.0	45.7	0.0	500	22.5	12.2	NC
GW-13	-21.0	-21.0	75.3	50.9	0.1	49.1	0.0	1500	67.5	34.4	NC

Notes:
(1) Wells with leachate extraction pump and controls.
(2) Gas flow (cfm) is calculated by multiplying the gas velocity (fpm) by 0.045 ft² for 3-inch diameter PVC pipe.
(3) Calibration checked: APRIL 19 1995
~~99% CH_4~~ read ____ ~~% CH_4~~ 4% O_2 → 3.9% O_2
~~2.5% CH_4~~ read ____ ~~% CH_4~~ Bal N_2 → 96.2% Bal
~~15% CO_2~~ read ____ ~~% CO_2~~

15% CO_2 → 14.9% CO_2
15% CH_4 → 15.4% CH_4
70% N_2 → 70.0% Bal

50% CH_4 → 49.3% CH_4
35% CO_2 → 35% CO_2
15% N_2 → 15.4% Bal

NA Not Available or Not Applicable
NC No Change
PH Header Pressure
PW Well Pressure

REFUSE\kaj03.tab

TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: MAY 4, 1995
Temperature: 55° F at 10:00
Barometric pressure: 30.10 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: GEM500 GM190
Date Gas Detector last calibrated: Factory calibrated: MAY '94 (4)

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4 (1) (% LEL)	O_2 (%)
G-1S	0.0	0.0	0	22.8
G-1D	0.0	0.0	0	22.6
G-6	0.0	0.0	0	22.6
G-8	0.0	0.0	0	22.8
G-9	0.0	0.1	2	22.7
G-10	0.0	0.0	0	22.6
GP-11S	0.0	0.0	0	21.2
GP-11D	0.0	0.0	0	22.0
GPW-1S	0.0	0.0	0	22.2
GPW-1M	0.0	0.0	0	21.2
GPW-1D	0.0	0.0	0	20.7
Speedway Building (2)	NA	NA	NA	NA
Speedway Building (3)	NA	0.0	0	23.1

Notes:

(1) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).
(2) Readings obtained from the northeast corner of the interior of the scale house.
(3) Readings obtained from interior of Mechanic's shop.
(4) See calibration data on Table 1.
NA Not Available or Not Applicable.

TABLE 3

REFUSE HIDEAWAY LANDFILL
MONTHLY BRANCH AND FLARE MONITORING INFORMATION
Date: MAY 4, 1994

	Pressure (in. W.C.)	CH_4[1] (%)	O_2 (%)	Gas Velocity (fpm)	Flow[2] (cfm)	Flow[3] (scfm)	Gas Temp	Valve Setting (fraction open)
Branch Monitoring Station								
North Branch	-23.0	49.9	0.0	1000	78.0	76.3	54.6	5/13
Central Branch	-18.0	44.8	2.2	500	39.0	38.6	55.5	4/13
South Branch	-24.0	53.5	0.0	1300	101.4	99.0	54.1	4/13
Flare Inlet Pipe								
Port A	+2.0							N/A
Port B	+2.0	49.2	0.7	2050	379.25	380.7	73.7	full
Port C	+1.0							N/A

Notes:

(1) Percent CH_4 (methane).
(2) Gas velocity is converted to gas flow by multiplying fpm x 0.185 @ 6-inch HDPE and fpm x 0.078 @ 4-inch PVC.
(3) Flows have been converted to standard conditions of 70°F and 406.9 inches water.
NA Not applicable.

TABLE 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION
Date: MAY 4, 1995

Well	LEACHATE HEAD [2] (ft)			Current Pump Hours		Previous Pump Hours		Elapsed Pump Hours	
	Gas Well Depth	Depth to Leachate	Leachate Head	Total Hours	Time[3]	Total Hours	Time[3]	Total Hours	Pump Hours
GW-1	51.7	51.7	0.0						
GW-2	53.3	53.3	0.0						
GW-3	57	56.3	0.7						
GW-4[1]	65	58.2	6.8	3329.4	11:35	3250.2	11:15	~816	79.2
GW-5[1]	70	53.2	16.8	6315.7	11:30	6134.9	11:10	~816	180.8
GW-6	36	34.8	1.2						
GW-7[1]	60	53.0	7.0	1414.3	10:45	1403.6	10:30	~816	10.7
GW-8[1]	69	47.9	21.1	16890.3	10:50	16558.8	10:35	~816	331.5
GW-9[1]	66	35.4	30.6	55.1	10:55	0.1	10:40	~816	55.0
GW-10	70	62.7	7.3						
GW-11[1]	65	65.0	0.0	2982.9	11:20	2798.0	10:50	~816	184.9
GW-12[1]	81	61.3	19.7	6276.7	11:15	6276.7	10:55	~816	0.0
GW-13[1]	69	63.4	5.6	4873.3	11:05	4146.2	10:55	~816	727.1

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Gas wells retro-fitted with threaded ports on risers October 1992. Leachate levels measured from retro-fitted port on gas well riser. Gas well depths obtained from Construction Observation Report, November, 1990 and Operation and Maintenance Manual, November 1991.
(3) Time of hour meter reading was recorded on MARCH 31 and MAY 4, 1995.
Shaded areas do not have reportable information.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: APRIL 1995

Alarm Dates	Alarm Cause	Solution (hours flare not operational)
04/14/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 4/14/95 (4.5 HRS)
04/16/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 4/16/95 (.75 HRS)
04/19/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 4/20/95 (19.25 HRS)
04/23/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 4/24/95 (36.0 HRS)
04/28/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 4/29/95 (16 HRS)
05/02/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 5/02/95 (10.5 HRS)

TABLE 6

REFUSE HIDEAWAY LANDFILL
SUMMARY OF WEEKLY MONITORING INFORMATION
Date: APRIL 1995

Description	Date: April 7, 1995				Date: April 12, 1995				Date: April 19, 1995				Date: April 29, 1995				Date: MAY 4, 1995			
	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)
Branch Monitoring Station																				
North Branch	5/13	-22.0	48.3	0.0	5/13	-23.0	49.4	0.0	5/13	-23.0	49.6	0.0	5/13	-20.0	61.4	0.0	5/13	-23.0	49.9	0.0
Central Branch	4/13	-16.0	44.7	2.7	4/13	-17.0	45.0	2.6	4/13	-18.5	45.0	2.1	4/13	-12.0	53.4	1.6	4/13	-18.0	44.8	2.2
South Branch	6/13	-21.0	45.9	1.8	6/13	-24.0	53.1	0.0	6/13	-25.0	54.7	0.0	6/13	-30.0	60.1	0.2	6/13	-24.0	53.5	0.0
Blower Inlet Pipe																				
Inlet Port A		-29.5	46.4	1.5		-30.5	49.5	0.6		-30.0	50.7	0.7		-29.0	58.1	0.6		-30.0	49.1	0.5
Inlet Port B		-30.0				-31.0				-30.0				-30.0				-30.0		
Outlet Port A		+3.5				+3.0				+3.0				+4.0				+3.0		
Flare Inlet Pipe																				
Sample Port A		+2.5				+2.0				+2.0				+3.5				+2.0		
Sample Port B		+2.0	46.2	1.5		+2.0	50.1	0.8		+2.0	50.4	0.5		+3.5	59.2	0.5		+2.0	49.2	0.7
Sample Port C		+1.5				+1.0				+1.0				+1.5				+1.0		
Flare Temperature (°F)	1525				1520				1480				1500				1500			
Flare Flow (cfm/scfm)	416.25/422				351/359				305/308				416.25/423.4				379.25/386.7			

Notes:

(1) Percent CH_4 (methane).
NA Not Available or Not Applicable.
Shaded areas do not have reportable information.

TERRA
▲ ENGINEERING & CONSTRUCTION CORPORATION ▲
ENVIRONMENTAL REMEDIATION
MUNICIPAL & UTILITY CONSTRUCTION
SPECIALTY EARTHWORK

June 22, 1995

Wisconsin Department of
Natural Resources
Environmental Response and
Repair Section
Bureau of Solid and Hazardous
Waste Management
101 South Webster Street,
GEF II, SE/3
Madison, Wisconsin 53707

Attn: Ms. Theresa Evanson

Re: Operation and Maintenance
Summary - May 1995
Landfill Gas and Leachate
Extraction System
Refuse Hideaway Landfill -
Middleton, Wisconsin
Terra Job # 468

Dear Ms. Evanson:

This letter summarizes operation and maintenance (O&M) activities performed by Terra Engineering & Construction Corporation (Terra), during the month of May 1995 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by Al's Modern Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
May 01, 1995	3,739 Gallons
May 01, 1995	4,243 Gallons
May 09, 1995	3,580 Gallons
May 09, 1995	2,663 Gallons
May 19, 1995	4,142 Gallons
Total	18,367 Gallons

(1) Based on liquid level measurements at the collection tank.

2201 VONDRON ROAD
MADISON, WI 53704-6795
608/221-3501 PHONE
608/221-4075 FAX

WEEKLY/MONTHLY MONITORING SCHEDULE

Weekly/Monthly monitoring of the landfill gas and leachate extraction system was performed on the following dates:

May 10, 1995	Weekly
May 18, 1995	Monthly Leachate Head/Gas Probes Monitoring
May 19, 1995	Site Visit by Mr. Jim Wheeler
May 20, 1995	Weekly
May 26, 1995	Weekly
June 2, 1995	Weekly/Monthly Gas Well Monitoring

Other Work Performed

There was a total of nine (9) alarm conditions alerted during the month of May (See Table 5). Seven (7) of the alarms were due to Flame Failure. The cause of the flame failures has not been determined, however an inspection of the blower fan, blower belts, and seals has been scheduled. The other two (2) alarm conditions were due to an erroneous high leachate alarm and a low temperature alarm. The Blower/Flare remained operational during each of these alarms conditions.

We are currently trying to determine the cause for the flame failures. It is possibly due to low discharge pressure at the blower resulting in low flare inlet pressure which may lead to fluctuations in the flame height in the flare, leading to the U.V. sensor loosing "sight" of the flame.

During Mr. Jim Wheeler's visit, (May 19, 1995) the driplegs and pressure relief valves were inspected. Water was added to the dripleg between the blower and the flare (DL-2) although the dripleg appeared to contain enough water to prevent any loss of gas pressure. The pressure relief valve was inspected and found to be in working order.

Also, during Mr. Wheeler's visit, sample ports were installed in the 1-inch riser located at the ends of the shallow lateral gas wells near GW-5.

New seals for the blower were purchased as they could potentially be the source of some loss of pressure to the flare. This was evidenced by landfill gas odor in the blower room and an audible leak at the seals.

Amperage readings were obtained from the blower motor and was found to be 6.3 amps. The blower motor is rated for 13 amps. (ie. the blower motor is not being overloaded.)

The erroneous high leachate alarm occurred after turning the power on to leachate tank control panel. The cause for the false alarm is currently being investigated. Capital Petroleum has been contacted to assist in trouble shooting this problem. Attempts to re-set the alarm failed and the power was turned off in order to keep electrical power to the leachate extraction pumps.

On May 30, 1995 the pumps at gas wells GW-8, 9 and 12 were pulled for inspection. The inspection was to determine the cause for electrical shorts in gas wells GW-8 and GW-12 and pump run on at gas well GW-9.

The lead wires were found to be broken at GW-12, new lead wire was installed and the pump re-set into the well.

The discharge hose at GW-9 was found to have slipped off the stab fitting at the well head. The hose was retrieved and re-connected. The pump was found to be in working order.

Two feet of lead wire and discharge hose was removed from GW-8. The pump was found to be in working order and re-set into the well. Following the re-setting of the pump, the motor minder would not re-set, possibly due to a fuse problem. New fuses were purchased and installed, however the motor minder could not be re-set. Further inspection or replacement of the lead wires may be warranted.

Flow adjustments were made to three (3) gas wells during the monthly monitoring. The adjustments are noted in Table 1 and were made to increase gas flow to the flare.

Gas probe readings were clear of methane with the exception of GP-11D which contained 0.7% methane by volume.

Leachate head readings and hour meter readings were obtained prior to the inspection of the pumps and lead wires at gas wells GW-8, 9 and 12.

The vegetation on the site is thick. As in the past, we will schedule personnel to cut the vegetation in the areas of the Blower/Flare, Leachate Tank and at the individual gas wells.

If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

Kirk Solberg

Kirk Solberg,
Environmental Geologist

REFUSE\may95.rpt

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: JUNE 2, 1995
Temperature: 70 ° F at 2:00
Barometric pressure: 29.92 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: GEM 500 GM 190
Date Gas Detector last calibrated: Factory calibrated: MAY '94 (3)
Velometer Model No./Serial No.: Almor 6000AP 52697
Date Velometer last calibrated: Factory calibrated: JAN '95

WELL (1)	PH (IN W.C.)	PW (IN W.C.)	TEMP. (°F)	METHANE (%CH4)	OXYGEN (%O2)	CARBON DIOXIDE (%CO2)	BALANCE %	GAS VELOCITY (FPM)	TOTAL FLOW (CFM) (2)	METHANE FLOW (CFM)	ADJUSTED VELOCITY (FPM)
GW-1	-23.0	0.0	62.3	10.2	19.1	12.5	58.2	0	0	0	Closed
GW-2	-23.0	0.0	62.0	11.5	18.3	11.1	59.1	0	0	0	Closed
GW-3	-23.0	-6.0	63.5	54.1	0.0	45.9	0.0	1100	49.5	26.8	NC
GW-4(1)	-24.0	-14.0	62.0	53.6	0.0	46.4	0.0	600	27.0	14.5	200 → 600
GW-5(1)	-23.0	-20.0	73.0	44.0	2.6	46.3	7.4	500	22.5	9.9	NC
GW-6	-21.0	-5.0	69.2	46.0	0.0	50.2	3.9	600	27.0	12.4	200 → 600
GW-7(1)	-21.0	-21.0	74.1	59.1	0.0	41.0	0.0	900	40.5	23.9	NC
GW-8(1)	-21.0	-21.0	82.0	56.7	0.0	43.2	0.0	400	18.0	10.2	200 → 400
GW-9(1)	-20.0	-19.0	85.4	40.8	4.1	40.4	15.0	400	18.0	7.3	NC
GW-10	-22.0	-6.0	102.0	44.3	0.0	50.0	5.9	750	33.7	14.9	NC
GW-11(1)	-20.0	-20.0	71.4	56.1	0.0	44.2	0.0	500	22.5	12.6	NC
GW-12(1)	-21.0	-12.0	108.3	43.8	0.0	45.6	8.9	1650	74.2	32.5	NC
GW-13	-20.0	-20.0	72.0	59.2	0.0	40.6	0.0	550	24.7	14.6	NC

Notes:
(1) Wells with leachate extraction pump and controls.
(2) Gas flow (cfm) is calculated by multiplying the gas velocity (fpm) by 0.045 ft^2 for 3-inch diameter PVC pipe.
(3) Calibration checked: MAY 18, 1995

~~99% CH_4~~ read _____ % CH_4
2.5% CH_4 read _____ % CH_4
~~15% CO_2~~ read _____ % CO_2

4% O_2 → 4.0
96% Bal → 96.0

15% CO_2 → 14.4%
15% CH_4 → 14.5%
70% Bal → 70.3%

50% CH_4 → 49.0%
35% CO_2 → 36.9%
15% ~~Bal~~ → 14.0%

NA Not Available or Not Applicable
NC No Change
PH Header Pressure
PW Well Pressure

REFUSE\kaj03.tab

TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: MAY 18
Temperature: 58° F at 1130
Barometric pressure: 29.77 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: GEM500/6M 190
Date Gas Detector last calibrated: Factory calibrated: MAY '94 (4)

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4 (1) (% LEL)	O_2 (%)
G-1S	0.0	0.0	0	20.8
G-1D	0.0	0.0	0	20.8
G-6	0.0	0.0	0	21.2
G-8	0.0	0.0	0	21.1
G-9	0.0	0.0	0	20.9
G-10	0.0	0.0	0	21.1
GP-11S	0.0	0.0	0	19.2
GP-11D	0.0	0.7	1.4	16.3
GPW-1S	0.0	0.0	0	20.5
GPW-1M	0.0	0.0	0	21.0
GPW-1D	0.0	0.0	0	20.0
Speedway Building (2)	NA	0.0	0	21.3
Speedway Building (3)	NA	0.0	0	21.4

Notes:

(1) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).
(2) Readings obtained from the northeast corner of the interior of the scale house.
(3) Readings obtained from interior of Mechanic's shop.
(4) See calibration data on Table 1.
NA Not Available or Not Applicable.

TABLE 3

REFUSE HIDEAWAY LANDFILL
MONTHLY BRANCH AND FLARE MONITORING INFORMATION
Date: JUNE 2, 1995

	Pressure (in. W.C.)	CH_4[1] (%)	O_2 (%)	Gas Velocity (fpm)	Flow[2] (cfm)	Flow[3] (scfm)	Gas Temp	Valve Setting (fraction open)
Branch Monitoring Station								
North Branch	-21.0	46.1	0.0	1650	128.7	122.5	68.0	5/13
Central Branch	-22.0	50.5	0.0	750	585	55.8	65.6	4/13
South Branch	-26.0	54.1	0.0	1800	140.4	134.1	59.5	6/13
Flare Inlet Pipe								
Port A	+3.0							N/A
Port B	+2.75	49.6	0.0	2350	434	426.2	84.3	FULL
Port C	+2.0							N/A

Notes:

(1) Percent CH_4 (methane).
(2) Gas velocity is converted to gas flow by multiplying fpm x 0.185 @ 6-inch HDPE and fpm x 0.078 @ 4-inch PVC.
(3) Flows have been converted to standard conditions of 70°F and 406.9 inches water.
NA Not applicable.

TABLE 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION
Date: MAY 18, 1995

Well	LEACHATE HEAD [2] (ft)			Current Pump Hours		Previous Pump Hours		Elapsed Pump Hours	
	Gas Well Depth	Depth to Leachate	Leachate Head	Total Hours	Time[3]	Total Hours	Time[3]	Total Hours	Pump Hours
GW-1	51.7	51.7	0						
GW-2	53.3	53.3	0						
GW-3	57	56.0	1.0						
GW-4[1]	65	57.8	7.2	3395.6	11:35	3329.4	11:35	~ 336	66.2
GW-5[1]	70	55.5	14.5	6555.7	11:30	6315.7	11:30	~ 336	240.0
GW-6	36	34.6	1.4						
GW-7[1]	60	60.0	0	1421.7	10:45	1414.3	10:45	~ 336	7.4
GW-8[1]	69	47.1	21.9 *	16890.3	10:50	16890.3	10:50	~ 336	0.0
GW-9[1]	66	46.3	19.7 *	95.9	10:55	55.1	10:55	~ 336	40.8
GW-10	70	62.8	7.2						
GW-11[1]	65	62.9	2.1	3133.7	11:20	2982.9	11:20	~ 336	150.8
GW-12[1]	81	60.2	20.8 *	6276.7	11:15	6276.7	11:15	~ 336	0.0
GW-13[1]	69	59.0	10.0	5081.6	11:05	4873.3	11:05	~ 336	208.3

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Gas wells retro-fitted with threaded ports on risers October 1992. Leachate levels measured from retro-fitted port on gas well riser. Gas well depths obtained from Construction Observation Report, November, 1990 and Operation and Maintenance Manual, November 1991.
(3) Time of hour meter reading was recorded on MAY 4, 1995 and MAY 18, 1995.
Shaded areas do not have reportable information.

* READINGS TAKEN PRIOR TO PUMP REMOVAL/INSPECTION.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: May 1995

Alarm Dates	Alarm Cause	Solution (hours flare not operational)
05/05/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 5/06/95 (15.0 HRS)
05/06/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 5/09/95 (68.5 HRS)
05/12/95	ERRONEOUS HIGH LEACHATE LEVEL ALARM.	ATTEMPTS TO RE-SET TANK ALARM FAILED. TURNED POWER TO TANK PANEL OFF. BLOWER FLARE OPERATIONAL.
05/22/95	LOW TEMPERATURE ALARM. BLOWER FLARE OPERATIONAL.	ADJUST CONTROL DAMPERS
05/23/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 5/23/95 (1.0 HRS)
05/23/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 5/24/95 (16.25 HRS)
05/24/95	FLAME FAILURE. POSSIBLY DUE TO LOW FLOWS.	RE-START BLOWER/FLARE 5/24/95 (2.0 HRS)
05/24/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 5/26/95 CLEANED U.V. SENSOR (32.0 HRS)
05/31/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 5/31/95 (1.5 HRS)

TABLE 6

REFUSE HIDEAWAY LANDFILL
SUMMARY OF WEEKLY MONITORING INFORMATION
Date: MAY 1995

Description	Date: MAY 10, 1995				Date: MAY 20, 1995				Date: MAY 26, 1995				Date: JUNE 2, 1995				Date:			
	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)
Branch Monitoring Station																				
North Branch	5/13	-22.0	53.4	0.0	5/13	-23.5	53.8	0.0	5/13	-18.0	62.9	0.0	5/13	-21.0	46.1	0.0				
Central Branch	4/13	-17.0	46.1	1.7	4/13	-18.0	49.4	1.6	4/13	-11.0	56.3	0.5	4/13	-22.0	50.5	0.0				
South Branch	5/13	-25.0	53.8	0.0	6/13	-25.0	58.0	0.0	6/13	-22.5	59.4	0.0	6/13	-26.0	54.1	0.0				
Blower Inlet Pipe																				
Inlet Port A		-29.0	52.2	0.4		-29.0	54.3	0.0		-28.0	60.0	0.0		-29.0	50.4	0.0				
Inlet Port B		-30.0				-30.0				-28.5				-30.0						
Outlet Port A		+3.0				+2.5				+5.5				+4.5						
Flare Inlet Pipe																				
Sample Port A		+2.0				+2.0				+4.0				+3.0						
Sample Port B		+2.0	53.4	0.5		+2.0	53.0	0.0		+4.0	60.0	0.0		+2.75	49.6	0.0				
Sample Port C		+1.0				+1.0				+2.5				+2.0						
Flare Temperature (°F)	1500°				1490°				1500°				1510							
Flare Flow (cfm/scfm)	360/360.4				333/327				416/421				434/426							

Notes:

(1) Percent CH_4 (methane).
NA Not Available or Not Applicable.
Shaded areas do not have reportable information.

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TERRA
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ENVIRONMENTAL REMEDIATION
MUNICIPAL & UTILITY CONSTRUCTION
SPECIALTY EARTHWORK

July 11, 1995

Wisconsin Department of
Natural Resources
Environmental Response and
Repair Section
Bureau of Solid and Hazardous
Waste Management
101 South Webster Street,
GEF II, SE/3
Madison, Wisconsin 53707

Attn: Ms. Theresa Evanson

Re: Operation and Maintenance
Summary - June 1995
Landfill Gas and Leachate
Extraction System
Refuse Hideaway Landfill -
Middleton, Wisconsin
Terra Job # 468

Dear Ms. Evanson:

This letter summarizes operation and maintenance (O&M) activities performed by Terra Engineering & Construction Corporation (Terra), during the month of June 1995 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by Al's Modern Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)	
May 31, 1995	4,800	Gallons
June 01, 1995	9,000	Gallons
June 09, 1995	4,500	Gallons
June 20, 1995	20,000	Gallons
June 28, 1995	4,500	Gallons
June 30, 1995	5,123	Gallons
Total	47,923	Gallons

(1) Based on liquid level measurements at the collection tank.

2201 VONDRON ROAD
MADISON, WI 53704-6795
608/221-3501 PHONE
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WEEKLY/MONTHLY MONITORING SCHEDULE

Weekly/Monthly monitoring of the landfill gas and leachate extraction system was performed on the following dates:

June 09, 1995	Weekly
June 14, 1995	Weekly
June 21, 1995	Weekly
June 27, 1995	Weekly/Monthly Gas Well Monitoring
June 30, 1995	Monthly Leachate Head and Gas Probe Monitoring

Other Work Performed

There was a total of twelve (12) alarm conditions alerted during the month of June, 1995. (See Table 5). Two (2) of the alarms were likely the result of electrical power interruptions due to thunderstorms in the area.

The General alarm on June 19, 1995 may have been due to the leachate tank overfill. A report regarding the leachate tank overfill, and remedial response will be submitted to the Wisconsin Department of Natural Resources (WDNR).

The cause for the remaining nine (9) alarms has yet to be determined. Trouble shooting possible causes included replacement of blower seals (6/8/95), replacement of blower belts (6/15/95) and subsequent tightening of the blower belts (6/17/95). All were done to increase gas flow to the flare.

The temperature recorder tape shows the flare to maintain a 1500°F temperature. The shut downs, however are preceded by erratic temperature swings. We are currently looking into the possibility of a problem with the Honeywell Controller as well as possible thermocouple problems. We will keep you updated on these issues.

In June of 1995, the weeds and tall grass were trimmed from the Blower/Flare area, leachate tank area as well as the individual gas well enclosures.

General Observations

Gas probe readings indicated that methane was present in gas probes GP-11s (14.2%), GP-11d (29.0%) and GP-6 (0.2%). High methane readings at GP-11s and GP-11D are seasonal. The 0.2% methane observed at GP-6 was the first observed since June 1994.

The branch control valves located in the field were exercised from closed to full open and back to closed with no adverse effects observed.

The landfill cover is in good condition with the exception of previously reported areas of stressed vegitation located southwest of GW-5.

The leachate extraction pumps appear to be in good working order with the exception of GW-8. It is suspected that a frayed lead wire is causing an electrical short. The pump os scheduled to be removed and lead wires replaced as soon as possible.

The control panel at the leachate tank is currently being inspected to determine the cause for the erroneous high leachate alarms. The inspection is being performed by Capital Petroleum Equipment of Madison as they service Red Jacket control panels. We will keep you updated on their findings.

If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

Kirk Solberg,
Environmental Geologist

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: JUNE 27, 1995
Temperature: 75 °F at 11:00
Barometric pressure: 29.83 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: GEM 500 GM190
Date Gas Detector last calibrated: Factory calibrated: MAY 94 (3)
Velometer Model No./Serial No.: Alnor 6000AP 52697
Date Velometer last calibrated: Factory calibrated:

WELL (1)	PH (IN W.C.)	PW (IN W.C.)	TEMP. (°F)	METHANE (%CH4)	OXYGEN (%O2)	CARBON DIOXIDE (%CO2)	BALANCE %	GAS VELOCITY (FPM)	(2) TOTAL FLOW (CFM)	METHANE FLOW (CFM)	ADJUSTED VELOCITY (FPM)
GW-1	-21.0	0.0	75.0	18.8	12.3	16.0	53.2	0	0	0	Closed
GW-2	-21.0	0.0	68.5	20.0	11.7	18.0	51.0	0	0	0	Closed
GW-3	-21.0	-4.0	68.3	58.0	0.0	42.0	0.0	950	42.75	24.8	NC
GW-4(1)	-22.0	-12.0	76.6	55.3	0.0	44.7	0.0	900	40.5	22.4	NC
GW-5(1)	-20.0	-17.0	80.5	45.8	2.1	51.8	0.0	550	24.75	11.3	NC
GW-6	-23.0	-5.0	75.7	58.2	0.0	41.6	0.0	600	27.0	15.7	NC
GW-7(1)	-24.0	-23.5	82.4	60.0	0.0	40.0	0.0	750	33.75	20.25	NC
GW-8(1)	-24.0	-24.0	84.5	58.0	0.0	42.0	0.0	500	22.50	13.0	NC
GW-9(1)	-23.0	-21.0	85.8	41.7	3.2	46.3	9.1	500	22.50	9.4	NC
GW-10	-22.5	-5.0	103.6	58.4	0.0	41.6	0.0	600	27.0	15.7	NC
GW-11(1)	-22.0	-22.0	92.5	60.7	0.0	39.3	0.0	200	9.0	32.7	NC
GW-12(1)	-22.0	-12.0	109.5	58.8	0.0	43.2	0.0	2200	99.0	58.2	NC
GW-13	-22.0	-22.0	77.7	59.0	0.0	41.0	0.0	900	40.5	23.9	NC

Notes:
(1) Wells with leachate extraction pump and controls.
(2) Gas flow (cfm) is calculated by multiplying the gas velocity (fpm) by 0.045 ft^2 for 3-inch diameter PVC pipe.
(3) Calibration checked: 6-27-95

99% CH_4 read → % CH_4
2.5% CH_4 read → % CH_4
15% CO_2 read → % CO_2

15% CH_4 → 15.7
15% CO_2 → 15.0
70% BAL → 69.4

50% CH_4 → 49.7
35% CO_2 → 34.1
15% BAL → 16.8

4% O_2 → 4.0
96% BAL → 96.0

NA Not Available or Not Applicable
NC No Change
PH Header Pressure
PW Well Pressure

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TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: JUNE 30, 1995
Temperature: 73° F at 1100
Barometric pressure: 29.98 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: GEM 500 GM 190
Date Gas Detector last calibrated: Factory calibrated: MAY '94 (4)

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4 (1) (% LEL)	O_2 (%)
G-1S	0.0	0.0	0	20.2
G-1D	0.0	0.0	0	20.5
G-6	0.0	0.2	1.0	14.4
G-8	0.0	0.0	0	20.9
G-9	0.0	0.0	0	21.0
G-10	0.0	0.0	0	20.9
GP-11S	0.0	14.2	>100	0.0
GP-11D	0.0	29.4	>100	0.0
GPW-1S	0.0	0.0	0	20.7
GPW-1M	-0.25	0.0	0	20.6
GPW-1D	-0.5	0.0	0	20.7
Speedway Building (2)	NA	0.0	0	21.5
Speedway Building (3)	NA	0.0	0	21.6

Notes:

(1) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).
(2) Readings obtained from the northeast corner of the interior of the scale house.
(3) Readings obtained from interior of Mechanic's shop.
(4) See calibration data on Table 1.
NA Not Available or Not Applicable.

TABLE 3

REFUSE HIDEAWAY LANDFILL
MONTHLY BRANCH AND FLARE MONITORING INFORMATION
Date: JUNE 27, 1995

	Pressure (in. W.C.)	CH_4[1] (%)	O_2 (%)	Gas Velocity (fpm)	Flow[2] (cfm)	Flow[3] (scfm)	Gas Temp	Valve Setting (fraction open)
Branch Monitoring Station								
North Branch	-24.0	56.2	0.0	1600	124.8	115.7	76.4	7/13
Central Branch	-25.0	53.6	0.0	900	70.2	645	78.4	7/13
South Branch	-24.0	49.0	0.2	2250	175.5	165.6	65.3	6/13
Flare Inlet Pipe								
Port A	+4.0							N/A
Port B	+4.0	52.3	0.0	2250	416.25	402.7	91.2	Full
Port C	+2.5							N/A

Notes:

(1) Percent CH_4 (methane).
(2) Gas velocity is converted to gas flow by multiplying fpm x 0.185 @ 6-inch HDPE and fpm x 0.078 @ 4-inch PVC.
(3) Flows have been converted to standard conditions of 70°F and 406.9 inches water.
NA Not applicable.

TABLE 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION
Date: JUNE 30, 1995

Well	LEACHATE HEAD [2] (ft)			Current Pump Hours		Previous Pump Hours		Elapsed Pump Hours	
	Gas Well Depth	Depth to Leachate	Leachate Head	Total Hours	Time[3]	Total Hours	Time[3]	Total Hours	Pump Hours
GW-1	51.7	51.3	0.4						
GW-2	53.3	53.0	0.3						
GW-3	57	55.2	1.8						
GW-4[1]	65	54.4	10.6	3983.2	9:07	3395.6	12:20	~1032	587.6
GW-5[1]	70	53.6	16.4	7390.9	9:03	6555.7	12:25	~1032	835.2
GW-6	36	34.6	1.4						
GW-7[1]	60	60	0	1448.9	8:37	1421.7	11:35	~1032	27.2
GW-8[1]	69	46.5	22.5	16907.1	8:39	16890.3	11:40	~1032	16.8
GW-9[1]	66	60.2	5.8	131.1	8:57	95.9	11:45	~1032	35.2
GW-10	70	63.2	6.8						
GW-11[1]	65	63.8	1.2	3885.4	8:53	3133.7	11:55	~1032	751.7
GW-12[1]	81	81	0	6309.0	8:48	6276.7	12:00	~1032	32.3
GW-13[1]	69	57.8	11.2	5081.6	8:45	5081.6	12:10	~1032	0.0

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Gas wells retro-fitted with threaded ports on risers October 1992. Leachate levels measured from retro-fitted port on gas well riser. Gas well depths obtained from Construction Observation Report, November, 1990 and Operation and Maintenance Manual, November 1991.
(3) Time of hour meter reading was recorded on MAY 18, 1995 and JUNE 30, 1995
Shaded areas do not have reportable information.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: June 1995

Alarm Dates	Alarm Cause	Solution (hours flare not operational)
06/03/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 6/04/95 (18.5 HRS)
06/06/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 6/07/95 (40.5 HRS)
06/07/95	GENERAL ALARM, FLAME FAILURE POSSIBLY DUE TO THUNDERSTORMS IN THE AREA.	REPLACE BLOWER SEALS RE-START BLOWER/FLARE 6/08/95 (18.5 HRS)
06/12/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 6/12/95 (10.75 HRS)
06/14/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 6/14/95 (8.0 HRS)
06/17/95	FLAME FAILURE. CAUSE NOT DETERMINED.	TIGHTEN BLOWER BELTS RE-START BLOWER/FLARE 6/17/95 (10.25 HRS)
06/19/95	GENERAL ALARM. LEACHATE TANK OVERFILL.	FOLLOWING TANK PUMP-OUT RE-START BLOWER/FLARE 6/20/95 (18.0 HRS)
06/21/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 6/21/95 (1.0 HRS)
06/22/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 6/22/95 (7.75 HRS)
06/23/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 6/23/95 (8.75 HRS)
06/23/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 6/27/95 (87.0 HRS)
06/28/95	GENERAL ALARM, FLAME FAILURE POSSIBLE DUE TO THUNDERSTORMS IN THE AREA.	RE-START BLOWER/FLARE 6/29/95 (18.0 HRS)

247 hr down in 624 hr (26 d) = 40% down time

TABLE 6

REFUSE HIDEAWAY LANDFILL
SUMMARY OF WEEKLY MONITORING INFORMATION
Date: JUNE 1995

	Date: JUNE 9, 1995				Date: JUNE 14, 1995				Date: JUNE 21, 1995				Date: JUNE 27, 1995				Date:			
Description	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)
Branch Monitoring Station																				
North Branch	5/13	-23.0	53.2	0.0	5/13	-18.0	52.8	0.0	5/13	-23.0	45.2	0.0	7/13	-24.0	56.2	0.0				
Central Branch	4/13	-26.0	58.0	0.0	5/13	-21.0	55.2	0.0	5/13	-25.0	49.7	0.0	7/13	-25.0	53.6	0.0				
South Branch	6/13	-25.0	57.7	0.0	6/13	-21.0	54.5	0.0	6/13	-23.0	46.9	0.0	6/13	-24.0	49.0	0.2				
Blower Inlet Pipe																				
Inlet Port A		-28.5	56.0	0.0		-25.0	53.6	0.0		-26.0	47.1	0.0		-27.0	52.7	0.0				
Inlet Port B		-28.5				-26.0				-27.0				-27.0						
Outlet Port A		+4.5				+7.5				+6.5				+6.0						
Flare Inlet Pipe																				
Sample Port A		+3.0				+5.0				+4.5				+4.0						
Sample Port B		+3.0	56.1	0.0		+5.0	53.3	0.0		+4.5	46.7	0.0		+4.0	52.3	0.0				
Sample Port C		+2.0				+3.0				+2.5				+2.5						
Flare Temperature (°F)	1500°				1500				1500				1500							
Flare Flow (cfm/scfm)	407/403				462/459				185/178				416/402							

Notes:

(1) Percent CH_4 (methane).
NA Not Available or Not Applicable.
Shaded areas do not have repcrtable information.

Refuse\forms1.bjh

TERRA
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ENVIRONMENTAL REMEDIATION
MUNICIPAL & UTILITY CONSTRUCTION
SPECIALTY EARTHWORK

August 29, 1995

Wisconsin Department of
Natural Resources
Environmental Response and
Repair Section
Bureau of Solid and Hazardous
Waste Management
101 South Webster Street,
GEF II, SE/3
Madison, Wisconsin 53707

Attn: Ms. Theresa Evanson

Re: Operation and Maintenance
Summary - July 1995
Landfill Gas and Leachate
Extraction System
Refuse Hideaway Landfill -
Middleton, Wisconsin
Terra Job # 468

Dear Ms. Evanson:

This letter summarizes operation and maintenance (O&M) activities performed by Terra Engineering & Construction Corporation (Terra), during the month of July 1995 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by Al's Modern Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
July 6, 1995	4,536 Gallons
July 11, 1995	5,047 Gallons
July 18, 1995	4,800 Gallons
Total	14,383 Gallons

(1) Based on liquid level measurements at the collection tank.

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MADISON, WI 53704-6795
608/221-3501 PHONE
608/221-4075 FAX

WEEKLY/MONTHLY MONITORING SCHEDULE

Weekly/Monthly monitoring of the landfill gas and leachate extraction system was performed on the following dates:

July 05, 1995	Weekly
July 17, 1995	Weekly
July 24, 1995	Weekly
July 28, 1995	Weekly
August 1, 1995	Quarterly Leachate Sample
August 4, 1995	Weekly/Monthly Monitoring

Other Work Performed

On July 11, 1995, the pump from Gas Well GW-8 was removed for inspection. As stated in the June monthly summary, an electrical short was suspected. Inspection of the pump showed the pump and motor to be in working order, however a break in the pigtail lead wire for the pump motor was discovered. A replacement pigtail was purchased. The new pigtail wire coating is the same type that was on the pump prior to the short circuit.

There were twelve (12) Alarm conditions alerted during the month of July. (See Table 5). Although the cause for most of the alarms was not determined, trouble shooting the problem continued throughout the month of July.

As stated in the June Monthly Summary, a problem with the Honeywell Temperature controller is suspected.

Information with regards to the existing configuration of the UDC3000 Honeywell controller was sent to Mr. John Gwinn of Linklater Corporation in Fountain Valley, California. Upon Reviewing the configuration (a copy is attached) and copies of the Temperature recorder tape, Mr. Gwinn suggested changing the proportional band rate 1 and proportional band rate 2 (PROP BD and PROPBD2 respectively) from the existing 20.0% to 15.0 %. This would "tighten" the operating range of the flare ie. a smaller deflection from the target temperature (1500°F) would activate the actionator motors controlling the dampers. Subsequent changes were made to the PROP BD and PROP BD2 rates if no improvements were observed. Typically the changes were made at the time of Blower Flare re-starts.

The initial change from 20.0 to 15.0 occurred during weekly monitoring on July 24, 1995. Subsequent changes are noted on table 5.

The effect of these changes in the PROPBD has yet to be determined. Mr. Gwinn has been supplied with further temperature record data but has not yet determined if the controller is faulty. We will keep you updated on this.

In order to determine if an electrical problem at the site may be causing shut downs, the power to the individual leachate extraction pumps was turned off. The power to each pump was then restored as the shut downs continued with the power to the pumps off. We are currently in the process of getting an estimated cost for an electrician to inspect the integrity of the existing electrical system. We will keep you updated on this prior to having the inspection performed.

Capital Petroleum inspected the Red Jacket control panel at the leachate tank and has informed us that the unit had to be taken in for repairs. We will keep you updated on this.

On August 1, 1995, the Quarterly leachate sample was obtained. The samples were sent to Mid-State Laboratories in Baraboo, Wisconsin for analysis. Results are pending and will be forwarded to the WDNR and Madison Metropolitan Sewerage District upon receipt.

General Observations

Flow adjustments were made to five (5) gas wells during the monthly monitoring (see table 1). Adjustments were made to increase methane flow and decrease oxygen flow to the flare.

Methane contents at the flare have been observed to be decreasing slightly. Mr. John Gwinn of Linklater has stated that if the methane content decreases to less then 40% by volume consistently at the flare, then an adjustment to the shutters in the burner at the flare may become necessary.

Gas probe readings indicated that methane was present in four (4) gas probes. (See Table 2) Gas Probes G-1s and G-1d contained 24.4% and 15.4% methane by volume respectively. These probes are located east of the leachate collection tank. Gas Probes GP-11s and GP-11d contained 17.4% and 23.5% methane by volume respectively.

The landfill cap appears to be in good condition with the exception of localized stressed vegetation in the area of gas well GW-5, which has been previously documented.

If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

FOR
Kirk Solberg,

REFUSE\july95.rpt

Environmental Geologist

UDC 3000 Configuration Record

Group Prompt	Function Prompt	Value or Selection
TUNING	PROP BD	20.0
	or	→ to 5.0
	GAIN	
	RATE MIN	0.40
	RSET MIN	
	or	
	RSET RPM	1.00
	or	
	MAN RSET	
	PROP BD2	20.0 → to 5.0
	or	
	GAIN 2	
	RATE2MIN	0.40
	RSET2MIN	
	or	
	RSET2RPM	1.00
	CYC SEC	4
	CYC2SEC	4
	LOCKOUT	MAX
SP RAMP	SP RAMP	DISABL
	TIME MIN	
	FINAL SP	
AUTOTUNE	ATENABL	
	OUT STEP	
	AT ERROR	
ALGORITHM	CONT ALG	PIDA
	INPUT 2	
	OUT ALG	TIME D
	4-20 RNG	
INPUT 1	DECIMAL	XXXX
	UNITS	DEG F
	IN 1 TYPE	K TC H
	XMITTER	
	IN 1 HI	2400
	IN 1 LO	0
	BIAS IN 1	0.0
	FILTER 1	0
	BURNOUT	UP
	EMISSIV	
	PWR FREQ	60 HZ
INPUT 2	XMITTER	
	IN 2 HI	
	IN 2 LO	
	FILTER 2	

Group Prompt	Function Prompt	Value or Selection
CONTROL	PID SETS	
	SW VALUE	
	SP SOURCE	LOCAL
	RATIO	1.00
	BIAS	0.0
	SP TRACK	
	POWER UP	A LSP
	SP HIL IM	1600
	SP LOL IM	1400
	ACTION	REVRSE
	OUT HIL IM	1000
	OUT LOL IM	0.0
	DROPOFF	0.0
	DEADBAND	0.5
	OUT HYST	
	FAILSAFE	0.0
	PB or GAIN	PB PC
	MIN or RPM	RPM
OPTIONS	AUX OUT	DISABL
	4MA VAL	
	20MA VAL	
	REM SW	NONE
COM	ComSTATE	DISABL
	ComADDR	
	SHED TIME	
	PARITY*	
	BAUD*	
	LOOPBACK**	
	SHEDMODE	
	SHED SP	
	UNITS	
ALARMS	A1S1 VAL	1390
	A1S2 VAL	F
	A2S1 VAL	
	A2S2 VAL	
	A1S1 TYPE	PV
	A1S2 TYPE	NONE
	A2S1 TYPE	NONE
	A2S2 TYPE	NONE
	A1S1 H L	LO
	A1S2 H L	
	A2S1 H L	
	A2S2 H L	
	AL HYST	0.5

*Not used in DMCS
**Not used in RS422

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: AUGUST 4, 1995
Temperature: 80 °F at 12⁰⁰
Barometric pressure: 29.25 inches Hg
Monitored by: K. Soliber J
Gas Detector Model No./Serial No.: GEM500 / 6M190
Date Gas Detector last calibrated: Factory calibrated: MAY '94 (3)
Velometer Model No./Serial No.: Alnor 6000AP 52697
Date Velometer last calibrated: Factory calibrated:

WELL (1)	PH (IN W.C.)	PW (IN W.C.)	TEMP. (°F)	METHANE (%CH4)	OXYGEN (%O2)	CARBON DIOXIDE (%CO2)	BALANCE %	GAS VELOCITY (FPM)	(2) TOTAL FLOW (CFM)	METHANE FLOW (CFM)	ADJUSTED VELOCITY (FPM)
GW-1	-21	0	91.6	15.7	15.5	11.7	56.6	0	0	0	Closed
GW-2	-21	0	81.3	2.0	21.5	1.1	75.5	0	0	0	Closed
GW-3	-21	-4	72.0	34.7	2.6	37.9	24.4	1000	45	15.6	1000 → 500
GW-4(1)	-22	-10	80.0	37.1	1.7	42.2	19.4	800	36	13.4	NC
GW-5(1)	-21	-12	85.6	42.2	4.6	42.5	11.2	775	34.9	14.7	NC
GW-6	-25	-4	85.4	46.4	0.9	43.6	9.3	650	29.3	13.6	NC
GW-7(1)	-25	-25	83.4	50.9	0.7	42.6	4.3	1050	47.3	24.1	NC
GW-8(1)	Under		repair					0	0	0	Under REPAIR
GW-9(1)	-25	-22	88.1	52.7	0.9	46.0	0.0	200	9	4.7	200 → 400
GW-10	-22	-22	106.3	38.1	0.9	44.0	17.7	600	27	10.3	600 → 500
GW-11(1)	-23	-23	89.0	56.7	0.8	42.7	0.0	300	13.5	7.7	300 → 400
GW-12(1)	-23	-11	110.1	35.7	0.8	42.9	21.5	1900	85.5	30.5	1900 → 1000
GW-13	-22	-22	83.1	54.3	0.9	45.1	0.0	950	42.8	23.2	NC

Notes:
(1) Wells with leachate extraction pump and controls.
(2) Gas flow (cfm) is calculated by multiplying the gas velocity (fpm) by 0.045 ft^2 for 3-inch diameter PVC pipe.
(3) Calibration checked: 7/28/95
99% CH_4 read ~~% CH_4~~
2.5% CH_4 read ~~% CH_4~~
15% CO_2 read ~~% CO_2~~

15% CH_4 → 14.4% 50% CH_4 → 46.6 4% O_2 → 4.5%
15% CO_2 → 13.8% 35% CO_2 → 33.6 96% N_2 → 95.5%
70% N_2 → 71.1% 15% N_2 → 18.9

NA Not Available or Not Applicable
NC No Change
PH Header Pressure
PW Well Pressure

TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: AUGUST 4, 1995
Temperature: 83° F at 12^00
Barometric pressure: 29.89 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: GEM-500 GM 190
Date Gas Detector last calibrated: Factory calibrated: MAY '94 (4)

due to flare operating only 50% of time.

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4 (1) (% LEL)	O_2 (%)
G-1S	0.0	24.4	>100	1.1
G-1D	0.0	15.4	>100	6.3
G-6	0.0	0.0	0	10.2
G-8	0.0	0.0	0	22.5
G-9	0.0	0.0	0	22.7
G-10	0.0	0.0	0	22.6
GP-11S	0.0	17.4	>100	1.0
GP-11D	0.0	23.5	>100	0.8
GPW-1S	0.0	0.0	0	21.6
GPW-1M	0.0	0.0	0	22.0
GPW-1D	0.0	0.0	0	22.3
Speedway Building (2)	NA	0.0	0	22.5
Speedway Building (3)	NA	0.0	0	23.1

Notes:

(1) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).
(2) Readings obtained from the northeast corner of the interior of the scale house.
(3) Readings obtained from interior of Mechanic's shop.
(4) See calibration data on Table 1.
NA Not Available or Not Applicable.

TABLE 3

REFUSE HIDEAWAY LANDFILL
MONTHLY BRANCH AND FLARE MONITORING INFORMATION
Date: AUGUST 4, 1995

	Pressure (in. W.C.)	CH_4[1] (%)	O_2 (%)	Gas Velocity (fpm)	Flow[2] (cfm)	Flow[3] (scfm)	Gas Temp	Valve Setting (fraction open)
Branch Monitoring Station								
North Branch	-22.0	41.0	0.7	1900	148.2	136.9	83.3	7/13
Central Branch	-25.0	50.4	0.9	700	54.6	50.1	82.7	7/13
South Branch	-23.5	40.7	2.2	2400	187.2	175.3	74.3	7/13
Flare Inlet Pipe								
Port A	+4.0							N/A
Port B	+4.0	41.1	1.6	2450	453.25	434.5	986	full
Port C	+2.5							N/A

Notes:

(1) Percent CH_4 (methane).
(2) Gas velocity is converted to gas flow by multiplying fpm x 0.185 @ 6-inch HDPE and fpm x 0.078 @ 4-inch PVC.
(3) Flows have been converted to standard conditions of 70°F and 406.9 inches water.
NA Not applicable.

TABLE 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION
Date: July 1995

Well	LEACHATE HEAD [2] (ft)			Current Pump Hours		Previous Pump Hours		Elapsed Pump Hours	
	Gas Well Depth	Depth to Leachate	Leachate Head	Total Hours	Time[3]	Total Hours	Time[3]	Total Hours	Pump * Hours
GW-1	51.7	51.7	0						
GW-2	53.3	53.3	0						
GW-3	57	56.0	1.0						
GW-4[1]	65	57.4	7.6	4469.0	9:05	3983.2	9:07	~840	485.8
GW-5[1]	70	53.4	16.6	7792.5	9:00	7390.9	9:03	~840	401.6
GW-6	36	34.9	1.1						
GW-7[1]	60	49.1	10.9	1865.6	8:30	1448.9	8:37	~840	416.7
GW-8[1]	69	46.4	22.6	16907.1	8:35	16907.1	8:39	Pump under repair	
GW-9[1]	66	58.7	7.3	139.0	8:55	131.1	8:57	~840	7.9
GW-10	70	64.2	5.8						
GW-11[1]	65	55.3	9.7	4290.6	8:50	3885.4	8:53	~840	405.2
GW-12[1]	81	81	0	6377.8	8:45	6309.0	8:48	~840	68.8
GW-13[1]	69	58.9	10.1	5081.6	8:40	5081.6	8:45	~840	0

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Gas wells retro-fitted with threaded ports on risers October 1992. Leachate levels measured from retro-fitted port on gas well riser. Gas well depths obtained from Construction Observation Report, November, 1990 and Operation and Maintenance Manual, November 1991.
(3) Time of hour meter reading was recorded on June 30, 1995 and Aug 4, 1995.
Shaded areas do not have reportable information.

* Power to the pumps was manually shut down during this reporting period.

All Pumps were shut down for a period of time while flare testing was done
GW-13 - fuse may be blown

Refuse\forms1.bjh

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: July 1995

Alarm Dates	Alarm Cause	Solution (hours flare not operational)
07/02/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 7/05/95 (79.5 HRS)
07/07/95	GENERAL ALARM. CAUSE NOT DETERMINED.	FLARE REMAINED OPERATIONAL 7/09/95 (0.0 HRS)
07/10/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 7/10/95 (7.0 HRS)
07/10/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 7/11/95 (10.0 HRS)
07/11/95	FLAME FAILURE. CAUSE NOT DETERMINED. POSSIBLY DUE TO THUNDERSTORMS.	RE-START BLOWER/FLARE 7/13/95 (40.0 HRS)
07/15/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 7/16/95 (35.0 HRS)
07/18/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 7/20/95 (58.0 HRS)
07/22/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 7/23/95 (19.75 HRS)
07/24/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE ADJUSTED PROPBD FROM 15 TO 10 7/25/95 (10.75 HRS)
07/26/95	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 7/27/95 (16.0 HRS)
07/27/95	GENERAL ALARM, FLAME FAILURE LIKELY DUE TO THUNDERSTORMS IN THE AREA.	RE-START BLOWER/FLARE 7/28/95 (22.0 HRS)
07/28/95	GENERAL ALARM, FLAME FAILURE CAUSED NOT DETERMINED.	RE-START BLOWER/FLARE ADJUSTED PROPBD FROM 10 TO 25 8/01/95 (57.5 HRS)

Inoperable 355.5 hrs
Total Hrs = 744
Flare down = 48% of time

TABLE 6

REFUSE HIDEAWAY LANDFILL
SUMMARY OF WEEKLY MONITORING INFORMATION
Date: July 1995

Description	Date: July 5, 1995				Date: July 17, 1995				Date: July 24, 1995				Date: July 28, 1995				Date: August 4, 1995			
	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)
Branch Monitoring Station																				
North Branch	7/13	-23.0	41.1	0.0	7/13	-23.5	42.5	0.0	7/13	-24.0	41.8	0.0	7/13	-20.0	56.3	0.0	7/13	-22.0	41.0	0.7
Central Branch	8/13	-24.0	49.9	0.0	8/13	-26.0	47.6	0.0	8/13	-26.0	49.7	0.0	7/13	-22.0	57.3	0.0	7/13	-25.0	50.4	0.9
South Branch	8/13	-23.0	43.6	0.0	8/13	-24.0	41.2	0.5	7/13	-25.0	39.7	0.6	7/13	-21.0	55.3	0.6	7/13	-23.5	40.7	0.2
Blower Inlet Pipe																				
Inlet Port A		-26.0	44.5	0.0		-27.0	43.3	6.0		-27.0	42.9	0.6		-24.0	56.1	0.6		-27.0	42.4	1.4
Inlet Port B		-27.0				-28.0				-28.0				-25.0				-28.0		
Outlet Port A		+ 6.0				+5.5				+5.5				+8.0				+6.5		
Flare Inlet Pipe																				
Sample Port A		+ 4.0				+4.0				+3.5				+5.0				+4.0		
Sample Port B		+ 4.0	44.7	0.0		+3.5	43.0	0.0		+3.5	42.6	0.0		+5.0	56.4	0.6		+4.0	41.1	1.6
Sample Port C		+ 2.5				+2.0				+2.5				+3.0				+2.5		
Flare Temperature (°F)	1500°				1518°				1510				1517				1500			
Flare Flow (cfm/scfm)	462.5/449.3				462.5/441.9				370/355.9				481/465.7				453/434.5			

Notes:

(1) Percent CH_4 (methane).
NA Not Available or Not Applicable.
Shaded areas do not have reportable information.

Refuse\forms1.bjh

TERRA
▲ ENGINEERING & CONSTRUCTION CORPORATION ▲
ENVIRONMENTAL REMEDIATION
MUNICIPAL & UTILITY CONSTRUCTION
SPECIALTY EARTHWORK

September 25, 1995

Wisconsin Department of
Natural Resources
Environmental Response and
Repair Section
Bureau of Solid and Hazardous
Waste Management
101 South Webster Street,
GEF II, SE/3
Madison, Wisconsin 53707

Attn: Ms. Theresa Evanson

Re: Operation and Maintenance
Summary - August 1995
Landfill Gas and Leachate
Extraction System
Refuse Hideaway Landfill -
Middleton, Wisconsin
Terra Job # 468

Dear Ms. Evanson:

This letter summarizes operation and maintenance (O&M) activities performed by Terra Engineering & Construction Corporation (Terra), during the month of August 1995 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by Al's Modern Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
August 2, 1995	4,700 Gallons
August 11, 1995	4,679 Gallons
August 25, 1995	5,000 Gallons
August 28, 1995	4,287 Gallons
Total	18,766 Gallons

(1) Based on liquid level measurements at the collection tank.

2201 VONDRON ROAD
MADISON, WI 53704-6795
608/221-3501 PHONE
608/221-4075 FAX

WEEKLY/MONTHLY MONITORING SCHEDULE

Weekly/Monthly monitoring of the landfill gas and leachate extraction system was performed on the following dates:

August 10, 1995	Weekly
August 18, 1995	Weekly
August 25, 1995	Weekly
September 1, 1995	Weekly, Monthly Gas Well and Leachate Head Monitoring
September 5, 1995	Monthly Gas Probe Monitoring

Other Work Performed

There were fifteen (15) alarm conditions alerted during the month of August, 1995. Two (2) of the alarms were attributed to thunderstorms causing a power interruption leading to a flame failure. The remaining alarms were due to flame failures with no cause determined. We are currently pursuing possible electrical problems and have contacted an electrician for a price to perform an inspection of the existing electrical system. We have also been in contact with Mr. John Gwinn of Linklater Corporation regarding the replacment of the Honeywell UDC3000 controller; however we would like to assess the integrity of the electrical system prior to installing any new components into the control panel. We will keep you updated on these issues.

The Red Jacket leachate control panel has been re-installed following an inspection by Capitol Petroleum who indicated to us that the panel was not faulty. However upon re-installation of the circuit board, an alarm condition was alerted. The cause of this alarm could be an electrical short between the probes and the control panel or moisture in the interstitial space of the double walled tank. In order to maintain power to the pumps, the power to the control panel has been turned off. The proposed electric inspection will include a check of the leachate tank control pane circuitry.

There appear to be problems with the electrical supply to some of the leachate extraction pumps. There is no power to the pump at Gas well GW-11, the hour meter at GW-9 indicated zero run time and an electrical short has burned out the Franklin starter at GW-13. The fuses were changed at gas wells GW-4, 5, and 12. As mentioned above, we are currently in contact with People Construction and planning an inspection of the electrical system.

On August 21, 1995, the control valves to the North, Central and South branches were closed from 7/13, 8/13 and 8/13 respectively to 5/13. This was done in an effort to decrease the flow to the flare as oxygen contents had been observed to be between 0.5% and 0.7%. The adjustment did not improve the performance of the flare as subsequent shut downs occurred. The valves were returned to their previous positions on August 25, 1995.

Methane was observed in gas probes G-1s, G-1d, GP-11s and GP-11d at 15.4%, 8.5%, 20.5% and 28.3% respectively. Methane has been observed in GP-11s and GP-11d on previous occasions. The methane observed in GP-1s and GP-1d is a first time occurrence. The Wisconsin Department of Natural Resources (WDNR) was notified of the methane readings in the gas probes. Follow-up readings of GP-1s & -1d on September 8, 1995, showed Methane contents to be 21.0% and 0.3% respectively.

The quarterly leachate analytical results were received (Leachate sampled August 1, 1995) and a copy of the results were forwarded to Mr. Paul Nehm of the Madison Metropolitan Sewerage District and to the WDNR.

General Observations

Discussions with Mr. John Gwinn have lead to a possible solution to the continued flare shut downs. Mr. Gwinn believes that power spikes or "Dirty Electricity" may have caused the Honeywell UDC 3000 controller to loose memory. To remediate this situation a replacement UDC 3000 was ordered on September 22, 1995. Mr. Gwinn will also include four (4) Metal Oxide Variable Resistors (MOV'S) which should prevent "dirty electricity" from affecting the replacement controller. Installation of the new controller will occur upon receipt of the unit.

People Construction will be contacted following the controller installation for an electrical system inspection, which should identify the cause of the power loss to some of the leachate extraction pumps. We will keep you updated on this.

If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

Kirk Solberg,
Environmental Geologist

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: August 1995

Alarm Dates	Alarm Cause	Solution (hours flare not operational)
08/04/95	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8/04/95 CHANGE PROP BD 25 TO 5 (3 HRS)
08/04/95	FLAME FAILURE, CAUSE NOT DETERMINED.	RESTART BLOWER/FLARE 08/05/95 CHANGE PROP BD FROM 5 TO 25 (14.5 HRS)
08/06/95	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8/07/95 CHANGE PROP BD FROM 25 TO 20 (34 HRS)
08/07/95	FLAME FAILURE, CAUSE NOT DETERMINED. POSSIBLY DUE TO THUNDERSTORMS IN AREA.	RE-START BLOWER/FLARE 8/08/95 (12 HRS)
08/08/95	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8/09/95 (10.5 HRS)
08/09/95	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8/10/95 (11 HRS)
08/12/95	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8/14/95 (50 HRS)
08/14/95	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8/16/95 (33.75 HRS) CHANGE PROP BD FROM 20 TO 25
08/16/95	GENERAL ALARM, FLAME FAILURE LIKELY DUE TO THUNDERSTORMS IN THE AREA	RE-START BLOWER/FLARE 8/17/95 (14.75 HRS)
08/18/95	GENERAL ALARM, FLAME FAILURE CAUSE NOT DETERMINED	RE-START BLOWER/FLARE 8/18/95 (3.5 HRS)
08/19/95	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8/21/95 (56 HRS)
08/21/95	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8/22/95 (12 HRS)
08/24/95	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8/24/95 (9 HRS)
08/25/95	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8/28/95 (64.5 HRS)
08/28/95	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 9/01/95 (84.5 HRS)

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: SEPTEMBER 1, 1995
Temperature: 76 °F at 2:00 PM
Barometric pressure: 30.11 inches Hg
Monitored by: J. Falbo
Gas Detector Model No./Serial No.: GM500 / GM190
Date Gas Detector last calibrated: Factory calibrated: MAY '94 (3)
Velometer Model No./Serial No.: Alnor 6000AP / 52697
Date Velometer last calibrated: Factory calibrated: 7/98

WELL (1)	PH (IN W.C.)	PW (IN W.C.)	TEMP. (°F)	METHANE (%CH4)	OXYGEN (%O2)	CARBON DIOXIDE (%CO2)	BALANCE %	GAS VELOCITY (FPM)	(2) TOTAL FLOW (CFM)	METHANE FLOW (CFM)	ADJUSTED VELOCITY (FPM)
GW-1	-21.0	0	75.2	15.7	15.7	11.4	57.5	0	0	0	closed
GW-2	-21.0	0	75.2	4.3	20.5	8.5	67.1	0	0	0	closed
GW-3	-21.0	-4.0	75.4	38.6	1.8	39.6	18.4	600	27.0	10.4	NC
GW-4(1)	-22.0	-10.0	81.3	41.0	1.2	42.3	13.7	800	36.0	14.8	NC
GW-5(1)	-21.0	-12.0	85.7	40.1	3.8	41.7	14.4	800	36.0	14.4	NC
GW-6	-25.0	-4.0	88.4	43.2	0.6	42.4	14.3	700	31.5	13.6	NC
GW-7(1)	-25.0	-25.0	86.4	46.3	0.5	43.5	9.3	1150	51.75	24.0	NC
GW-8(1)	←	—	Under	repair	—	—	—	—	—	→	
GW-9(1)	-25.0	-25.0	86.4	51.7	0.6	47.7	0.4	300	13.5	7.0	NC
GW-10	-22.0	-22.0	104.3	37.6	0.6	40.3	20.1	550	24.75	9.3	NC
GW-11(1)	-23.0	-23.0	93.4	55.4	0.6	40.1	4.7	450	20.25	11.2	NC
GW-12(1)	-23.0	-5.0	108.8	57.1	0.6	45.1	0.0	800	36.0	20.6	NC
GW-13	-22.0	-22.0	87.4	52.7	0.6	43.5	3.5	1050	47.25	24.9	NC

Notes:
(1) Wells with leachate extraction pump and controls.
(2) Gas flow (cfm) is calculated by multiplying the gas velocity (fpm) by 0.045 ft^2 for 3-inch diameter PVC pipe.
(3) Calibration checked: 9-1-95
99% CH_4 read ____ % CH_4
2.5% CH_4 read ____ % CH_4
15% CO_2 read ____ % CO_2

50% CH_4 → 47.0%
35% CO_2 → 37.3%
15% BAL → 15.1%

4.0% O_2 → 4.8
96.0% BAL → 95.2

15% CO_2 → 15.4%
15% CH_4 → 14.1%
70% BAL → 69.5%

NA Not Available or Not Applicable
NC No Change
PH Header Pressure
PW Well Pressure

REFUSE\kaj03.tab

TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: 9-5-95
Temperature: 81° F at 1100
Barometric pressure: 30.22 inches Hg
Monitored by: J. Falbo
Gas Detector Model No./Serial No.: GEM 500 / GM 190
Date Gas Detector last calibrated: Factory calibrated: MAY '94 (4)

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4 (1) (% LEL)	O_2 (%)
G-1S	0.0	15.4	>100	7.3
G-1D	0.0	8.5	>100	10.5
G-6	0.0	0.0	0	15.7
G-8	0.0	0.0	0	22.7
G-9	0.0	0.0	0	22.3
G-10	0.0	0.0	0	22.5
GP-11S	0.0	20.5	>100	0.6
GP-11D	0.0	28.3	>100	1.5
GPW-1S	0.0	0.0	0	22.0
GPW-1M	0.0	0.0	0	22.3
GPW-1D	0.0	0.0	0	20.3
Speedway Building (2)	NA	0.0	0	22.5
Speedway Building (3)	NA	0.0	0	22.6

Notes:

(1) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).
(2) Readings obtained from the northeast corner of the interior of the scale house.
(3) Readings obtained from interior of Mechanic's shop.
(4) See calibration data on Table 1.
NA Not Available or Not Applicable.

TABLE 3

REFUSE HIDEAWAY LANDFILL
MONTHLY BRANCH AND FLARE MONITORING INFORMATION
Date: SEPTEMBER 1, 1995

	Pressure (in. W.C.)	CH_4[1] (%)	O_2 (%)	Gas Velocity (fpm)	Flow[2] (cfm)	Flow[3] (scfm)	Gas Temp	Valve Setting (fraction open)
Branch Monitoring Station								
North Branch	-26	55.9	0.6	1350	105.3	97.0	82.4	7/13
Central Branch	-25	56.1	0.7	850	66.3	61.1	81.3	7/13
South Branch	-21	51.2	1.0	2050	159.9	150.8	76.4	7/13
Flare Inlet Pipe								
Port A	+3.5							N/A
Port B	+3.0	55.4	0.6	2250	416.25	416.9	76.4	full
Port C	+2.0							N/A

Notes:

(1) Percent CH_4 (methane).
(2) Gas velocity is converted to gas flow by multiplying fpm x 0.185 @ 6-inch HDPE and fpm x 0.078 @ 4-inch PVC.
(3) Flows have been converted to standard conditions of 70°F and 406.9 inches water.
NA Not applicable.

TABLE 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION
Date: AUGUST 1995

Well	LEACHATE HEAD [2] (ft)			Current Pump Hours		Previous Pump Hours		Elapsed Pump Hours	
	Gas Well Depth	Depth to Leachate	Leachate Head	Total Hours	Time[3]	Total Hours	Time[3]	Total Hours	Pump Hours
GW-1	51.7	51.7	0.0						
GW-2	53.3	53.3	0.0						
GW-3	57	57.0	0.0						
GW-4[1]	65	57.5	7.5	4985.4	9:44	4469.0	9:05	696.5	516.4
GW-5[1]	70	56.7	13.3	8313.4	9:39	7792.5	9:00	696.5	520.9
GW-6	36	35.8	0.2						
GW-7[1]	60	60	0.0	2534.0	9:12	1865.6	8:30	696.75	668.4
GW-8[1]	69	69	0.0	16907.2	9:14	16907.1	8:35	696.5	0.1
GW-9[1]	66	49.6	16.4	139.0	9:35	139.0	8:55	696.5	0.0
GW-10	70	63.4	6.6						
GW-11[1]	65	52.9	12.1	4290.6	9:33	4290.6	8:50	696.75	0.0
GW-12[1]	81	NA	NA	6432.0	9:29	6377.8	8:45	696.75	54.2
GW-13[1]	69	59.2	9.8	5081.6	9:25	5081.6	8:40	696.5	0.0

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Gas wells retro-fitted with threaded ports on risers October 1992. Leachate levels measured from retro-fitted port on gas well riser. Gas well depths obtained from Construction Observation Report, November, 1990 and Operation and Maintenance Manual, November 1991.
(3) Time of hour meter reading was recorded on AUGUST 4, 1995 and SEPTEMBER 1, 1995.
Shaded areas do not have reportable information.

TABLE 6

REFUSE HIDEAWAY LANDFILL
SUMMARY OF WEEKLY MONITORING INFORMATION
Date: AUGUST, 1995

Description	Date: AUGUST 10, 1995				Date: AUGUST 18, 1995				Date: AUGUST 25, 1995				Date: SEPTEMBER 1, 1995				Date:			
	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)
Branch Monitoring Station																				
North Branch	7/13	-22.0	54.3	0.6	7/13	-20.0	55.5	0.5	5/13	-12.0	55.3	0.6	7/13	-26.0	55.9	0.6				
Central Branch	8/13	-23.0	55.1	0.5	8/13	-22.0	55.1	0.7	5/13	-18.0	55.5	0.6	7/13	-25.0	56.1	0.7				
South Branch	8/13	-22.0	50.8	0.6	8/13	-22.0	49.9	0.6	5/13	-14.0	49.3	0.6	7/13	-21.0	51.2	1.0				
Blower Inlet Pipe																				
Inlet Port A		-25.0	51.3	0.6		-24.0	52.4	0.6		-26.0	53.1	0.6		-28.0	55.4	0.7				
Inlet Port B		-26.0				-25.0				-27.0				-29.0						
Outlet Port A		+6.0				+7.0				+5.0				+5.0						
Flare Inlet Pipe																				
Sample Port A		+4.0				+4.5				+3.5				+3.5						
Sample Port B		+2.5	NA	NA		+4.5	52.0	0.6		+3.0	52.3	0.6		+3.0	55.4	0.6				
Sample Port C		+2.5				+3.0				+2.0				+2.0						
Flare Temperature (°F)	1500°				1483→1525				1500°				1500							
Flare Flow (cfm/scfm)	370/358				409/NA				425.5/NA				416/416.9							

Notes:

(1) Percent CH_4 (methane).
NA Not Available or Not Applicable.
Shaded areas do not have reportable information.

TERRA
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ENVIRONMENTAL REMEDIATION
MUNICIPAL & UTILITY CONSTRUCTION
SPECIALTY EARTHWORK

October 17, 1995

Wisconsin Department of
Natural Resources
Environmental Response and
Repair Section
Bureau of Solid and Hazardous
Waste Management
101 South Webster Street,
GEF II, SE/3
Madison, Wisconsin 53707

Attn: Ms. Theresa Evanson

Re: Operation and Maintenance
Summary - September 1995
Landfill Gas and Leachate
Extraction System
Refuse Hideaway Landfill -
Middleton, Wisconsin
Terra Job # 468

Dear Ms. Evanson:

This letter summarizes operation and maintenance (O&M) activities performed by Terra Engineering & Construction Corporation (Terra), during the month of September 1995 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by Al's Modern Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
September 19, 1995	4,944 Gallons
September 29, 1995	4,632 Gallons
Total	9,576 Gallons

(1) Based on liquid level measurements at the collection tank.

2201 VONDRON ROAD
MADISON, WI 53704-6795
608/221-3501 PHONE
608/221-4075 FAX

WEEKLY/MONTHLY MONITORING SCHEDULE

Weekly/Monthly monitoring of the landfill gas and leachate extraction system was performed on the following dates:

September 08, 1995	Weekly
September 15, 1995	Weekly
September 22, 1995	Weekly
September 29, 1995	Weekly
October 05, 1995	Weekly, Monthly Gas Probes Monthly Leachate Monitoring *

* Monthly Monitoring of individual gas wells omitted due to decreased blower/flare run time.

Other Work Performed

There were six (6) alarm conditions alerted during the month of September. (SEE TABLE 5) All alarms were due to flame failures with the cause of the flame failure not determined but suspected to be due to a fault of the Honeywell UDC 3,000 controller. We are currently awaiting the delivery of a replacement controller unit.

The extended down time was due to the fact that following blower/flare re-starts, the flare would operate for an average of 21.25 hours prior to experiencing a flame failure, and it was not feasible to re-start the flare on a daily basis.

As a result of the shut downs and short run times, the monthly monitoring was limited to gas probe and leachate head monitoring.

On September 8, 1995, the Franklin starter for the pump in gas well GW-13 was found to have shorted out. A replacement Franklin starter has not yet been purchased as an electrical systems check should be performed prior to installing any new components to the pump control panels.

During monthly pump panel monitoring, water has been observed with-in some of the pump control panels. Weep holes were drilled into those panels to allow the water to drain.

On September 8, 1995, follow-up methane readings were obtained from gas probes GP-1s and GP-1d due to the increased methane contents observed in these probes during the August 1995 monthly monitoring.(15.4% and 8.5% respectively) The September 8th readings indicated that GP-1s and GP-1d contained 21.0% and 0.3% methane respectively. During the September monthly gas probe monitoring,

methane was observed in only two gas probes. (SEE TABLE 2). Gas probe GP-1s contained 17.9% methane and gas probe GP-11d contained 5.6% methane. The WDNR was notified of these gas probe readings.

General Observations

We are currently awaiting the delivery of the replacement controller unit from Linklater Corporation. The extended lead time for the unit is due to availability and the need for programming of the unit by Mr. John Gwinn of Linklater.

The times of the shut downs and re-starts were added to TABLE 5 this month to show the short run time of the blower and flare. Note that the shut downs occurred in the evening hours between 8:00PM and 9:30PM.

The landfill cap appears to be in good condition with the exception of the areas previously reported around gas well GW-5.

The pump at gas well GW-8 has yet to be re-installed as we do not have power to the panel. This will be addressed during the electrical system inspection following the installation of the blower/flare controller unit.

We will keep you updated on these issues.

If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

Kirk Solberg,
Environmental Geologist

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: SEPTEMBER 1995
Temperature: _____ °F at _____
Barometric pressure: _____ inches Hg
Monitored by: _____
Gas Detector Model No./Serial No.: _____
Date Gas Detector last calibrated: Factory calibrated: _____ (3)
Velometer Model No./Serial No.: _____
Date Velometer last calibrated: Factory calibrated: _____

THERE WAS NO MONTHLY MONITORING OF GAS WELLS IN THE MONTH OF SEPTEMBER DUE TO NUMEROUS SHUT DOWNS BELIEVED TO BE CAUSED BY A FAULTY COMPONENT IN THE CONTROL PANEL.

WELL (1)	PH (IN W.C.)	PW (IN W.C.)	TEMP. (°F)	METHANE (%CH4)	OXYGEN (%O2)	CARBON DIOXIDE (%CO2)	BALANCE %	GAS VELOCITY (FPM)	(2) TOTAL FLOW (CFM)	METHANE FLOW (CFM)	ADJUSTED VELOCITY (FPM)
GW-1											
GW-2											
GW-3											
GW-4(1)											
GW-5(1)											
GW-6											
GW-7(1)											
GW-8(1)											
GW-9(1)											
GW-10											
GW-11(1)											
GW-12(1)											
GW-13											

Notes:
(1) Wells with leachate extraction pump and controls.
(2) Gas flow (cfm) is calculated by multiplying the gas velocity (fpm) by 0.045 ft^2 for 3-inch diameter PVC pipe.
(3) Calibration checked: _____
99% CH_4 read _____ % CH_4
2.5% CH_4 read _____ % CH_4
15% CO_2 read _____ % CO_2

NA Not Available or Not Applicable
NC No Change
PH Header Pressure
PW Well Pressure

REFUSE\kaj03.tab

TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: October 5, 1995
Temperature: 59° F at 11:00 AM
Barometric pressure: 29.79 inches Hg
Monitored by: J. Falbo
Gas Detector Model No./Serial No.: GEM 500 / GM 190
Date Gas Detector last calibrated: Factory calibrated: MAY 95 (4)

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4 (1) (% LEL)	O_2 (%)
G-1S	0.0	17.9	>100	1.3
G-1D	0.0	0.0	0	20.7
G-6	0.0	0.0	0	21.9
G-8	0.0	0.0	0	22.0
G-9	0.0	0.0	0	20.9
G-10	+ 0.5	0.0	0	22.0
GP-11S	0.0	0.0	0	19.8
GP-11D	0.0	5.6	>100	8.2
GPW-1S	0.0	0.0	0	21.2
GPW-1M	0.0	0.0	0	19.5
GPW-1D	+ 0.5	0.0	0	19.7
Speedway Building (2)	NA	0.0	0	20.9
Speedway Building (3)	NA	0.0	0	20.9

Notes:

(1) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).
(2) Readings obtained from the northeast corner of the interior of the scale house.
(3) Readings obtained from interior of Mechanic's shop.
(4) See calibration data on Table 1.
NA Not Available or Not Applicable.

TABLE 3

REFUSE HIDEAWAY LANDFILL
MONTHLY BRANCH AND FLARE MONITORING INFORMATION
Date: SEPTEMBER 29, 1995

	Pressure (in. W.C.)	CH_4[(1)] (%)	O_2 (%)	Gas Velocity (fpm)	Flow[(2)] (cfm)	Flow[(3)] (scfm)	Gas Temp	Valve Setting (fraction open)
Branch Monitoring Station								
North Branch	-22.0	55.7	0.6	1400	109.2	103.8	68.5	7/13
Central Branch	-22.0	56.8	0.6	1200	93.6	89.2	67.2	7/13
South Branch	-21.0	55.2	0.7	2100	163.8	156.8	66.3	7/13
Flare Inlet Pipe								
Port A	+4.0							N/A
Port B	+4.0	57.0	1.1	2800	518	517.2	77.3	
Port C	+2.0							N/A

Notes:

(1) Percent CH_4 (methane).
(2) Gas velocity is converted to gas flow by multiplying fpm x 0.185 @ 6-inch HDPE and fpm x 0.078 @ 4-inch PVC.
(3) Flows have been converted to standard conditions of 70°F and 406.9 inches water.
NA Not applicable.

TABLE 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION
Date: October 5, 1995

Well	LEACHATE HEAD [2] (ft)			Current Pump Hours		Previous Pump Hours		Elapsed Pump Hours	
	Gas Well Depth	Depth to Leachate	Leachate Head	Total Hours	Time[3]	Total Hours	Time[3]	Total Hours	Pump Hours
GW-1	51.7	51.7	0.0						
GW-2	53.3	53.3	0.0						
GW-3	57	57.0	0.0						
GW-4[1]	65	57.3	7.7	5113.8	11:17	4985.4	9:44	842	128.4
GW-5[1]	70	55.4	14.6	9074.5	11:12	8313.4	9:39	842	762.1
GW-6	36	35.9	0.1						
GW-7[1]	60	60	0	3351.9	10:43	2534.0	9:12	842	817.9
GW-8[1]	69	69	0	16907.2	10:46	16907.2	9:14	842	0.0
GW-9[1]	66	47.3	18.7	139.1	11:09	139.1	9:39	842	0.0
GW-10	70	65.4	4.6						
GW-11[1]	65	54.7	10.3	4290.6	11:06	4290.6	9:33	842	0.0
GW-12[1]	81	73.4	7.6	6443.5	11:01	6432.0	9:29	842	11.5
GW-13[1]	69	62.3	6.7	5081.6	10:57	5081.6	9:25	842	0.0

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Gas wells retro-fitted with threaded ports on risers October 1992. Leachate levels measured from retro-fitted port on gas well riser. Gas well depths obtained from Construction Observation Report, November, 1990 and Operation and Maintenance Manual, November 1991.
(3) Time of hour meter reading was recorded on 9/1/95 and 10/5/95.
Shaded areas do not have reportable information.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: September 1995

Alarm Dates	Alarm Cause	Solution (hours flare not operational)
09/01/95 (9:30PM)	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 9:55AM 09/05/95 (84 HRS)
09/05/95 (8:00PM)	FLAME FAILURE, CAUSE NOT DETERMINED.	RESTART BLOWER/FLARE 9:11AM 09/08/95 CHANGE PROP BD FROM 25 TO 20 (61 HRS)
09/08/95 (9:30PM)	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 2:00PM 09/15/95 (160.5 HRS)
09/16/95 (8:30PM)	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 2:30PM 09/22/95 (138 HRS)
09/22/95 (8:30PM)	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 11:00AM 09/29/95 (159 HRS)
10/01/95 (8:00PM)	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 11:00AM 10/05/95 (87 HRS)

TABLE 6

REFUSE HIDEAWAY LANDFILL
SUMMARY OF WEEKLY MONITORING INFORMATION
Date: SEPTEMBER 1995

Description	Date: SEPTEMBER 8, 1995				Date: SEPTEMBER 15, 1995				Date: SEPTEMBER 22, 1995				Date: SEPTEMBER 29, 1995				Date: October 5, 1995			
	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)
Branch Monitoring Station																				
North Branch	7/13	-25.0	56.1	0.8	7/13	-21.0	50.4	0.4	7/13	-21.0	52.5	0.6	7/13	-22.0	55.7	0.6	7/13	-20.0	59.9	0.5
Central Branch	7/13	-27.0	56.1	0.8	7/13	-25.0	52.1	0.5	7/13	-21.0	50.5	0.6	7/13	-22.0	56.8	0.6	7/13	-24.0	58.8	0.5
South Branch	7/13	-23.0	43.4	2.5	7/13	-21.0	51.3	0.5	7/13	-20.0	51.3	0.6	7/13	-21.0	55.2	0.7	7/13	-19.0	57.0	0.5
Blower Inlet Pipe																				
Inlet Port A		-28.5	50.2	1.6		-25.0	51.5	0.5		-25.0	51.5	0.6		-27.0	55.6	0.8		-26.0	58.5	0.6
Inlet Port B		-27.5				-28.5				-27.0				-28.0				-28.0		
Outlet Port A		+4.5				+6.5				+6.0				+6.5				+7.0		
Flare Inlet Pipe																				
Sample Port A		+3.0				+4.0				+4.0				+4.0				+4.5		
Sample Port B		+3.0	50.4	1.6		+4.0	52.3	0.6		+3.5	52.5	0.6		+4.0	57.0	1.1		+4.5	58.0	0.6
Sample Port C		+1.5				+2.5				+2.5				+2.0				+2.5		
Flare Temperature (°F)	1482 °F				1500				1500				1500				1500			
Flare Flow (cfm/scfm)	407/395.4				499.5/492.8				462.5/461.8				518/517				518/517			

Notes:

(1) Percent CH_4 (methane).
NA Not Available or Not Applicable.
Shaded areas do not have reportable information.

Refuse\forms1.bjh

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ENVIRONMENTAL REMEDIATION
MUNICIPAL & UTILITY CONSTRUCTION
SPECIALTY EARTHWORK

November 9, 1995

Wisconsin Department of
Natural Resources
Environmental Response and
Repair Section
Bureau of Solid and Hazardous
Waste Management
101 South Webster Street,
GEF II, SE/3
Madison, Wisconsin 53707

Attn: Ms. Theresa Evanson

Re: Operation and Maintenance
Summary - October 1995
Landfill Gas and Leachate
Extraction System
Refuse Hideaway Landfill -
Middleton, Wisconsin
Terra Job # 468

Dear Ms. Evanson:

This letter summarizes operation and maintenance (O&M) activities performed by Terra Engineering & Construction Corporation (Terra), during the month of October 1995 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by Al's Modern Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
October 07, 1995	4,598 Gallons
October 18, 1995	4,374 Gallons
October 27, 1995	4,115 Gallons
	Total 13,087 Gallons

(1) Based on liquid level measurements at the collection tank.

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MADISON, WI 53704-6795
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608/221-4075 FAX

WEEKLY/MONTHLY MONITORING SCHEDULE

Weekly/Monthly monitoring of the landfill gas and leachate extraction system was performed on the following dates:

October 13, 1995	Weekly
October 17, 1995	Weekly
October 24, 1995	Weekly
November 03, 1995	Weekly
November 07, 1995	Weekly, Monthly Gas Wells

* Monthly leachate levels obtained 11/01/95. Monthly Gas Probe readings obtained 11/06/95.

Other Work Performed

There were eight (8) alarm conditions alerted during the month of October. (SEE TABLE 5)

As previously reported, a problem with the Honeywell UDC 3000 controller was the suspected cause of the re-curring Flame Failures. On October 31, 1995, a new Honeywell UDC 3000 controller unit was received and installed into the blower/flare control panel. Following the re-start, a "tighter" line was observed on the temperature recorder tape, and the frequency of shut downs has decreased.

There continues to be a problem with the electric power to the leachate extraction pumps as evidenced by the pump hour meter readings. People Construction has been contacted to perform and inspection of the electrical wiring for the pumps in order to determine the cause of the problem. They have tentatively scheduled a site visit during the week of November 13, 1995. We will keep the Wisconsin Department of Natural Resources (WDNR) updated on their progress.

Visu-Sewer has been contacted to perform the annual leachate conveyance line clean out. The scheduling of this is dependent on the weather and site conditions as they must maneuver a tank truck on the landfill. We will keep the WDNR updated on this.

General Observations

Following the installation of the replacement Honeywell controller, the blower/flare ran consistently and gas extraction well methane content readings were obtained. In general, the wells showed high methane content. An

adjustment in flow was made to gas well GEW-5 from 700 feet per minute (fpm) to 350 fpm due to high oxygen content (4.6%). Gas extraction wells GEW-1 and GEW-2 remain closed.

Gas probe readings indicated 0.0% methane in all gas probes.

Leachate heads remain high due to the lack of electric power to the pumps. This may be a cause of the relatively low flows.

The cap appears to be in good condition, recent wet weather has left some ponded water in the area of GEW-9. The vegetation has become thick in some areas and the option of mowing the cap may need to be addressed in the spring of 1996.

Conclusion

System has been running consistently following the installation of the replacement controller. As soon as the electrical problem to the leachate pumps has been identified and corrected, the Quadrennial testing of the flare will be scheduled.

If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

Kirk Solberg

Kirk Solberg,
Environmental Geologist

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: NOVEMBER 7, 1995
Temperature: 34 °F at 200
Barometric pressure: 29.87 inches Hg
Monitored by: K. Solberg / J. Fe. 160
Gas Detector Model No./Serial No.: GEM 500 / GM 190
Date Gas Detector last calibrated: Factory calibrated: MAY '94
Velometer Model No./Serial No.: Alnor 6006AP / 52697
Date Velometer last calibrated: Factory calibrated:

WELL (1)	PH (IN W.C.)	PW (IN W.C.)	TEMP. (°F)	METHANE (%CH4)	OXYGEN (%O2)	CARBON DIOXIDE (%CO2)	BALANCE %	GAS VELOCITY (FPM)	(2) TOTAL FLOW (CFM)	METHANE FLOW (CFM)	ADJUSTED VELOCITY (FPM)
GW-1	-22.0	0	41.0	18.8	12.3	16.0	53.2	0	0	0	closed
GW-2	-22.0	0	41.0	20.0	11.0	18.0	51.0	0	0	0	closed
GW-3	-22.0	-1.0	60.4	59.8	0.7	39.6	0.0	1150	51.75	30.9	NC
GW-4(1)	-21.0	-11.0	66.0	51.0	1.0	39.4	9.7	550	24.75	12.6	NC
GW-5(1)	-21.0	-19.0	75.0	44.0	4.6	36.0	16.0	700	31.5	13.9	700 → 350
GW-6	-21.0	-1.0	65.0	60.0	1.0	39.1	0.0	800	36.0	21.6	NC
GW-7(1)	-25.0	-25.0	72.0	57.5	0.9	41.0	1.0	800	36.0	20.7	NC
GW-8(1)			Under	repair				0	0	0	closed
GW-9(1)	-25.0	-25.0	82.0	60.4	1.0	38.6	0.0	400	18.0	10.9	NC
GW-10	-25.0	-3.0	93.0	54.8	1.0	42.5	2.4	400	18.0	9.9	NC
GW-11(1)	-23.0	-23.0	82.0	63.1	0.8	36.3	0.0	650	29.25	18.5	NC
GW-12(1)	-25.0	-5.0	102.0	52.1	0.9	41.1	5.6	650	29.25	15.2	NC
GW-13	-27.0	-21.0	83.0	58.8	1.1	39.8	0.0	1400	63.0	37.0	NC

Notes:
(1) Wells with leachate extraction pump and controls.
(2) Gas flow (cfm) is calculated by multiplying the gas velocity (fpm) by 0.045 ft^2 for 3-inch diameter PVC pipe.
(3) Calibration checked: 10-24-95
99% CH_4 read _____ % CH_4
2.5% CH_4 read _____ % CH_4
15% CO_2 read _____ % CO_2

50% CH_4 → 47.9%
35% CO_2 → 30.5%
15% Bal → 21.0%
0% O_2 → 0.6%

15% CH_4 → 14.1%
15% CO_2 → 13.7%
70% Bal → 71.3%
0% O_2 → 0.8%

4% O_2 → 4.6 → 3.8%
96% Bal → 95.4 → 96.2%

NA Not Available or Not Applicable
NC No Change
PH Header Pressure
PW Well Pressure

REFUSE\kaj03.tab

TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: NOVEMBER 6, 1995
Temperature: 50 °F at 2^00
Barometric pressure: 29.69 ↓ inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: GEM500 GM 190
Date Gas Detector last calibrated: Factory calibrated: MAY '94 (4)

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4 (1) (% LEL)	O_2 (%)
G-1S	0.0	0.0	0	16.4
G-1D	0.0	0.0	0	20.9
G-6	0.0	0.0	0	21.4
G-8	0.0	0.0	0	21.5
G-9	0.0	0.0	0	18.1
G-10	+1.0	0.0	0	21.5
GP-11S	0.0	0.0	0	18.5
GP-11D	0.0	0.0	0	20.9
GPW-1S	0.0	0.0	0	20.4
GPW-1M	+0.5	0.0	0	18.6
GPW-1D	+0.5	0.0	0	18.1
Speedway Building (2)	NA	0.0	0	22.8
Speedway Building (3)	NA	0.0	0	22.8

Notes:

(1) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).
(2) Readings obtained from the northeast corner of the interior of the scale house.
(3) Readings obtained from interior of Mechanic's shop.
(4) See calibration data on Table 1.
NA Not Available or Not Applicable.

TABLE 3

REFUSE HIDEAWAY LANDFILL
MONTHLY BRANCH AND FLARE MONITORING INFORMATION
Date: NOVEMBER 7, 1995

	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Gas Velocity (fpm)	Flow (2) (cfm)	Flow (3) (scfm)	Gas Temp	Valve Setting (fraction open)
Branch Monitoring Station								
North Branch	-25.0	53.6	0.6	1050	81.9	79.1	54.0	7/13
Central Branch	-26.0	58.8	0.4	800	62.4	60.5	50.3	7/13
South Branch	-24.0	54.8	0.9	1500	117.0	113.6	52.5	7/13
Flare Inlet Pipe								
Port A	+3.0							N/A
Port B	+2.5	55.2	0.9	2300	425.5	432.7	63.5	Full
Port C	+1.5							N/A

Notes:

(1) Percent CH_4 (methane).
(2) Gas velocity is converted to gas flow by multiplying fpm x 0.185 @ 6-inch HDPE and fpm x 0.078 @ 4-inch PVC.
(3) Flows have been converted to standard conditions of 70°F and 406.9 inches water.
NA Not applicable.

TABLE 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION
Date: NOVEMBER 1, 1995

Well	LEACHATE HEAD [2] (ft)			Current Pump Hours		Previous Pump Hours		Elapsed Pump Hours	
	Gas Well Depth	Depth to Leachate	Leachate Head	Total Hours	Time[3]	Total Hours	Time[3]	Total Hours	Pump Hours
GW-1	51.7	51.6	0.1						
GW-2	53.3	53.2	0.1						
GW-3	57	56.5	0.5						
GW-4[1]	65	55.7	9.3	5113.8	1:40	5113.8	11:17	~650	0.0
GW-5[1]	70	55.1	14.9	9656.2	1:36	9074.5	11:12	~650	581.7
GW-6	36	34.5	1.5						
GW-7[1]	60	51.5	8.5	3979.1	1:13	3351.9	10:43	~650	627.2
GW-8[1]	69	49.1	19.9	16907.2	1:15	16907.2	10:46	~650	0.0
GW-9[1]	66	48.5	17.5	139.1	1:33	139.1	11:09	~650	0.0
GW-10	70	63.4	6.6						
GW-11[1]	65	47.1	17.9	4290.6	1:31	4290.6	11:06	~650	0.0
GW-12[1]	81	61.7	19.3	6443.5	1:28	6443.5	11:07	~650	0.0
GW-13[1]	69	57.5	11.5	5081.6	1:25	5081.6	10:57	~650	0.0

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Gas wells retro-fitted with threaded ports on risers October 1992. Leachate levels measured from retro-fitted port on gas well riser. Gas well depths obtained from Construction Observation Report, November, 1990 and Operation and Maintenance Manual, November 1991.
(3) Time of hour meter reading was recorded on 10-5-95 and 11-1-95.
Shaded areas do not have reportable information.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: October 1995

Alarm Dates	Alarm Cause	Solution (hours flare not operational)
10/07/95 (9:30PM)	FLAME FAILURE, CAUSE NOT DETERMINED. LIKELY A CONTROLLER PROBLEM.	RE-START BLOWER/FLARE 9:30AM 10/13/95 (156 HRS)
10/15/95 (9:00PM)	FLAME FAILURE, CAUSE NOT DETERMINED.	RESTART BLOWER/FLARE 8:00AM 10/16/95 (11 HRS)
10/16/95 (7:00PM)	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 9:00AM 10/17/95 (14 HRS)
10/18/95 (12:30AM)	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8:15AM 10/23/95 (151.75 HRS)
10/25/95 (3:15AM)	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8:00AM 10/25/95 (4.75 HRS)
10/26/95 (5:15AM)	FLAME FAILURE, CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 7:45AM 10/26/95 (2.5 HRS)
10/26/95 (9:15AM)	FLAME FAILURE, CAUSE NOT DETERMINED	RE-START BLOWER/FLARE 1:50PM 10/30/95 (100.5 HRS)
11/06/95 (10:30PM)	FLARE FAILURE, CAUSE NOT DETERMINED	RE-START BLOWER/FLARE 8:00AM 11/07/95 (9.5 HRS)

new controller - 10/31/95

REFUSE HIDEAWAY LANDFILL
SUMMARY OF WEEKLY MONITORING INFORMATION
Date: October 1995

Description	Date: 10-13-95				Date: 10-17-95				Date: 10-24-95				Date: 11-3-95				Date: 11-7-95			
	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)
Branch Monitoring Station																				
North Branch	7/13	-26.0	60.3	0.9	7/13	-27.0	53.0	0.9	7/13	-28.5	52.2	0.8	7/13	-28.0	44.5	0.9	7/13	-25.0	53.6	0.6
Central Branch	7/13	-26.0	60.1	0.9	7/13	-28.0	56.9	0.7	7/13	-29.5	54.7	0.5	7/13	-30.0	55.4	0.5	7/13	-26.0	58.8	0.4
South Branch	7/13	-23.0	57.7	1.0	7/13	-25.5	43.9	2.5	7/13	-25.0	42.5	2.1	7/13	-29.0	52.7	0.8	7/13	-24.0	54.8	0.9
Blower Inlet Pipe																				
Inlet Port A		-28.5	59.2	0.9		-30.0	50.0	1.7		-31.0	49.0	1.4		-32.0	50.0	0.9		-31.0	55.5	0.8
Inlet Port B		-30.0				-30.5				-31.5				-33.0				-32.0		
Outlet Port A		+5.0				+4.5				+3.5				+3.0				+4.5		
Flare Inlet Pipe																				
Sample Port A		+3.5				+3.0				+2.5				+2.0				+3.0		
Sample Port B		+3.5	59.0	0.9		+3.0	50.0	1.7		+2.0	48.8	1.4		+2.0	50.2	1.0		+2.5	55.2	0.9
Sample Port C		+2.0				+1.5				+1.5				+1.0				+1.5		
Flare Temperature (°F)	1500				1500				1420→1620				1500				1500			
Flare Flow (cfm/scfm)	398/392				444/432				388/382				323/329				425/432			

Notes:

(1) Percent CH_4 (methane).
NA Not Available or Not Applicable.
Shaded areas do not have reportable information.

ECRS\Refuse\forms1.bjh

TERRA
▲ ENGINEERING & CONSTRUCTION CORPORATION ▲
ENVIRONMENTAL REMEDIATION
MUNICIPAL & UTILITY CONSTRUCTION
SPECIALTY EARTHWORK

December 18, 1995

Wisconsin Department of
Natural Resources
Environmental Response and
Repair Section
Bureau of Solid and Hazardous
Waste Management
101 South Webster Street,
GEF II, SE/3
Madison, Wisconsin 53707

Attn: Ms. Theresa Evanson

Re: Operation and Maintenance
Summary - November 1995
Landfill Gas and Leachate
Extraction System
Refuse Hideaway Landfill -
Middleton, Wisconsin
Terra Job # 468

Dear Ms. Evanson:

This letter summarizes operation and maintenance (O&M) activities performed by Terra Engineering & Construction Corporation (Terra), during the month of November 1995 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by Al's Modern Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
November 05, 1995	4,313 Gallons
November 10, 1995	4,533 Gallons
November 29, 1995	4,327 Gallons
	Total 13,173 Gallons

(1) Based on liquid level measurements at the collection tank.

2201 VONDRON ROAD
MADISON, WI 53704-6795
608/221-3501 PHONE
608/221-4075 FAX

WEEKLY/MONTHLY MONITORING SCHEDULE

Weekly/Monthly monitoring of the landfill gas and leachate extraction system was performed on the following dates:

November 17, 1995	Weekly
November 22, 1995	Weekly
November 30, 1995	Weekly
December 08, 1995	Weekly, Monthly Leachate Levels
December 13, 1995	Weekly, Monthly Gas Wells, Gas Probes

Other Work Performed

There were six (6) alarm conditions alerted during the month of November. (SEE TABLE 5)

The causes for the flame failures has not been determined. Mr. John Gwinn of Linklater Corporation was contacted with regards to the "fine tuning" of the new controller unit. The adjustments made to the controller parameters are noted in Table 5.

Mr. Gwinn informed us that adjustments may be required to three (3) controller parameters. These parameters are, the PROP BD (originally set at 20.0), the RSET RPM (originally set at 5.00) and the RATE MIN (originally set at 0.15).

In general, the PROP BD is how much of a change in the flare temperature will be allowed prior to the controller reacting. The RSET RPM is the number of times per minute the controller "checks" the temperature of the flare. The RATE MIN is the rate of reaction of the actuator motors when a change in flare temperature occurs.

Adjustments made to these parameters will be noted.

A preliminary inspection of the electrical system was conducted on November 20, 1995 and December 15, 1995 by Academy Electric of Madison. They were asked to identify the cause for the circuit breaker failure in the electrical panel at the blower/flare. They identified a short at Gas Well 9 which caused the circuit breaker to fail and cut power to leachate pumps.

They were also asked to identify possible electrical problems at Gas Wells 4, 5, 7, 8, 9, 11*, 12 and 13. * Pump at GEW 11 works.

The coyote controls at gas wells GEW-4, 12 and 13 are not working properly and will likely need to be replaced.

The Franklin Motor starters at gas wells GEW-4, 5, 9, 12 and 13 did not check out and will likely need to be replaced.

The pumps and lead wires in gas wells GEW-4, 5, 7, 8*, 9, 12 and 13 will need to be removed from the wells and visually inspected as there is either an electrical short in the lead wire or the pump motor is burnt out. The pump and lead wires have been removed from GEW-8, and it is believed that this pump motor is burnt out.

Academy Electric also checked the integrity of the sensor wiring at the leachate tank and concluded that the interstitial tank leak sensor is in need of replacement.

Terra will remove the pumps and lead wires from gas wells 5, 7, 9 and 13 for inspection on a Time and Materials basis. We will wait for your approval to perform this work.

A cost to replace and install the coyote controls, franklin starters, re-seal conduit and add cycle counters to the pump control panels will be forwarded to the WDNR as soon as possible.

The quarterly leachate analytical sample was obtained on December 6, 1995. The sample was sent to Mid-State Laboratories for analysis. The results will be forwarded to the Madison Metropolitan Sewerage District (MMSD) and to the WDNR upon receipt.

The annual leachate/condensate conveyance line clean-out was performed by Visu-sewer on December 7, 1995.

If you have any questions regarding this report, please to not hesitate to contact us.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

Kirk Solberg

Kirk Solberg,
Environmental Geologist

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: DECEMBER 13, 1995
Temperature: 22 °F at 1100
Barometric pressure: 30.12 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: Gem 500 / Gm 190
Date Gas Detector last calibrated: Factory calibrated: MAY '94
Velometer Model No./Serial No.: Alnor 6000AP / 52697
Date Velometer last calibrated: Factory calibrated: JAN 1995

WELL (1)	PH (IN W.C.)	PW (IN W.C.)	TEMP. (°F)	METHANE (%CH4)	OXYGEN (%O2)	CARBON DIOXIDE (%CO2)	BALANCE %	GAS VELOCITY (FPM)	(2) TOTAL FLOW (CFM)	METHANE FLOW (CFM)	ADJUSTED VELOCITY (FPM)
GW-1	-24.0	0	57.3	3.7	18.6	5.1	72.6	0	0	0	Closed
GW-2	-24.0	0	57.3	3.1	18.2	5.2	73.3	0	0	0	Closed
GW-3	-24.0	-2.0	65.0	48.9	1.4	35.4	14.1	1500	67.5	33.0	NC
GW-4(1)	-25.0	-16.0	70.0	37.7	1.7	30.3	29.9	800	36.0	13.6	NC
GW-5(1)	NA	-18	70.1	40.5	4.7	28.4	25.7	400	18.0	7.3	NC
GW-6	NA	NA	60.9	NA	NA	NA	NA	650	29.2	NA	NC
GW-7(1)	-28.0	-28.0	72.0	50.9	1.5	34.5	13.1	1300	58.5	29.8	NC
GW-8(1)			Under	repair							NA
GW-9(1)	-28.0	NA	70.7	NA	NA	NA	NA	1000	45	NA	NC
GW-10	-26.0	-2.0	100.0	32.7	0.7	31.0	35.9	400	18	5.9	NC
GW-11(1)	-27.0	-27.0	80.0	58.0	2.1	33.6	7.0	900	40.5	23.5	NC
GW-12(1)	-27.0	-6.0	110.0	36.3	1.2	29.9	33.4	1400	63	22.9	NC
GW-13	-27.0	-26.0	74.0	52.4	1.8	40.5	6.2	1000	45	23.6	NC

Notes:
(1) Wells with leachate extraction pump and controls.
(2) Gas flow (cfm) is calculated by multiplying the gas velocity (fpm) by 0.045 ft^2 for 3-inch diameter PVC pipe.
(3) Calibration checked: 11-27-95

99% CH_4 read		% CH_4
2.5% CH_4 read	X	% CH_4
15% CO_2 read	X	% CO_2

50% CH_4 → 47.7% *
35% CO_2 → 30.0%
15% BAL → 21.9 %
0% O_2 → 0.6 %

15% CH_4 → 13.8% *
15% CO_2 → 12.2%
70% BAL → 73.5%
0% O_2 → 0.5%

4% O_2 → 3.7%
96% BAL → 96.3%

NA Not Available or Not Applicable
NC No Change
PH Header Pressure
PW Well Pressure

* Calibration Gas Canisters low.

TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: December 13, 1995
Temperature: 20 °F at 11:00
Barometric pressure: 30.12 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: GEM 500 / GM190
Date Gas Detector last calibrated: Factory calibrated: May '94 (4)

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4 (1) (% LEL)	O_2 (%)
G-1S	0.0	0.0	0	21.3
G-1D	0.0	0.0	0	21.2
G-6	0.0	0.0	0	20.9
G-8	0.0	0.0	0	20.7
G-9	0.0	0.0	0	16.2
G-10	+0.5	0.0	0	20.9
GP-11S	0.0	0.0	0	20.5
GP-11D	0.0	0.0	0	20.5
GPW-1S	0.0	0.0	0	20.1
GPW-1M	+0.5	0.0	0	18.0
GPW-1D	+0.5	0.0	0	18.0
Speedway Building (2)	NA	0.0	0	21.4
Speedway Building (3)	NA	0.0	0	21.1

Notes:

(1) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).
(2) Readings obtained from the northeast corner of the interior of the scale house.
(3) Readings obtained from interior of Mechanic's shop.
(4) See calibration data on Table 1.
NA Not Available or Not Applicable.

TABLE 3

REFUSE HIDEAWAY LANDFILL
MONTHLY BRANCH AND FLARE MONITORING INFORMATION
Date: DECEMBER 13, 1995

	Pressure (in. W.C.)	CH_4[1] (%)	O_2 (%)	Gas Velocity (fpm)	Flow[2] (cfm)	Flow[3] (scfm)	Gas Temp	Valve Setting (fraction open)
Branch Monitoring Station								
North Branch	-27.0	NA	NA	1000	78.0	76.8	46.5	7/13
Central Branch	-30.0	NA	NA	700	54.6	53.5	45.1	7/13
South Branch	-27.0	NA	NA	1650	128.7	126.6	46.8	7/13
Flare Inlet Pipe								
Port A	+4.0							N/A
Port B	NA	NA	NA	1900	351.5	NA	56.1	FULL
Port C	NA							N/A

Notes:

(1) Percent CH_4 (methane).
(2) Gas velocity is converted to gas flow by multiplying fpm x 0.185 @ 6-inch HDPE and fpm x 0.078 @ 4-inch PVC.
(3) Flows have been converted to standard conditions of 70°F and 406.9 inches water.
NA Not applicable.

TABLE 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION
Date: DECEMBER 8, 1995

Well	LEACHATE HEAD (2) (ft)			Current Pump Hours		Previous Pump Hours		Elapsed Pump Hours	
	Gas Well Depth	Depth to Leachate	Leachate Head	Total Hours	Time(3)	Total Hours	Time(3)	Total Hours	Pump Hours
GW-1	51.7	51.7	0.0						
GW-2	53.3	53.3	0.0						
GW-3	57	54.2	2.8						
GW-4(1)	65	52.8	12.2	5113.8	10:24	5713.8	1:40	~891	0
GW-5(1)	70	57.4	12.6	10180.6	10:19	9656.2	1:36	~891	524.4
GW-6	36	34.5	1.5						
GW-7(1)	60	48.8	11.2	4381.9	9:56	3979.1	1:13	~891	402.8
GW-8(1)	69	69	0.0	16907.3	9:58	16907.2	1:15	~891	0.1
GW-9(1)	66	52.7	13.3	139.1	10:16	139.1	1:30	~891	0
GW-10	70	64.5	5.5						
GW-11(1)	65	55.4	9.6	4576.5	10:14	4290.6	1:31	~891	285.9
GW-12(1)	81	72.5	8.5	6443.5	10:11	6443.5	1:28	~891	0
GW-13(1)	69	52.4	16.6	5081.6	10:08	5081.6	1:25	~891	0

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Gas wells retro-fitted with threaded ports on risers October 1992. Leachate levels measured from retro-fitted port on gas well riser. Gas well depths obtained from Construction Observation Report, November, 1990 and Operation and Maintenance Manual, November 1991.
(3) Time of hour meter reading was recorded on NOVEMBER 1, 1995 and DECEMBER 8, 1995.
Shaded areas do not have reportable information.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: ~~October~~ November 1995

11/10/95 (11:30AM)	FLAME FAILURE. CAUSE NOT DETERMINED	RE-START BLOWER/FLARE 4:15PM 11/10/95 (4.75 HRS)
11/12/95 (9:00PM)	FLAME FAILURE. CAUSE NOT DETERMINED. CONTROLLER POSSIBLY NEEDS "FINE TUNING" OF PARAMETERS	RE-START BLOWER/FLARE 8:00AM 11/13/95. ADJUSTED CONTROLLER PROP BD FROM 20.0 TO 15.0 (11.0 HRS)
11/16/95 (11:00PM)	FLAME FAILURE. CAUSE NOT DETERMINED. RECORDER TAPE SHOWS ERRATIC TEMPERATURES.	RE-START BLOWER/FLAME 8:30AM 11/17/95. ADJUSTED CONTROLLER PROP BD FROM 15.0 TO 20.0. (9.5 HRS)
11/18/95 (8:00PM)	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 9:00AM 11/20/95. ADJUSTED CONTROLLER RATE-MIN FROM 0.15 TO 0.20 (37.0 HRS)
11/22/95	NO ALARM. ERRATIC TEMPERATURES OBSERVED.	ADJUSTED CONTROLLER RSET RPM FROM 5.0 TO 6.0
11/25/95 (7:00PM)	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8:00AM 11/27/95. ADJUSTED PROP BD FROM 20.0 TO 17.5. (37.0 HRS)
12/2/95 (12:30AM)	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 12:30PM 12/4/95 CHANGED PROP BD FROM 17.5 TO 20.0 (84.0 HRS)

Down - 183.25 hr

Tot hr in mo - 720 hr

% down time = 25%

TABLE 6

REFUSE HIDEAWAY LANDFILL
SUMMARY OF WEEKLY MONITORING INFORMATION
Date: NOVEMBER 1995

	Date: NOVEMBER 17, 1995				Date: NOVEMBER 22, 1995				Date: NOVEMBER 30, 1995				Date: DECEMBER 8, 1995				Date: DECEMBER 13, 1995			
Description	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)
Branch Monitoring Station																				
North Branch	7/13	-27.0	54.2	0.8	7/13	-26.0	45.2	0.7	7/13	-27.0	42.4	0.7	7/13	-26.0	45.5	1.8	7/13	-27.0	NA	NA
Central Branch	7/13	-26.0	54.6	0.6	7/13	-30.5	52.4	0.5	7/13	-28.0	49.2	0.4	7/13	-29.0	50.7	0.9	7/13	-30.0	NA	NA
South Branch	7/13	-24.0	52.3	0.5	7/13	-28.0	48.1	1.4	7/13	-28.0	44.5	1.6	7/13	-27.0	51.5	1.1	7/13	-27.0	NA	NA
Blower Inlet Pipe																				
Inlet Port A		-30.0	53.8	0.6		-31.5	47.7	0.9		-32.0	44.9	1.1		-30.0	52.2	1.7		-30.0	NA	NA
Inlet Port B		-31.0				-29.0				-33.0				-30.0				-31.0		
Outlet Port A		+5.5				+3.5				+4.0				+4.5				+4.0		
Flare Inlet Pipe																				
Sample Port A		+3.5				NA				NA				NA				NA		
Sample Port B		+3.5	54.3	0.5		NA	47.5	1.2		+2.5	45.6	1.2		NA	51.6	1.5		NA	NA	NA
Sample Port C		+2.0				+1.0				NA				+1.5				NA		
Flare Temperature (°F)	1500				1510				1510				1500				1500			
Flare Flow (cfm/scfm)	462.5/480.6				333/340.5				407/416				NA				351/NA			

Notes:

(1) Percent CH_4 (methane).
NA Not Available or Not Applicable.
Shaded areas do not have reportable information.

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TERRA
▲ ENGINEERING & CONSTRUCTION CORPORATION ▲
ENVIRONMENTAL REMEDIATION
MUNICIPAL & UTILITY CONSTRUCTION
SPECIALTY EARTHWORK

January 8, 1996

Wisconsin Department of
Natural Resources
Environmental Response and
Repair Section
Bureau of Solid and Hazardous
Waste Management
101 South Webster Street,
GEF II, SE/3
Madison, Wisconsin 53707

Attn: Ms. Theresa Evanson

Re: Operation and Maintenance
Summary - December 1995
Landfill Gas and Leachate
Extraction System
Refuse Hideaway Landfill -
Middleton, Wisconsin
Terra Job # 468

Dear Ms. Evanson:

This letter summarizes operation and maintenance (O&M) activities performed by Terra Engineering & Construction Corporation (Terra), during the month of December 1995 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by Al's Modern Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
December 11, 1995	3,326 Gallons
Total	3,326 Gallons

(1) Based on liquid level measurements at the collection tank.

2201 VONDRON ROAD
MADISON, WI 53704-6795
608/221-3501 PHONE
608/221-4075 FAX

WEEKLY/MONTHLY MONITORING SCHEDULE

Weekly/Monthly monitoring of the landfill gas and leachate extraction system was performed on the following dates:

December 20, 1995	Weekly
December 26, 1995	Weekly
January 4, 1996	Weekly, Monthly Leachate Levels, Monthly Gas Wells, Gas Probes

There were five (5) alarm conditions alerted during the month of December. (SEE TABLE 5). Although the causes for the Flame Failures were not determined, it is possible that cold temperatures caused condensate to freeze and block some of the gas flow at the individual gas well control valves. This was evident at GW-8 where condensate had froze and plugged the pipe between the well and the header. (See next section for further details).

Minor adjustments were made to the Honeywell controller parameters in an effort to run the flare at a steadier temperature. The parameter changes are noted in Table 5.

Other Work Performed

On December 22, 1995, a 6-inch blind flange was installed on gas-well GW-8. The pump, leadwire and discharge hose had previously been removed for inspection. The pump had not been re-installed due to malfunctions in the pump control panel, and landfill gas was passively venting from the well.

The installation of the blind flange made the opening of the valve on the header line possible to utilize the gas from GW-8 for the flare. The valve was observed to be frozen shut and upon further inspection the 3-inch diameter PVC pipe from the gas well to the header was plugged with frozen condensate. This prevented the flow of any gas from the well to the header.

On December 28, 1995, the plugged pipe was removed and replaced. The replaced pipe is held in place with two 3-inch adjustable couplings. The valve appears to have thawed but needs to be replaced as it appears that the valve has been stripped and cannot be adjusted. There is a 3-inch valve in the blower building which can be used for replacement.

General Observation

There was no methane detected in any gas probes during the monthly

monitoring.

The flare temperature variations observed on the temperature recorder tape are possibly due to the low gas flows observed. The low flows may be due to frozen condensate blocking off some of the flow from the well to the header. It should be noted that even though the above ground header pipes to the wells are insulated, frozen condensate has been observed. The lower flows may also be due to the leachate levels in the wells.

We are currently obtaining cost information repair of the existing leachate extraction system and for a leachate extraction system upgrade to air driven pumps. This information will be forwarded to you as soon as possible.

If you have any questions regarding this report, please do not hesitate to contact us.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

Kirk Solberg

Kirk Solberg,
Environmental Geologist

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: January 4, 1996
Temperature: 13° F at 7 am
Barometric pressure: 29.98 inches Hg
Monitored by: K. Selberg
Gas Detector Model No./Serial No.: Gem 500 / GA890
Date Gas Detector last calibrated: Factory calibrated: May '94
Velometer Model No./Serial No.: Alnor 6000AP / 52697
Date Velometer last calibrated: Factory calibrated: Jan '95

WELL (1)	PH (IN W.C.)	PW (IN W.C.)	TEMP. (°F)	METHANE (%CH4)	OXYGEN (%O2)	CARBON DIOXIDE (%CO2)	BALANCE %	GAS VELOCITY (FPM)	(2) TOTAL FLOW (CFM)	METHANE FLOW (CFM)	ADJUSTED VELOCITY (FPM)
GW-1	-24	0	22.1	3.6	18.4	4.4	73.6	0	0	0	closed
GW-2	-24	0	22.0	3.7	18.1	6.1	72.1	0	0	0	closed
GW-3	-24	-2	67.6	63.7	0.9	35.2	0.0	1250	56.3	35.8	NC
GW-4(1)	-24	-15	66.0	48.5	1.5	44.1	5.4	1000	45.0	21.8	NC
GW-5(1)	-24	-18	64.0	47.8	4.1	41.0	7.3	500	22.5	10.7	NC
GW-6	-30	-4	59.7	47.3	0.3	45.5	7.7	600	27.0	12.8	NC
GW-7(1)	-28	-28	60.5	62.8	0.0	37.0	0.0	600	27.0	16.9	NC
GW-8(1)	-28	-8	23.5	66.6	0.8	32.7	0.0	400	18.0	12.0	NC
GW-9(1)	-27	-27	66.7	71.4	1.1	28.0	0.0	400	18.0	12.8	NC
GW-10	-28	-4	96.5	44.4	0.2	44.7	10.8	200	9.0	4.0	NC
GW-11(1)	-26	-26	77.0	60.7	1.7	24.5	0.6	1150	51.8	31.4	NC
GW-12(1)	-26	-8	110	46.7	0.6	44.1	9.7	900	40.5	18.9	NC
GW-13	-25	-25	71.4	63.5	0.4	36.2	0.0	500	22.5	14.3	NC

Notes:
(1) Wells with leachate extraction pump and controls.
(2) Gas flow (cfm) is calculated by multiplying the gas velocity (fpm) by 0.045 ft^2 for 3-inch diameter PVC pipe.
(3) Calibration checked: 1-4-96

99% CH_4 read	% CH_4
2.5% CH_4 read	% CH_4
15% CO_2 read	% CO_2

4% O_2 → 3.6%
96% Bal → 96.4%

15% CH_4 → 17.3
15% CO_2 → 15.0
70% Bal → 67.7
0% O_2 → 0.0

50% CH_4 → 50.7
35% CO_2 → 35.0
15% Bal → 14.3
0% O_2 → 0.0

NA Not Available or Not Applicable
NC No Change
PH Header Pressure
PW Well Pressure

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TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: January 4, 1996
Temperature: 13 F at 7:00
Barometric pressure: 29.98 inches Hg
Monitored by: K. Solberg
Gas Detector Model No./Serial No.: Gem 500 / 190
Date Gas Detector last calibrated: Factory calibrated: May '94 (4)

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4 (1) (% LEL)	O_2 (%)
G-1S	0.0	0.0	0	19.5
G-1D	6.0	0.0	0	19.7
G-6	0.0	0.0	0	19.6
G-8	0.0	0.0	0	20.1
G-9	0.0	0.0	0	19.3
G-10	-0.5	0.0	0	19.6
GP-11S	0.0	0.0	0	19.3
GP-11D	0.0	0.0	0	19.4
GPW-1S	0.0	0.0	0	19.4
GPW-1M	0.0	0.0	0	19.4
GPW-1D	0.0	0.0	0	19.4
Speedway Building (2)	NA	0.0	0	20.0
Speedway Building (3)	NA	0.0	0	20.0

Notes:

(1) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).
(2) Readings obtained from the northeast corner of the interior of the scale house.
(3) Readings obtained from interior of Mechanic's shop.
(4) See calibration data on Table 1.
NA Not Available or Not Applicable.

TABLE 3

REFUSE HIDEAWAY LANDFILL
MONTHLY BRANCH AND FLARE MONITORING INFORMATION
Date: January 4, 1996

	Pressure (in. W.C.)	CH_4[1] (%)	O_2 (%)	Gas Velocity (fpm)	Flow[2] (cfm)	Flow[3] (scfm)	Gas Temp	Valve Setting (fraction open)
Branch Monitoring Station								
North Branch	-26.0	51.8	0.5	800	62.4	62.6	35.6	7/13
Central Branch	-30.0	57.2	0.3	500	39.0	38.5	38.5	7/13
South Branch	-26.0	52.4	1.6	1300	101.4	100.9	39.7	7/13
Flare Inlet Pipe								
Port A	NA							N/A
Port B	+2.5	53.1	0.9	1600	296	309.1	51.6	Full
Port C	NA							N/A

Notes:

(1) Percent CH_4 (methane).
(2) Gas velocity is converted to gas flow by multiplying fpm x 0.185 @ 6-inch HDPE and fpm x 0.078 @ 4-inch PVC.
(3) Flows have been converted to standard conditions of 70°F and 406.9 inches water.
NA Not applicable.

TABLE 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION
Date: JANUARY 4, 1996

Well	LEACHATE HEAD [2] (ft)			Current Pump Hours		Previous Pump Hours		Elapsed Pump Hours	
	Gas Well Depth	Depth to Leachate	Leachate Head	Total Hours	Time[3]	Total Hours	Time[3]	Total Hours	Pump Hours
GW-1	51.7	51.7	0.0						
GW-2	53.3	53.3	0.0						
GW-3	57	56.3	0.7						
GW-4[1]	65	54.9	10.1	5113.8	11:39	5113.8	10:24	~625	0
GW-5[1]	70	46.3	23.7	10562.0	11:36	10180.6	10:19	~625	381.4
GW-6	36	34.8	1.2						
GW-7[1]	60	49.0	11.0	4387.9	11:10	4381.9	9:56	~625	6.0
GW-8[1]	69	48.5	20.5	16907.3	11:13	16907.3	9:58	~625	0.0
GW-9[1]	66	43.8	22.2	139.1	11:30	139.1	10:16	~625	0.0
GW-10	70	62.7	7.3						
GW-11[1]	65	63.2	1.8	NA	11:26	45765	10:14	~625	NA
GW-12[1]	81	60.0	21	6443.5	11:23	6443.5	10:11	~625	0.0
GW-13[1]	69	57.2	11.8	5081.7	11:20	5081.6	10:08	~625	0.0

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Gas wells retro-fitted with threaded ports on risers October 1992. Leachate levels measured from retro-fitted port on gas well riser. Gas well depths obtained from Construction Observation Report, November, 1990 and Operation and Maintenance Manual, November 1991.
(3) Time of hour meter reading was recorded on December 8, 1995 and Jan 4, 1996.
Shaded areas do not have reportable information.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: December 1995

ALARM DATE	ALARM CAUSE	SOLUTION (HOURS FLARE NOT OPERATIONAL)
12/14/95 (11:15PM)	FLAME FAILURE. CAUSE NOT DETERMINED	RE-START BLOWER/FLARE 8:00AM ON 12/15/95 (8.75 HRS)
12/15/95 (7:30PM)	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLAME 7:45AM ON 12/18/95. (36.25 HRS)
12/21/95 (8:45PM)	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8:45AM ON 12/22/95. CHANGE PROP BD FROM 20.0 TO 17.5 (12.0 HRS)
12/28/95 (7:00AM)	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 10:00AM ON 12/28/95. CHANGE RSET RPM FROM 6.0 TO 5.95 (3.0 HRS)
12/31/95 (1:30PM)	FLAME FAILURE. CAUSE NOT DETERMINED.	RE-START BLOWER/FLARE 8:45AM ON 1/2/96. CHANGE RSET RPM FROM 5.95 TO 6.0 (43.25 HRS)
1/04/96	NO ALARM FLARE OPERATIONAL. OBSERVED FLAMES EXITING THE TOP OF THE FLARE.	MANUAL BLOWER/FLARE SHUT DOWN RE-SET PROP BD TO 20.0, RATE MIN TO .20, RE-START BLOWER/ FLARE

TABLE 6

REFUSE HIDEAWAY LANDFILL
SUMMARY OF WEEKLY MONITORING INFORMATION
Date: December 1995

Description	Date: December 20, 1995				Date: December 26, 1995				Date: January 4, 1996				Date:				Date:			
	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)	Valve Setting	Pressure (in. W.C.)	CH_4 (1) (%)	O_2 (%)
Branch Monitoring Station																				
North Branch	7/13	-29.0	49.6	0.4	7/13	-28.0	44.8	0.4	7/13	-26.0	51.8	0.5								
Central Branch	7/13	-32.0	54.5	0.2	7/13	-31.0	52.1	0.2	7/13	-30.0	57.2	0.3								
South Branch	7/13	-28.5	56.0	0.6	7/13	-26.0	52.1	0.9	7/13	-26.0	52.4	1.6								
Blower Inlet Pipe																				
Inlet Port A		-31.0	54.2	0.5		-31.0	50.0	0.6		-32.0	52.2	0.7								
Inlet Port B		-32.0				-32.0				-33.0										
Outlet Port A		+3.5				+3.0				+4.0										
Flare Inlet Pipe																				
Sample Port A		+2.0				NA				NA										
Sample Port B		+2.0	54.0	0.8		+2.0	50.3	0.7		+2.5	53.1	0.9								
Sample Port C		+1.0				NA				NA										
Flare Temperature (°F)	1500				1500				1500											
Flare Flow (cfm/scfm)	333/341.1				370/391.9				296/309.1											

Notes:

(1) Percent CH_4 (methane).
NA Not Available or Not Applicable.
Shaded areas do not have reportable information.

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