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

February 7, 1997

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 1997
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 1997 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by A-1 Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
December 30, 1996	4,435 gallons
December 31, 1996	4,117 gallons
January 9, 1997	9,444 gallons
January 20, 1997	8,324 gallons
January 30, 1997	8,205 gallons
Total Gallons	34,525 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:

January 7, 1997	Quarterly Leachate Sampling
January 10, 1997	Weekly, Quarterly Leachate Sampling
January 20, 1997	Weekly
January 30, 1997	Weekly, Monthly Leachate Head Monitoring and Monthly Gas Probe Monitoring
February 5, 1997	Weekly, Monthly Gas Well Monitoring

There were seven (7) system shut downs during the period from January 2, 1997 to February 5, 1997.

The actual cause of the shut downs has not been determined. The temperature recorder tape indicates a fluctuating temp just before shut down. John Gwinn from Linklater Corp. thought one theory could be that the gas flow to the flare was not sufficient to keep the flare running. With fluctuating temps prior to shut down, the north and south dampers are closing causing the flame to rise out of sight of the ultra-violet sensor causing a shut down. Flow and damper adjustments were made to try to alleviate the shut down problem.

Other Work Performed

Quarterly leachate sampling was conducted January 7, 1997 and January 10, 1997. Enclosed are results from the January 7, 1997 sampling round. January 10, 1997 results will be reported in the February report. Copies of all tests results will be forwarded to MMSD.

It was noted during monthly leachate head monitoring that GW-12 was not operating. Terra pulled the leachate pump. It was noted that the pumps float was obstructed by debris. The debris was cleared and the pump is working as intended.

On February 3, 1997, the compressors oil was changed. Compressor hours 1091.7 hours.

If you have any questions, please do not hesitate to call me.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

James A. Falbo
Project Manager

Attachments

REFUSE\jan97.rpt

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: January 1997

ALARM DATE	ALARM CAUSE	SOLUTION (HOURS FLARE NOT OPERATIONAL)
01/02/97 (5:30 PM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 3:42 PM. ON 01/03/97 (22.0 HRS)
01/07/97 (4:45 PM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 4:30 PM. ON 01/08/97 (24.0 HRS)
01/13/97 (1:00 AM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 3:52 PM. ON 01/14/97 (27.0 HRS)
01/18/97 (6:30 AM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 9:15 AM. ON 01/20/97 (51.0 HRS)
01/25/97 (12:30 PM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 8:55 AM. ON 01/27/97 (44.5 HRS)
01/29/97 (1:35 PM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 9:05 AM. ON 01/31/97 (43.5 HRS)
02/03/97 (4:00 AM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 1:50 PM. ON 02/03/97 (10.0 HRS)

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: 2-5-97
Temperature: 32 °F at 1100
Barometric pressure: 30.37 inches Hg
Monitored by: SAF
Gas Detector Model No./Serial No.: Gem 500 / Gm190
Date Gas Detector last calibrated: Factory calibrated: May 94 (3)
Velometer Model No./Serial No.: AP 6000
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	-7	0	35.4	0.0	20.1	0.0	79.8	0.0	0.0	0.0	
GW-2	-7	0	37.8	0.0	21.3	0.0	78.7	0.0	00	0.0	
GW-3	-7	-5 1/2	60.4	41.4	0.0	35.3	23.3	1200	54	22.4	
GW-4 (1)	-7	-5	58.3	50.4	0.0	37.4	12.2	700	31.5	15.9	
GW-5 (1)	-7	-7	68.0	59.4	0.0	40.1	0.5	700	31.5	18.7	
GW-6	-13	-9	61.1	38.4	0.0	33.1	28.5	500	22.5	8.64	
GW-7 (1)	-13	-13	56.4	56.7	0.0	35.5	7.8	700	31.5	17.9	
GW-8 (1)	-13	-13	60.5	57.1	0.3	37.0	5.6	700	31.5	18.0	
GW-9 (1)	-12	-12	42.8	60.5	0.0	38.7	0.8	700	31.5	19.1	
GW-10	-12	-7	100.4	30.5	0.0	30.2	39.3	600	27	8.2	
GW-11 (1)	-9	-9	32.8	65.6	0.0	34.0	0.4	600	27	17.7	
GW-12 (1)	-11	-7	97.8	47.8	0.0	33.2	19.0	1200	54	25.8	
GW-13	-11	-11	57.9	55.9	0.0	38.4	5.7	400	18	10.1	

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: _____
50% CH_4 read _____ % CH_4
15% 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

TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: 1-31-97
Temperature: 35 °F at 7:00
Barometric pressure: 30.07 inches Hg
Monitored by: SAF
Gas Detector Model No./Serial No.: GEM 500 / GM190
Date Gas Detector last calibrated: Factory calibrated: May 96 (4)

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4 (1) (% LEL)	O_2 (%)
G-1S	0.0	0.0	0.0	20.5
G-1D	0.0	0.0	0.0	20.3
G-6	0.0	0.0	0.0	19.4
G-8	0.0	0.0	0.0	20.7
G-9	0.0	0.0	0.0	20.3
G-10	0.0	0.0	0.0	19.4
GP-11S	0.0	0.0	0.0	20.7
GP-11D	0.0	0.0	0.0	18.4
GPW-1S	0.0	0.0	0.0	17.3
GPW-1M	0.0	0.0	0.0	20.1
GPW-1D	0.0	0.0	0.0	16.3
Speedway Building (2)	NA	0.0	0.0	20.5
Speedway Building (3)	NA	0.0	0.0	20.7

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: 2-5-97

	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	-9	43.8	0.0	800	62.4	65.1	36.5	3/9
Central Branch	-11	43.3	0.0	900	70.2	72.3	40.5	3/9
South Branch	-6	52.8	0.0	1100	85.8	90.2	36.5	3/9
Flare Inlet Pipe								
Port A	+2							N/A
Port B	+2	47.4	0.0	1500	277.5	285.9	56.9	Full ~~+2~~
Port C	+1							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: 1-31-97

Well	LEACHATE HEAD (ft) Gas Well Depth	Depth to Leachate	Leachate Head	Current Pump Cycles	Previous Pump Cycles	Difference	Gal. (3) Pumped	Compressor Hour Reading Current Hours	Previous Hours	Total Hours
GW-1	51.7	51.6	0.1					1065.7	850.3	215.3
GW-2	53.3	53.2	0.1							
GW-3	57	56.0	1.0							
GW-4 (1)	65	64.4	0.6	123938	109360	14578	1385			
GW-5 (1)	70	69.3	0.7	540003	439652	100351	9533.345			
GW-6	36	33.9	2.1							
GW-7 (1)	60	59.7	0.3	217613	134907	136706	12987			
GW-8 (1)	69	68.6	0.4	361208	317678	48530	4610			
GW-9 (1)	66	65.5	0.5	254290	223800	30490	2897			
GW-10	70	66.3	3.7							
GW-11 (1)	65	64.5	0.5	114071	87245	26826	2548			
GW-12 (1)	81	74.7	6.3	310824	310824	0.0	0.0			
GW-13 (1)	69	68.6	0.4	297990	245084	52908	5026			

38,986 gal

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Time of cycle meter reading was recorded on 12-31-96 and 1-31-97.
(3) Difference x .095 gal/cycle = gallons pumped.

twenty years

ANALYTICAL REPORT

RECEIVED
JAN 29 1997
TERRA ENGINEERING

TERRA ENGINEERING
JIM FALBO
2201 VONDRON RD.
MADISON, WI 53704

Client I.D. No.: LT2000000010
Work Order No.: 9701000078
Report Date: 01/28/97
Date Received: 01/07/97
Arrival Temperature: On Ice

Project Name: **REFUSE HIDEAWAY** Project Number: 468

Sample I.D. #:146492 **Sample Description:**LANDFILL LEACHATE **Date Sampled:**01/07/97

Analyte	Result	Units	LOD	LOQ
Selenium	<1	µg/L	1	3
Matrix interference.				
Hexavalent Chromium	138	µg/L	5	17
Hexavalent Chromium sample preparation date was 1/8/97.				
Chromium, Total, Low Level (Cr6+ Confirmation)	45	µg/L	10	33
Copper	<10	µg/L	10	33
Lead	44	µg/L	30	100
Analysis Date Metals Sample Preparation	1/08/97			

Comments for entire Work Order:
None

Submitted By:

Commonwealth Technology, Inc.
1230 Lange Court
Baraboo, Wisconsin 53913

WI DNR Lab Certification Number: 157066030 DHSS Certification Number: MW0289

Phone 608-356-2760
Fax 608-356-2766
E-mail boo@ctienv.com

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

March 7, 1997

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 1997
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 1997 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by A-1 Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
February 03, 1997	9,174 gallons
February 07, 1997	4,453 gallons
February 13, 1997	4,150 gallons
February 17, 1997	4,163 gallons
February 24, 1997	10,118 gallons
Total Gallons	32,058 gallons

Based on liquid level measurements at the collection tank.

DRON ROAD
., WI 53704-6795
21-3501 PHONE
08/221-4075 FAX

WEEKLY/MONTHLY MONITORING SCHEDULE

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

February 10, 1997	Weekly
February 21, 1997	Weekly
February 28, 1997	Weekly
March 5, 1997	Monthly Leachate Head Monitoring
March 6, 1997	Weekly, Monthly Gas Probe Monitoring, Monthly Gas Well Monitoring

There were four (4) system shut downs during the period from February 5, 1997 to March 6, 1997.

Other Work Performed

Annual Leachate line clean-out was conducted by Visu-sewer on February 5, 1997.

If you have any questions, please do not hesitate to call me.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

James A. Falbo
Project Manager

Attachments

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: 3-5-97
Temperature: 33 °F at 11:00am
Barometric pressure: 30.08↓ inches Hg
Monitored by: JAF
Gas Detector Model No./Serial No.: Gem500/GM190
Date Gas Detector last calibrated: Factory calibrated: May 44 (3)
Velometer Model No./Serial No.: Alnor 6001
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	-7	0	37.3	0.0	20.3	7.3	72.4	0	0	0	
GW-2	-7	0	40.2	0.0	20.5	8.7	70.8	0	0	0	
GW-3	-7	-5	57.7	52.3	0.2	38.2	9.3	1250	56.25	32.5	
GW-4 (1)	-7	-7	54	62.6	0.3	37.1	0.0	500	22.5	12.7	
GW-5 (1)	-7	-4	51.3	55.9	0.8	42.0	1.3	700	31.5	16.2	
GW-6	-8	-7	56.1	40.5	0.0	34.3	25.2	500	22.5	12.6	
GW-7 (1)	-8	-8	56.7	62.5	0.1	37.4	0.0	700	31.5	17.9	
GW-8 (1)	-8	-8	57.8	58.2	0.3	41.2	0.3	600	27.0	15.6	
GW-9 (1)	-8	-8	47.0	59.5	0.2	39.2	1.1	600	27.0	12.7	
GW-10	-10	-6	96.3	41.7	0.0	34.9	23.4	500	22.5	9.4	
GW-11 (1)	-10	-10	41.0	65.7	0.0	34.3	0.0	800	36	14.8	
GW-12 (1)	-10	-10	94.8	53.0	0.0	36.6	10.4	1000	45	23.9	
GW-13	-10	-10	62.8	57.0	0.4	40.7	1.9	500	22.5	14.1	

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: 3-4-97
- 50% CH_4 read 50 % CH_4
- 15% CH_4 read 15 % CH_4
- 15% CO_2 read 15 % CO_2

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: 3-5-97
Temperature: 33 °F at 1100
Barometric pressure: 30.08 inches Hg
Monitored by: JAF
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	0.0	19.3
G-1D	0.0	0.0	0.0	19.5
G-6	0.0	0.0	0.0	20.7
G-8	0.0	0.0	0.0	20.3
G-9	0.0	0.0	0.0	20.3
G-10	0.0	0.0	0.0	20.5
GP-11S	0.0	0.0	0.0	20.3
GP-11D	0.0	0.0	0.0	20.2
GPW-1S	0.0	0.0	0.0	20.1
GPW-1M	0.0	0.0	0.0	18.0
GPW-1D	0.0	0.0	0.0	17.8
Speedway Building (2)	NA	0.0	0.0	20.8
Speedway Building (3)	NA	0.0	0.0	20.7

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: 3-5-97

	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	-10	50.3	0.2	800	62.4	65.0	37.0	3/9
Central Branch	-8	46.8	0.8	600	46.8	48.9	37.5	3/9
South Branch	-8	45.7	2.6	1100	85.8	89.6	37.4	4/9
Flare Inlet Pipe								
Port A	+1							N/A
Port B	+1	50.6	0.1	1400	259	268.3	51.7	Full
Port C	+3/4							N/A

→ The inlet flare pressures are low because valving is reduced to maintain gas concentration TAE 3/10/97

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: 3-4-97

	LEACHATE HEAD (ft)							Compressor Hour Reading		
Well	Gas Well Depth	Depth to Leachate	Leachate Head	Current Pump Cycles	Previous Pump Cycles	Difference	Gal. Pumped (3)	Current Hours	Previous Hours	Total Hours
GW-1	51.7	51.7	0.0					1315.1	1065.7	249.4
GW-2	53.3	53.3	0.0							
GW-3	57	56.4	0.6							
GW-4 (1)	65	64.7	0.3	145160	123938	21222	2016			
GW-5 (1)	70	69.5	0.5	643957	540003	103954	9875.6			
GW-6	36	33.4	2.6							
GW-7 (1)	60	59.4	0.6	308894	217613	91281	8671.7			
GW-8 (1)	69	68.7	0.3	409675	361208	48467	4604.4			
GW-9 (1)	66	65.4	0.6	285142	254290	30854	2930.9			
GW-10	70	65.3	4.7							
GW-11 (1)	65	64.3	0.7	146696	114071	32625	3099.4			
GW-12 (1)	81	80.4	0.6	369029	310824	58205	5529.5			
GW-13 (1)	69	68.6	0.4	350457	297990	52467	4984.4			

41,711.9 gal

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Time of cycle meter reading was recorded on 3-4-97 and 1-31-97.
(3) Difference x .095 gal/cycle = gallons pumped.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: February 1997

ALARM DATE	ALARM CAUSE	SOLUTION (HOURS FLARE NOT OPERATIONAL)
02/05/97 (11:00 PM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 2:30 PM. ON 02/06/97 (15.5 HRS)
02/12/97 (10:30 AM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 1:00 PM. ON 02/13/97 (26.5 HRS)
02/24/97 (6:00 AM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 8:50 AM. ON 02/25/97 (27.0 HRS)
03/03/97 (1:30 AM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 9:30 AM. ON 03/04/97 (32.0 HRS)

twenty years

ANALYTICAL REPORT

RECEIVED
FEB - 6 1997

TERRA ENGINEERING

Client I.D. No.: LT2000000010
Work Order No.: 9701000171
Report Date: 02/04/97
Date Received: 01/10/97
Arrival Temperature: On Ice

TERRA ENGINEERING
JIM FALBO
2201 VONDRON RD.
MADISON, WI 53704

Project Name: **REFUSE HIDEAWAY** Project Number: **468**

Sample I.D. #:146900 **Sample Description:**LANDFILL LEACHATE **Date Sampled:**01/10/97

Analyte	Result	Units	LOD	LOQ
Cadmium	<4	µg/L	4	13
Chromium	44	µg/L	10	33
Nickel	128	µg/L	20	67
Zinc	17	µg/L	10	33
Mercury	<0.4	µg/L	0.2	0.7
Elevated detection limit due to sample dilution presence of matrix interference.				
	1/13/97			
Oil and Grease	8	mg/L	4	13
pH (Lab)	6.70	S.U.'s	NA	NA
Cyanide	12	µg/L	5	17
Silver	0.4	µg/L	0.1	0.3
Estimated value. Elevated concentration due to sample dilution.				
Analysis Date Silver	1/28/97			

Comments for entire Work Order:
None

Submitted By:

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

April 11, 1997

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 1997
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 1997 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by A-1 Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
March 03, 1997	9,229 gallons
March 13, 1997	14,062 gallons
March 17, 1997	4,474 gallons
Total Gallons	27,765 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 14, 1997	Weekly
March 21, 1997	Weekly
March 25, 1997	Weekly
March 31, 1997	Monthly Leachate Head Monitoring, Quarterly Leachate Sampling, Quarterly Monitoring
April 4, 1997	Weekly, Monthly Gas Probe Monitoring, Monthly Gas Well Monitoring

There were four (4) system shut downs during the period from March 6, 1997 to April 4, 1997.

Other Work Performed

On March 13, 1997, the leachate compressor shut down due to faulty unloader piston seals in the cylinder heads. The seals were replaced under warranty on March 31, 1997. The piston seals will be lubricated every three (3) months or 1,000 hours of operation so seals do not wear prematurely.

On March 18, 1997, all air filters in the compressor building were dismantled and cleaned. This will also take place every three (3) months or 1,000 hours of operation.

On March 21, 1997, the above ground well lateral on gas well 8 was replaced. The lateral broke due to gas header pipe settlement.

On March 31, 1997, quarterly leachate sampling was conducted. Results will be sent to the DNR and Madison Metropolitan Sewerage District when they are received.

If you have any questions, please do not hesitate to call me.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

James A. Falbo
Project Manager

Attachments

REFUSE\mar97.rpt

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: 4-1-97
Temperature: 60° F at 2:00 pm
Barometric pressure: 30.22 inches Hg
Monitored by: JAF
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.:
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	-9	0	60.7	0.3	20.8	20.3	58.6	0	0	0	
GW-2	-9	0	60.1	0.4	21.4	24.0	54.2	0	0	0	
GW-3	-9	-6½	63.3	48.3	0.0	46.4	5.3	1500	67.5	32.6	
GW-4(1)	-9	-9	60.9	61.1	0.0	38.8	0.0	650	29.3	17.9	
GW-5(1)	-5	-5	63.1	54.0	1.2	45.4	0.0	700	31.5	17.0	
GW-6	-14	-11	68.1	30.6	0.1	34.2	34.6	700	31.5	9.6	
GW-7(1)	-14	-14	64.5	59.4	0.0	39.0	1.3	500	22.5	13.4	
GW-8(1)	-14	-14	73.4	58.2	0.0	41.8	0.0	500	22.5	13.1	
GW-9(1)	-14	-14	63.1	57.5	0.8	41.7	0.0	600	27.0	15.5	
GW-10	-11	-7	103.1	33.1	0.2	36.1	30.6	600	27.0	8.9	
GW-11(1)	-10	-10	65.4	64.6	0.0	35.4	0.0	800	36.0	23.3	
GW-12(1)	-10	-10	95.6	50.0	0.0	41.0	8.6	800	36.0	18.0	
GW-13	-10	-10	66.4	56.5	0.0	43.0	0.0	700	31.5	17.8	

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: 4-1-97
50% CH_4 read 50 % CH_4
15% CH_4 read 15 % CH_4
15% CO_2 read 15 % CO_2

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: 4-1-97
Temperature: 60° F at 2130
Barometric pressure: 30.22 inches Hg
Monitored by: JAF
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	0.0	21.2
G-1D	0.0	0.0	0.0	20.9
G-6	0.0	0.0	0.0	21.0
G-8	0.0	0.0	0.0	21.1
G-9	0.0	0.0	0.0	21.1
G-10	0.0	0.0	0.0	21.4
GP-11S	0.0	0.0	0.0	21.0
GP-11D	0.0	0.0	0.0	21.3
GPW-1S	0.0	0.0	0.0	20.8
GPW-1M	0.0	0.0	0.0	21.2
GPW-1D	0.0	0.0	0.0	21.3
Speedway Building (2)	—	0.0	0.0	21.2
Speedway Building (3)	—	0.0	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: 4-1-97

	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	-11	46.3	0.0	800	62.4	61.8	60.5	3/9
Central Branch	-14	42.3	0.0	900	70.2	68.7	63.3	3/9
South Branch	-10	43.3	1.0	1200	93.6	93.1	59.3	3/9
Flare Inlet Pipe								
Port A	+2							N/A
Port B	+2	44.7	0.2	1700	314.5	315.7	70.3	Full
Port C	+1							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: 3-31-97

	LEACHATE HEAD (ft)							Compressor Hour Reading		
Well	Gas Well Depth	Depth to Leachate	Leachate Head	Current Pump Cycles	Previous Pump Cycles	Difference	Gal. (3) Pumped	Current Hours	Previous Hours	Total Hours
GW-1	51.7	51.7	0.0					1430.3	1315.1	115.2
GW-2	53.3	53.3	0.0							
GW-3	57	56.7	0.3							
GW-4 (1)	65	64.5	0.5	166098	145160	20938	1989.11			
GW-5 (1)	70	69.4	0.6	727091	643957	83134	7897.7			
GW-6	36	34.3	0.7							
GW-7 (1)	60	59.3	0.7	396116	308894	87222	8286.1			
GW-8 (1)	69	68.4	0.6	440110	409675	30435	2891.3			
GW-9 (1)	66	65.7	0.3	308417	285142	23275	2211.1			
GW-10	70	64.4	5.6							
GW-11 (1)	65	64.6	0.4	188 746	146696	42050	3994.75			
GW-12 (1)	81	80.6	0.4	463777	369029	94748	9001.1			
GW-13 (1)	69	68.5	0.5	389972	350457	39515	3753.9			

40,025 gal

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Time of cycle meter reading was recorded on 3-31-97 and 3-4-97.
(3) Difference x .095 gal/cycle = gallons pumped.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: March 1997

ALARM DATE	ALARM CAUSE	SOLUTION (HOURS FLARE NOT OPERATIONAL)
03/12/97 (11:30 AM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 1:55 PM. ON 03/13/97 (26.5 HRS)
03/16/97 (3:00 AM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 2:30 PM. ON 03/18/97 (35.5 HRS)
03/22/97 (8:00 AM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 9:00 AM. ON 03/24/97 (49.0 HRS)
03/30/97 (8:00 AM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 1:10 PM. ON 03/31/97 (29.0 HRS)
		down - 140 hr
		Tot hr - 744
		down - 19% time

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

May 9, 1997

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 1997
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 1997 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by A-1 Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
April 01, 1997	4,896 gallons
April 02, 1997	16,410 gallons
April 08, 1997	4,562 gallons
April 10, 1997	4,250 gallons
April 11, 1997	4,401 gallons
April 15, 1997	4,232 gallons
April 16, 1997	3,583 gallons
April 17, 1997	9,326 gallons
April 22, 1997	9,950 gallons
April 25, 1997	4,743 gallons
Total Gallons	66,353 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:

April 11, 1997	Weekly
April 18, 1997	Weekly
April 25, 1997	Weekly
May 1, 1997	Weekly
May 6, 1997	Monthly Leachate Head Monitoring, Monthly Gas Probe Monitoring

There were five (5) system shut downs during the period from April 4, 1997 to May 5, 1997.

Other Work Performed

On April 25, 1997, the control panel lost power when I was changing a light bulb in the panel. Academy Electric was called and found a blown fuse in the control panel. The fuse was replaced and the panel is operating properly.

On May 1, 1997, the flare safeguard control was discovered to be malfunctioning . Jim Dix of Linklater Corp. recommended the control be replaced. A new unit was ordered on May 6, 1997. Linklater estimates 2-4 weeks for delivery of the new control. No weekly or monthly gas well monitoring will be conducted until the new control is installed, since the flare is shut down.

Also enclosed are Quarterly Leachate Analytical Results. A copy of, the results were sent to the Madison Metropolitan Sewerage District.

If you have any questions, please do not hesitate to call me.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

James A. Falbo
Project Manager

Attachments

TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: 5-6-97
Temperature: 55 °F at 2:00
Barometric pressure: 30.21 inches Hg
Monitored by: SAF
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	0.0	20.9
G-1D	0.0	0.0	0.0	20.9
G-6	0.0	0.0	0.0	20.7
G-8	0.0	0.0	0.0	20.6
G-9	0.0	0.0	0.0	20.5
G-10	-0.5	0.0	0.0	20.7
GP-11S	0.0	0.0	0.0	19.6
GP-11D	0.0	0.0	0.0	20.4
GPW-1S	0.0	0.0	0.0	20.5
GPW-1M	0.0	0.0	0.0	21.0
GPW-1D	0.0	0.0	0.0	20.6
Speedway Building (2)	—	0.0	0.0	20.9
Speedway Building (3)	—	0.0	0.0	20.8

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 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION

Date: 5-6-97

Well	LEACHATE HEAD (ft)							Compressor Hour Reading		
	Gas Well Depth	Depth to Leachate	Leachate Head	Current Pump Cycles	Previous Pump Cycles	Difference	Gal. Pumped (3)	Current Hours	Previous Hours	Total Hours
GW-1	51.7	57.1	0.0					1700.5	1430.3	270.2
GW-2	53.3	53.3	0.0							
GW-3	57	56.5	0.5							
GW-4 (1)	65	64.6	0.4	234342	160098	74244	7053.2			
GW-5 (1)	70	69.5	0.5	912223	727091	185132	17587.5			
GW-6	36	34.5	1.5							
GW-7 (1)	60	59.5	0.5	592018	396116	195902	18610.7			
GW-8 (1)	69	68.5	0.5	590220	440110	150110	14260.5			
GW-9 (1)	66	65.6	0.4	356477	308417	48060	4565.7			
GW-10	70	64.3	5.7							
GW-11 (1)	65	64.3	0.7	271957	188746	83211	7905.1			
GW-12 (1)	81	80.3	0.7	466568	463777	2791	256.2			
GW-13 (1)	69	68.4	0.6	481060	389972	91088	8653.4			

78,892.3

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Time of cycle meter reading was recorded on 3-31-97 and 5-6-97.
(3) Difference x .095 gal/cycle = gallons pumped.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: April 1997

ALARM DATE	ALARM CAUSE	SOLUTION (HOURS FLARE NOT OPERATIONAL)
04/04/97 (4:00 PM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 8:40 AM. ON 04/07/97 (64.0 HRS)
04/13/97 (3:00 AM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 8:40 AM. ON 04/14/97 (29.5 HRS)
04/20/97 (4:00 AM)	FLAME FAILURE. DUE TO LOW LANDFILL GAS CONTENT	RE-START BLOWER/FLARE, AT 11:00 AM. ON 04/23/97 (79.0 HRS)
04/24/97 (7:30 PM)	FLAME FAILURE. DUE TO FAULTY FLARE CONTROL	RE-START BLOWER/FLARE, AT 9:30 AM. ON 04/25/97 (11.0 HRS)
04/25/97 (2:20 PM)	FLAME FAILURE. DUE TO FAULTY FLARE CONTROL	RE-START BLOWER/FLARE, AT 11:15 AM. ON 04/29/97 (93.0 HRS)
04/29/97 (2:00 PM)	FLAME FAILURE. DUE TO FAULTY FLARE CONTROL	BLOWER NOT RESTORED UNTIL FLARE CONTROL IS REPLACED.

ANALYTICAL REPORT

Page:1

Client I.D. No.: LT2000000010
Work Order No.: 9704000091
Report Date: 04/18/97
Date Received: 04/03/97
Arrival Temperature: On Ice

TERRA ENGINEERING
JIM FALBO
2201 VONDRON RD.
MADISON, WI 53704

Project Name: **REFUSE HIDEAWAY** Project Number: **468**

Sample I.D. #:154059 **Sample Description:**LEACHATE **Date Sampled:**04/03/97

Analyte	Result	Units	LOD	LOQ
Cyanide	15	µg/L	5	17
Analysis Date Cyanide	4/04/97			
Selenium	<1	µg/L	1	3
Analysis Date Selenium	4/10/97			
Hexavalent Chromium	112	µg/L	5	17
Analysis Date Hexavalent Chromium	4/04/97			
Mercury	<0.2	µg/L	0.2	0.7
Analysis Date Mercury	4/17/97			
Analysis Date Metals Sample Preparation	4/07/97			
Oil and Grease	5	mg/L		
Analysis Date Oil and Grease	4/10/97			
pH (Lab)	7.14	S.U.'s	NA	NA
Analysis Date pH	4/03/97			
Silver	0.40	µg/L	0.10	0.33
Analysis Date Silver	4/15/97			
Chromium	37	µg/L	5	17
Analysis Date Chromium	4/09/97			
Cadmium	<4	µg/L	4	13
Analysis Date Cadmium	4/09/97			
Copper	<10	µg/L	10	33
Analysis Date Copper	4/09/97			
Lead	<40	µg/L	40	133
Analysis Date Lead	4/09/97			
Zinc	13	µg/L	5	17
Estimated value: concentration was less than LOQ.				
Analysis Date Zinc	4/09/97			
Nickel	92	µg/L	20	67
Analysis Date Nickel	4/09/97			

Comments for entire Work Order:
None

Submitted By:

Commonwealth Technology, Inc.
1230 Lange Court
Baraboo, Wisconsin 53913

WI DNR Lab Certification Number: 157066030 DHSS Certification Number: MW0289

Phone 608-356-2760
Fax 608-356-2766
E-mail boo@ctienv.com

ANALYTICAL REPORT

twenty years

RECEIVED
JAN 29 1997
TERRA ENGINEERING

Client I.D. No.: LT2000000010
Work Order No.: 9701000078
Report Date: 01/28/97
Date Received: 01/07/97
Arrival Temperature: On Ice

TERRA ENGINEERING
JIM FALBO
2201 VONDRON RD.
MADISON, WI 53704

Project Name: **REFUSE HIDEAWAY** Project Number: 468

Sample I.D. #:146492 **Sample Description:**LANDFILL LEACHATE **Date Sampled:**01/07/97

Analyte	Result	Units	LOD	LOQ
Selenium	<1	µg/L	1	3
Matrix interference.				
Hexavalent Chromium	138	µg/L	5	17
Hexavalent Chromium sample preparation date was 1/8/97.				
Chromium, Total, Low Level (Cr6+ Confirmation)	45	µg/L	10	33
Copper	<10	µg/L	10	33
Lead	44	µg/L	30	100
Analysis Date Metals Sample Preparation	1/08/97			

Comments for entire Work Order:
None

Submitted By:

Commonwealth Technology, Inc.
1230 Lange Court
Baraboo, Wisconsin 53913

WI DNR Lab Certification Number: 157066030 DHSS Certification Number: MW0289

Phone 608-356-2760
Fax 608-356-2766
E-mail boo@ctienv.com

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

June 6, 1997

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 1997
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 1997 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by A-1 Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
May 01, 1997	9,341 gallons
May 05, 1997	5,006 gallons
May 14, 1997	8,058 gallons
May 19, 1997	9,080 gallons
May 29, 1997	4,032 gallons
May 30, 1997	8,991 gallons
Total Gallons	40,476 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 27, 1997	Monthly Leachate Head Monitoring, Monthly Gas Probe Monitoring

Due to flame safeguard control failure, no weekly or monthly gas well monitoring was conducted.

Other Work Performed

On May 9, 1997, quarterly maintenance was conducted on the leachate systems air compressor. The oil was changed, the air filters were cleaned out and the unloaders were greased.

If you have any questions, please do not hesitate to call me.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

James A. Falbo
Project Manager

Attachments

TABLE 2

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS PROBE MONITORING INFORMATION

Date: 6-3-97
Temperature: 62° F at 2:00
Barometric pressure: 30.06 inches Hg
Monitored by: JAF
Gas Detector Model No./Serial No.: Gem500 Gm150
Date Gas Detector last calibrated: Factory calibrated: May 97 (4)

Probe	Pressure (inches W.C.)	CH_4 (%)	CH_4[1] (% LEL)	O_2 (%)
G-1S	0.0	51.8 %	< 100 %	0.0
G-1D	0.0	22.3 %	< 100 %	9.1
G-6	0.0	0.0	0.0	20.7
G-8	0.0	0.0	0.0	20.5
G-9	0.0	0.0	0.0	20.7
G-10	0.0	0.0	0.0	20.8
GP-11S	0.0	0.0	0.0	16.0
GP-11D	0.0	0.0	0.0	16.0
GPW-1S	0.0	0.0	0.0	20.5
GPW-1M	0.0	0.0	0.0	20.7
GPW-1D	0.0	0.0	0.0	20.7
Speedway Building [2]	—	0.0	0.0	20.7
Speedway Building [3]	—	0.0	0.0	20.7

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 4

REFUSE HIDEAWAY LANDFILL
MONTHLY LEACHATE HEAD MONITORING INFORMATION
Date: 5-27-97

Well	LEACHATE HEAD (ft)							Compressor Hour Reading		
	Gas Well Depth	Depth to Leachate	Leachate Head	Current Pump Cycles	Previous Pump Cycles	Difference	Gal. (3) Pumped	Current Hours	Previous Hours	Total Hours
GW-1	51.7	51.7	0.0					1853.8	1700.5	153.3
GW-2	53.3	53.3	0.0							
GW-3	57	55.4	1.6							
GW-4 (1)	65	63.0	2.0	276396	234342	42054	3995.13			
GW-5 (1)	70	69.6	0.4	603939	512223	91716	8713.0			
GW-6	36	34.0	2.0							
GW-7 (1)	60	59.7	0.3	675880	592018	83862	7966.9			
GW-8 (1)	69	68.6	0.4	540754	490220	50534	4800.73			
GW-9 (1)	66	65.3	0.7	375252	356477	18775	1783.6			
GW-10	70	63.9	6.1							
GW-11 (1)	65	64.5	0.5	309986	271957	38029	3612.8			
GW-12 (1)	81	80.2	0.8	500142	466568	33574	3189.5			
GW-13 (1)	69	68.0	1.0	532606	481060	51546	4896.8			

38,958.46

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Time of cycle meter reading was recorded on 5-6-97 and 5-27-97.
(3) Difference x .095 gal/cycle = gallons pumped.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: May 1997

ALARM DATE	ALARM CAUSE	SOLUTION (HOURS FLARE NOT OPERATIONAL)
	DUE TO FLAME SAFEGUARD CONTROL FAILURE, THE FLARE WAS NOT RUNNING FOR THE MONTH OF MAY	

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

August 4, 1997

Wisconsin Department of
Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711

Attn: Mr. Harlan Kuehling

Re: Operation and Maintenance
Summary - June 1997
Landfill Gas and Leachate
Extraction System
Refuse Hideaway Landfill
Middleton, Wisconsin
Terra Job #468

Dear Mr. Kuehling:

This letter summarizes operation and maintenance (O&M) activities performed by Terra Engineering & Construction Corporation (Terra), during the month of June 1997 at the Refuse Hideaway Landfill. Specific tasks are discussed in the following sections:

SCHEDULED LEACHATE LOADOUT

Leachate/Condensate was pumped and transported by A-1 Sewer Service to the Madison Metropolitan Sewerage District Treatment Facility. The hauling dates and quantities are as follows:

	Measured (1) Volume (gals)
June 03, 1997	4,906 gallons
June 05, 1997	9,511 gallons
June 13, 1997	4,914 gallons
June 19, 1997	4,739 gallons
June 21, 1997	13,130 gallons
June 26, 1997	4,452 gallons
Total Gallons	41,652 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

NOTE NEW ZIP 53718-6795
VISIT OUR WEBSITE:
www.terraeng.com

WEEKLY/MONTHLY MONITORING SCHEDULE

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

June 13, 1997	Weekly
June 17, 1997	Annual & Quarterly Leachate Samples, Quarterly Monitoring
June 19, 1997	Weekly
June 25, 1997	Weekly
June 30, 1997	Monthly Leachate Head Monitoring, Monthly Gas Probe Monitoring, Monthly Gas Well Monitoring, Weekly
July 15, 1997	Resample VOC Leachate

There were seven (7) system shut downs during the period from June 9, 1997 to June 30, 1997.

Other Work Performed

On June 9, 1997, the new Flame Safe Guard Control was installed. Restarted Flare at 12:00 p.m. on June 19, 1997. Flare was down for 1,008 hours.

On June 11, 1997, a new Thermocouple was installed due to Thermocouple failure.

On June 17, 1997, Annual and Quarterly Leachate Samples were taken. Results are attached. A copy of the Annual and Quarterly Leachate Samples will be sent to Madison Metropolitan Sewerage District.

I have enclosed a copy of the Flame Safe Guard Control Owner's Manual.

If you have any questions, please do not hesitate to call me.

Sincerely,
TERRA ENGINEERING & CONSTRUCTION CORP.

James A. Falbo
Project Manager

Attachments

REFUSE\june97.rpt

TABLE 1

REFUSE HIDEAWAY LANDFILL
MONTHLY GAS EXTRACTION WELLS MONITORING INFORMATION

Date: 6-30-97
Temperature: ____ F at ____
Barometric pressure: ____ inches Hg
Monitored by: SAF
Gas Detector Model No./Serial No.: Gem500 GM190
Date Gas Detector last calibrated: Factory calibrated: 10/94 (3)
Velometer Model No./Serial No.: ____
Date Velometer last calibrated: Factory calibrated: 10-96

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	-7	+1.2	82.5	17.4	14.4	11.0	57.2	—	—	—	
GW-2	-7	+0.8	80.0	1.0	19.7	0.0	79.3	—	—	—	
GW-3	-6	-2.7	72.5	60.2	0.0	39.8	0.0	900	40.5	24.4	
GW-4(1)	-6½	-4.8	81.5	60.0	0.0	40.0	0.0	400	18.0	10.8	
GW-5(1)	-2½	-.7	82.5	57.6	0.2	42.2	0.0	250	11.3	6.5	
GW-6	-9	-6.8	72.5	61.7	0.0	38.3	0.0	650	29.3	18.0	
GW-7(1)	-9½	-9.2	83.3	63.0	0.0	37.0	0.0	400	18.0	11.3	
GW-8(1)	-9½	-9.0	86.5	58.1	0.4	41.5	0.0	400	18.0	10.5	
GW-9(1)	-9½	-8.1	82.3	59.9	0.3	39.8	0.0	350	15.8	9.4	
GW-10	-8	-4.2	92.2	61.1	0.0	38.9	0.0	400	18	11.0	
GW-11(1)	-8	-6.9	81.2	66.1	0.0	33.9	0.0	200	9.0	6.0	
GW-12(1)	-8	-6	99.1	60.3	0.0	39.7	0.0	650	29.3	17.7	
GW-13	-8	-6.9	83.3	62.8	0.0	37.2	0.0	400	18	11.3	

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: 6-30-97
50% CH_4 read 50 % CH_4
15% CH_4 read 15 % CH_4
15% CO_2 read 15 % CO_2

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: 6-30-97
Temperature: ____ F at ____
Barometric pressure: ____ inches Hg
Monitored by: JAF
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	+.6	28.8	100>	2.7
G-1D	+.6	45.5	100>	0.0
G-6	0.0	0.0	0.0	15.0
G-8	0.0	0.0	0.0	20.3
G-9	0.0	0.0	0.0	20.4
G-10	0.0	0.0	0.0	20.4
GP-11S	+.6	7.6	100>	0.0
GP-11D	+.6	13.9	100>	0.0
GPW-1S	+1.3	0.0	0.0	20.0
GPW-1M	+1.4	0.0	0.0	19.5
GPW-1D	+1.4	0.0	0.0	18.6
Speedway Building (2)	0.0	0.0	0.0	20.7
Speedway Building (3)	0.0	0.0	0.0	20.7

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: 6-30-97

	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	-7.6	61.9	0.0	1000	78	72.9	82.0	3/9
Central Branch	-9.0	56.5	1.0	800	62.4	59.7	81.5	3/9
South Branch	-6.8	54.0	1.7	1100	85.8	70.5	72.0	3/9
Flare Inlet Pipe								
Port A	+2.1/2							N/A
Port B	+1 1/2	59.1	0.1	1400	259	249.6	92.0	Full
Port C	+1/2							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: 6-30-97

	LEACHATE HEAD (ft)							Compressor Hour Reading		
Well	Gas Well Depth	Depth to Leachate	Leachate Head	Current Pump Cycles	Previous Pump Cycles	Difference	Gal. (3) Pumped	Current Hours	Previous Hours	Total Hours
GW-1	51.7	46.3	5.4					2079.2	1853.8	225.4
GW-2	53.3	48.0	5.3							
GW-3	57	55.3	1.7							
GW-4 (1)	65	63.7	1.3	335468	276396	59072	5611.8			
GW-5 (1)	70	69.5	.5	154056	003939	150117	14261.1			
GW-6	36	36.0	0.0							
GW-7 (1)	60	58.0	2.0	783787	675880	107907	10251.2			
GW-8 (1)	69	68.5	0.5	597832	540754	57078	5422.4			
GW-9 (1)	66	65.5	0.5	417754	375-252	42502	4037.7			
GW-10	70	62.0	8.0							
GW-11 (1)	65	64.5	0.5	353860	309986	43874	4168.0			
GW-12 (1)	81	80.5	0.5	567072	500142	66930	6358.4			
GW-13 (1)	69	6 .7	1.3	625505	532606	92899	8825.4			

58,936 gal

Notes:

(1) Wells with leachate extraction pumps and controls.
(2) Time of cycle meter reading was recorded on 5-27-97 and 6-30-97.
(3) Difference x .095 gal/cycle = gallons pumped.

TABLE 5

REFUSE HIDEAWAY LANDFILL
MONTHLY SUMMARY OF SYSTEM ALARM LOG
Date: June 1997

ALARM DATE	ALARM CAUSE	SOLUTION (HOURS FLARE NOT OPERATIONAL)
06/09/97 6:30 PM	FLAME FAILURE - DUE TO BAD THERMOCOUPLE	RESTART BLOWER/FLARE AT 10:00 AM ON 06/10/97 (8.5 HRS)
06/10/97 7:00 PM	FLAME FAILURE - UNKNOWN REASON	RESTART BLOWER/FLARE AT 1:05 PM ON 06/13/97 (66.0 HRS)
06/15/97 7:00 PM	FLAME FAILURE - UNKNOWN REASON	RESTART BLOWER/FLARE AT 1:50 PM ON 06/16/97 (19.0 HRS)
06/17/97 2:00 AM	FLAME FAILURE - UNKNOWN REASON	RESTART BLOWER/FLARE AT 10:00 AM ON 06/19/97 (56.0 HRS)
06/20/97 3:00 PM	FLAME FAILURE - DUE TO HIGH LEACHATE LEVEL	RESTART BLOWER/FLARE AT 9:30 AM ON 06/23/97 (66.5 HRS)
06/26/97 11:50 AM	FLAME FAILURE - UNKNOWN REASON	RESTART BLOWER/FLARE AT 1:05 PM ON 06/27/97 (24.0 HRS)
06/27/97 6:00 AM	FLAME FAILURE - UNKNOWN REASON	RESTART BLOWER/FLARE AT 10:00 AM ON 06/30/97 (76.0 HRS)

ANALYTICAL REPORT

RECEIVED
JUL 17 1997
TERRA ENGINEERING

TERRA ENGINEERING
JIM FALBO
2201 VONDRON RD.
MADISON, WI 53704

Client I.D. No.: LT2000000010
Work Order No.: 9706000471
Report Date: 07/15/97
Date Received: 06/17/97
Arrival Temperature: On Ice

Project Name: Project Number:

Sample I.D. #:161759 **Sample Description:**LANDFILL LEACHATE **Date Sampled:**06/17/97

Analyte	Result	Units	LOD	LOQ	Method
Cyanide	<10	µg/L	5	13	9010
Elevated detection limit due to sample dilution; presence of matrix interference.					
Analysis Date Cyanide	6/25/97				9010
Selenium	<1	µg/L	1	3	7740
Analysis Date Selenium	6/23/97				7740
Hexavalent Chromium	74	µg/L	5	17	7196
Analysis Date Hexavalent Chromium	6/18/97				7196
Cadmium	<4	µg/L	4	13	6010
Analysis Date Cadmium	6/24/97				6010
Chromium	34	µg/L	5	17	6010
Analysis Date Chromium	6/24/97				6010
Copper	19	µg/L	10	33	6010
Estimated value: concentration was less than LOQ.					
Analysis Date Copper	6/25/97				6010
Lead	<40	µg/L	40	133	6010
Analysis Date Lead	6/24/97				6010
Nickel	106	µg/L	20	67	6010
Analysis Date Nickel	6/24/97				6010
Zinc	18	µg/L	5	17	6010
Analysis Date Zinc	6/25/97				6010
Mercury	<0.2	µg/L	0.2	0.7	7470
Analysis Date Mercury	7/02/97				7470
Analysis Date Metals Sample Preparation	6/18/97				3020
Oil and Grease	10				413.1
Analysis Date Oil and Grease	6/23/97				413.1
pH (Lab)	7.19	S.U.'s	NA	NA	9045
Analysis Date pH	6/13/97				9045
Silver	<0.20	µg/L	0.10	0.33	7761
Elevated detection limit due to sample dilution.					
Analysis Date Silver	6/23/97				7761

Sample I.D. #:161760 **Sample Description:**LANDFILL LEACHATE **Date Sampled:**06/17/97

Analyte	Result	Units	LOD	LOQ	Method
Analysis Date TCLP Herbicides	7/09/97				Sub Lab
See attached report for results.					
Analysis Date TCLP Pesticides	7/09/97				Sub Lab
See attached report for results.					
Analysis Date TCLP SVOC's	7/09/97				Sub Lab
See attached report for results.					
Extraction - TCLP	6/20/97				EPA 1311
TCLP ICP Arsenic	<0.10	mg/L	0.10	0.33	EPA 6010

Submitted By:

Commonwealth Technology, Inc. WI DNR Lab Certification Number: 157066030 DHSS Certification Number: MW0289
1230 Lange Court
Baraboo, Wisconsin 53913
Phone 608-356-2760
Fax 608-356-2766
E-mail fyi@ctienv.com

Client I.D. No.: LT2000000010
Work Order No.: 9706000471
Report Date: 07/15/97
Date Received: 06/17/97
Arrival Temperature: On Ice

TERRA ENGINEERING
JIM FALBO
2201 VONDRON RD.
MADISON, WI 53704

Project Name: Project Number:

Sample I.D. #:161760 **Sample Description:**LANDFILL LEACHATE **Date Sampled:**06/17/97

Analyte	Result	Units	LOD	LOQ	Method
TCLP ICP Barium	1.18	mg/L	0.005	0.017	EPA 6010
TCLP ICP Cadmium	<0.004	mg/L	0.004	0.013	EPA 6010
TCLP ICP Chromium	0.037	mg/L	0.005	0.017	EPA 6010
TCLP ICP Lead	<0.040	mg/L	0.040	0.133	EPA 6010
TCLP ICP Selenium	<0.1	mg/L	0.1	0.3	EPA 6010
TCLP Mercury	<0.0002	mg/L	0.0002	0.0007	EPA 7470
Metals Sample Preparation	6/20/97				EPA 3020
TCLP Silver	<0.003	mg/L	0.003	0.010	EPA 7760
Matrix interference.					

Comments for entire Work Order:
None

Submitted By:

Commonwealth Technology, Inc.
1230 Lange Court
Baraboo, Wisconsin 53913

WI DNR Lab Certification Number: 157066030 DHSS Certification Number: MW0289

Phone 608-356-2760
Fax 608-356-2766
E-mail fyi@ctienv.com

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Madison, WI 53717
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ENCHEM INC.

Corporate Office & Laboratory
1795 Industrial Drive
Green Bay, WI 54302
414-469-2436 • Fax: 414-469-8827
1-800-7-ENCHEM

- Analytical Report -

Project Name : TERRA - REFUSE
Project Number : 9706000471
WI DNR LAB ID : 113138520

Submitter # : 1272.00
Submitter : COMMONWEALTH TECHNOLOGY
Report Date : 7/9/97

Sample No.	Station ID	Collection Date	Sample No.	Station ID	Collection Date
972091-001	161760 LANDFILL LEACHATE	6/17/97			

I certify that the data contained in this Final Report has been generated and reviewed in accordance with approved methods and Laboratory Standard Operating Procedure. Exceptions, if any, are discussed in the accompanying sample narrative. Release of this final report is authorized by Laboratory management, as is verified by the following signature.

Elizabeth Nelson
Approval Signature

7/9/97
Date

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802 Deming Way
Madison, WI 53717
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Corporate Office & Laboratory
1795 Industrial Drive
Green Bay, WI 54302
414-469-2436 • Fax: 414-469-8827
1-800-7-ENCHEM

- Analytical Report -

Project Name : TERRA - REFUSE
Project Number : 9708000471
Lab Sample Number : 972091-001
Station ID : 161760 LANDFILL LEACHATE
WI DNR LAB ID : 113138520

Submitter # : 1272.00
Submitter : COMMONWEALTH TECHNOLOGY
Report Date : 7/9/97
Collection Date : 6/17/97
Matrix Type : LEACHATE

Semi-Volatile Organic Results

TCLP LIST - SEMIVOLATILES **Prep Method: SW846 3510** **Extraction Date: 6/24/97**

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
2,4,5-Trichlorophenol	< 0.25	0.25	mg/L		7/1/97	SW846 8270
2,4,6-Trichlorophenol	< 0.050	0.050	mg/L		7/1/97	SW846 8270
2,4-Dinitrotoluene	< 0.050	0.050	mg/L		7/1/97	SW846 8270
Cresol, total	< 0.15	0.15	mg/L		7/1/97	SW846 8270
Hexachlorobenzene	< 0.050	0.050	mg/L		7/1/97	SW846 8270
Hexachlorobutadiene	< 0.050	0.050	mg/L		7/1/97	SW846 8270
Hexachloroethane	< 0.050	0.050	mg/L		7/1/97	SW846 8270
Nitrobenzene	< 0.050	0.050	mg/L		7/1/97	SW846 8270
Pentachlorophenol	< 0.25	0.25	mg/L		7/1/97	SW846 8270
Pyridine	< 0.25	0.25	mg/L		7/1/97	SW846 8270

Semi-Volatile Organic Results

TCLP LIST--HERBICIDES **Prep Method: SW-846 8150** **Extraction Date: 6/23/97**

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
2,4,5-TP (Silvex)	0.0013	0.00020	mg/L	D	6/26/97	SW846 8150
2,4-D	< 0.00020	0.00020	mg/L		6/24/97	SW846 8150

Semi-Volatile Organic Results

TCLP LIST - PESTICIDES **Prep Method: SW846 3510** **Extraction Date: 6/23/97**

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
Chlordane	< 0.00050	0.00050	mg/L		6/28/97	SW846 8080
Endrin	< 0.0010	0.0010	mg/L		6/28/97	SW846 8080
gamma-BHC (Lindane)	< 0.00050	0.00050	mg/L		6/28/97	SW846 8080
Heptachlor and its epoxide	< 0.00050	0.00050	mg/L		6/28/97	SW846 8080
Methoxychlor	< 0.0050	0.0050	mg/L		6/28/97	SW846 8080
Toxaphene	< 0.050	0.050	mg/L		6/28/97	SW846 8080

Madison Office & Laboratory
802 Deming Way
Madison, WI 53717
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ENCHEM INC.

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1-800-7-ENCHEM

Data Qualifier Sheet

D	Analyte value from diluted analysis.

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1795 Industrial Drive
Green Bay, WI 54302
414-469-2436 • Fax: 414-469-8827
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- Analytical Report -

Project Name : TERRA ENG
Project Number : 9707000340
WI DNR LAB ID : 113138520

Submitter # : 1272.00
Submitter : COMMONWEALTH TECHNOLOGY
Report Date : 7/24/97

Sample No.	Station ID	Collection Date	Sample No.	Station iD	Collection Date
972470-001	164918 LF LEACHATE	7/15/97			

I certify that the data contained in this Final Report has been generated and reviewed in accordance with approved methods and Laboratory Standard Operating Procedure. Exceptions, if any, are discussed in the accompanying sample narrative. Release of this final report is authorized by Laboratory management, as is verified by the following signature.

Eric L Thomas — Approval Signature

7/24/97 — Date

Madison Office & Laboratory
802 Deming Way
Madison, WI 53717
608-827-5501 • Fax: 608-827-5503
1-888-5-ENCHEM

ENCHEM INC.

Corporate Office & Laboratory
1795 Industrial Drive
Green Bay, WI 54302
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1-800-7-ENCHEM

- Analytical Report -

Project Name : TERRA ENG
Project Number : 9707000340
Lab Sample Number : 972470-001
Station ID : 164918 LF LEACHATE
WI DNR LAB ID : 113138520

Submitter # : 1272.00
Submitter : COMMONWEALTH TECHNOLOGY
Report Date : 7/24/97
Collection Date : 7/15/97
Matrix Type : LEACHATE

Volatile Organic Results

TCLP LIST - VOLATILES **Prep Method: SW846 5030**

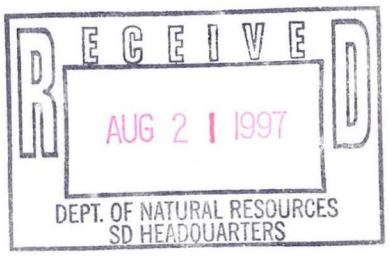
Analyte	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Analysis Method
1,1-Dichloroethene	< 0.10			0.10	mg/L		7/21/97	SW846 8260
1,2-Dichloroethane	< 0.10			0.10	mg/L		7/21/97	SW846 8260
1,4-Dichlorobenzene	< 0.10			0.10	mg/L	J	7/21/97	SW846 8260
2-Butanone	< 0.20			0.20	mg/L		7/21/97	SW846 8260
Benzene	< 0.10			0.10	mg/L	J	7/21/97	SW846 8260
Carbon tetrachloride	< 0.10			0.10	mg/L		7/21/97	SW846 8260
Chlorobenzene	< 0.10			0.10	mg/L		7/21/97	SW846 8260
Chloroform	< 0.10			0.10	mg/L		7/21/97	SW846 8260
Tetrachloroethene	< 0.10			0.10	mg/L		7/21/97	SW846 8260
Trichloroethene	< 0.10			0.10	mg/L		7/21/97	SW846 8260
Vinyl chloride	< 0.050			0.050	mg/L	J	7/21/97	SW846 8260

787 W. Sherwood
Springfield, MO 65810

417 881-7303
FAX 417 881-2821

SCS FIELD SERVICES, INC.

August 20, 1997
File No. 0797026.00



Mr. Harlan Kuehling, P.G.
Hydrogeologist
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711

Subject: Operation and Maintenance of the Refuse Hideaway Landfill Gas (LFG) and Leachate Collection System During July 1997

Dear Mr. Kuehling:

This letter report summarizes operation and maintenance (O&M) activities performed by SCS Field Services, Inc. (SCS-FS) at the Refuse Hideaway Landfill LFG and Leachate Collection System (Collection System) during July 1997.

SUMMARY

Highlights of the O&M activities completed by SCS-FS at the Collection System during July included:

- The LFG Recovery System recorded less than 10 percent downtime.
-
- Sixteen loads of leachate totaling approximately 72,000 gallons were removed from the Leachate Collection System.

- The methane content measured at GP-11S was 9.1 percent, by volume, and the methane content measured in GP-11D was 16.9 percent, by volume. No methane was detected in the other Monitoring Locations.

BACKGROUND

LFG Recovery System

The Refuse Hideaway Landfill LFG Recovery System became operational in 1991. The Refuse Hideaway Landfill LFG Recovery System is defined as the following components:

- The Blower/Flare Station;
- The Collection System; and
- Monitoring Locations.

The Blower/Flare Station consists of one centrifugal LFG blower, an enclosed flare, a candlestick flare (as a backup combustion unit), and associated controls and appurtenances. The Collection System consists of 13 extraction wells, four drip legs, and associated gas and

pneumatic header piping. The Monitoring Locations include 11 wells located throughout the site, and ambient air monitoring within the nearby Speedway buildings.

Proper operation of the Collection System is verified through testing of the extraction wells. LFG withdrawal rates at individual wells are adjusted based on test results. Testing for subsurface gas migration is done at the Monitoring Locations. Operation of the Blower/Flare Station provides vacuum necessary to withdraw the gas from the landfill, which helps control surface emissions and subsurface migration; odors and emissions are controlled by combustion of the gas at the flare.

Leachate Collection System

The current leachate collection system was installed in 1996, and is comprised pneumatic pumps installed in eight of the existing LFG extraction wells. Compressed air for the pneumatic pumps is supplied by a compressor located at the Blower/Flare Station. The collected leachate is stored onsite in a 25,000 gallon underground storage tank. Leachate is removed from the tank by a subcontractor, and is transported to the Madison Metropolitan Sewage District for treatment and ultimate discharge.

SCS-FS began routine monitoring of the Collection System on July 1, 1997.

TESTING EQUIPMENT

Gas composition testing at the Recovery System was performed using a Landtec GEM-500 Infra-Red Gas Analyzer. The GEM-500 measures methane, carbon dioxide, and oxygen as percent by volume. The GEM-500 also calculates the balance gas component of the LFG (assumed to be nitrogen) and reports it as percent by volume.

Pressure testing was measured in inches of water column and was performed using the GEM-500. LFG flow was measured with the GEM-500 and a Dwyer Pitot tube. Temperature measurement was performed using a handheld, analog temperature probe. Combustion temperatures measured at the flare were obtained from the in-place instrumentation.

Leachate level determination was performed one of two ways:

- For the extraction wells that have a leachate extraction pump, leachate levels were obtained using the bubbler tube installed along with each pump.

- For the gas extraction wells that do not contain a leachate extraction pump, the leachate levels were monitored using an electric tape.

ON-SITE ACTIVITIES

Weekly LFG activities were completed on July 5, 12, 18, 24, and 29. A summary of operational data collected during these weekly activities is shown in Table 1. Monthly activities were completed on July 29, 1997, with summaries shown in Tables 2, 3, and 4. Copies of all field data sheets are included with this report as Appendix A. The following activities were of note:

- With the exception of the five shutdowns discussed below, the Blower/Flare Station operation was consistent through the month. During the month of July methane concentrations at the blower inlet ranged from a high of 44.5 to a low of 36.8 percent, by volume. Oxygen levels recorded in July ranged from 1.5 to 2.1 percent, by volume.

- Sixteen loads of leachate totaling approximately 72,000 gallons were removed from the Leachate Collection System during the month of July. A summary of the loads removed is shown in Table 5.

- Five alarm responses occurred during the month of July. A summary of those alarms and possible causes are noted in Table 6.

- A visual inspection of the landfill cover did not indicate any significant erosion features. No leachate seeps were noted.

ISSUES TO RESOLVE

SCS-FS personnel met with the Wisconsin Department of Natural Resources (Department) at the Site on July 3, 1997. During this meeting, several operational considerations were discussed; SCS-FS notes from this meeting were summarized in a July 16, 1997 memorandum to yourself. In that memorandum, SCS-FS discussed implementing some different operational methods in an attempt to reduce unplanned system shutdowns (previously reported by others as being in excess of 80 times per year).

This involved increasing flows from certain LFG collection wells, and relaxing the 1.0 percent oxygen limit. The preliminary data presented by SCS-FS during the month of July tends to support that system downtime can be reduced in this manner; however composite oxygen levels for the month were between 1.5 percent and 2.1 percent.

If the Department's desire is to maintain a low system downtime, SCS-FS requests that a relaxed oxygen limit be allowed. Based on July monitoring data, this would tend to suggest that a composite (at the blower inlet) limit of 2.0 percent oxygen be allowed, and that no individual collection well have an oxygen level greater than 3.0 percent.

RESOLUTION TO PREVIOUS ISSUES

As no previous issues existed, no resolution was necessary.

WORK PROJECTED FOR THE UPCOMING MONTH

SCS-FS will be contacting a local electrician to provide an estimate to install an ammeter and hour meter for the blower motor. This estimate will be forwarded to the Department for review and approval prior to performing the work.

SCS-FS will also attempt to coordinate an inspection of the enclosed flare during the month of August. This will be done during a planned system shutdown at which time the leachate collection lines will be jetted out. Because of scheduling conflicts, this work may be postponed until September 1997. The Department will be notified in advance of this scheduled work.

STANDARD PROVISIONS

The findings described above were recorded by both SCS-FS and SCS-FS contracted parties. Changes can and do occur which affect the operation of the system. Department personnel should contact SCS-FS immediately in the event of a system malfunction or operational deficiency.

Although SCS-FS is the primary party designated to operate and maintain the subject system, Department staff may find it necessary to make adjustments to the system if conditions change. SCS-FS should be notified of any adjustments made by Department staff.

SCS-FS is pleased to provide our services to the Department and we enjoy working on the project. Should you have questions, please do not hesitate to contact either of the undersigned.

Sincerely,

William O. Reed
Regional Manager
SCS FIELD SERVICES, INC.

Galen S. Petoyan
President
SCS FIELD SERVICES, INC.

WOR:GSP;bms
Enclosures

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TABLE 1.
REFUSE HIDEAWAY LANDFILL
WEEKLY BLOWER/FLARE STATION SUMMARY FOR JULY 1997

Date	Time	Bar. Pres. [in-Hg]	Air Temp. [Deg F]	Blower Inlet Pressure [in-W.C.]	Blower Inlet Methane [%vol]	Blower Inlet Oxygen [%vol]	Blower Outlet Pressure [in-W.C.]	Flare Inlet Valve Position	Comments
07/05/97	10:30 am	29.75	70	-31.5	44.5	1.6	3.0	FULL OPEN	
07/12/97	9:00 am	29.83	80	-31.0	36.8	2.1	4.6	FULL OPEN	
07/18/97	10:00 am	30.00	80	-30.8	37.5	1.5	4.8	FULL OPEN	
07/24/97	1:00 pm	29.85	80	-30.5	42.0	2.0	3.8	FULL OPEN	
07/29/97	1:45 pm	30.02	70	-32.5	40.0	1.5	2.6	FULL OPEN	
Average:					40.2	1.7			
Maximum:					44.5	2.1			
Minimum:					36.8	1.5			

in-Hg Inches of Mercury
Deg F Degrees Fahrenheit
in-W.C. Inches of Water Column
%vol Percent by Volume

TABLE 2.
REFUSE HIDEAWAY LANDFILL
LFG COLLECTION WELL TESTING RESULTS SUMMARY FOR JULY 1997

Well No.	Date	Methane [%vol]	Oxygen [%vol]	Well Pressure [in-W.C.]	Header Pressure [in-W.C.]	Flow [cfm]	Temp. [Deg F]	Valve Setting	Comments
GW-01	07/29/97	0.5	12.0	1.0	-11.0	0		0	
GW-02	07/29/97	15.0	14.0	3.0	-11.0	0		0	
GW-03	07/29/97	39.1	0.7	-7.0	-11.0	85	68	50	
GW-04	07/29/97	54.0	1.0	-10.0	-11.0	90	74	70	
GW-05	07/29/97	49.8	1.8	-6.0	-6.0	80	78	100	NOTE HEADER DROP BETWEEN GW4 AND GW5
GW-06	07/29/97	32.6	0.6	-7.6	-11.0	80	72	30	
GW-07	07/29/97	55.0	0.5	-9.5	-11.0	83	76	60	
GW-08	07/29/97	53.4	0.8	-7.5	-11.0	92	83	75	
GW-09	07/29/97	54.9	0.4	-8.9	-10.0	115	82	100	
GW-10	07/29/97	26.0	1.1	-2.0	-33.0	30	79	10	
GW-11	07/29/97	57.9	0.6	-31.1	-35.0	100	81	90	
GW-12	07/29/97	36.4	0.7	-11.0	-35.0	78	98	20	
GW-13	07/29/97	45.8	0.7	-29.5	-33.0	150	78	80	

%vol Percent by volume
in-W.C. Inches of water column
cfm Cubic feet per minute
Deg F Degrees Fahrenheit
ND None Detected

TABLE 3.
REFUSE HIDEAWAY LANDFILL
LEACHATE HEAD MEASUREMENT SUMMARY FOR JULY 1997

Well No.	Date	Leachate Level [feet, above bottom of well]	Counter Reading
GW-01	07/29/97	7.7	N/A
GW-02	07/29/97	5.8	N/A
GW-03	07/29/97	4.7	N/A
GW-04	07/29/97	1.2	394,603
GW-05	07/29/97	0.4	314,210
GW-06	07/29/97	DRY	N/A
GW-07	07/29/97	1.9	902,116
GW-08	07/29/97	0.6	659,388
GW-09	07/29/97	0.6	455,343
GW-10	07/29/97	10.7	N/A
GW-11	07/29/97	0.4	430,494
GW-12	07/29/97	0.4	637,247
GW-13	07/29/97	0.6	764,350

TABLE 4.
REFUSE HIDEAWAY LANDFILL
MONITORING WELL TESTING RESULTS FOR JULY 1997

Well No.	Date	Methane [%vol]	Oxygen [%vol]	Pressure [in-W.C.]	Comments
G-01D	07/29/97	ND	17.9	0.0	
G-01S	07/29/97	ND	19.9	0.0	
G-06	07/29/97	ND	19.8	0.0	
G-08	07/29/97	ND	19.9	0.0	
G-09	07/29/97	ND	19.0	0.0	
G-10	07/29/97	ND	20.0	0.0	
GP-11D	07/29/97	16.9	1.2	0.0	
GP-11S	07/29/97	9.1	0.8	0.0	
GPW-1D	07/29/97	ND	19.7	0.0	
GPW-1M	07/29/97	ND	19.0	0.0	
GPW-1S	07/29/97	ND	19.9	0.0	
SPEEDWAY BLDGS	07/29/97	ND	20.0	0.0	

% vol Percent by volume
in-W.C. Inches of water column
ND None Detected

TABLE 5.
REFUSE HIDEAWAY LANDFILL
LEACHATE HAULING SUMMARY FOR JULY 1997

Date	Beginning Tank Depth [inches]	Ending Tank Depth [inches]	Total Gallons Hauled
07/02/97	117	93	4,751
	95	75	4,399
07/03/97	82	61	4,695
	66	47	4,150
07/04/97	55	35	4,142
	36	11	4,074
07/09/97	74	52	4,878
	52	28	4,790
07/15/97	88	69	4,233
	69	48	4,612
07/16/97	55	34	4,333
07/18/97	55	33	4,524
07/21/97	55	35	4,142
07/24/97	58	37	4,411
07/28/97	58	31	5,554
	78	58	4,467
Total:			72,155
Count:			16

TABLE 6.
REFUSE HIDEAWAY LANDFILL
ALARM RESPONSES FOR JULY 1997

Alarm Date	Response Date	Alarm Codes	Comments
07/01/97	07/01/97	1,4	System Failure - Cause Unknown
07/04/97	07/05/97	1,4	System Failure - Cause Unknown
07/05/97	07/06/97	1,4	System Failure - Cause Unknown
07/19/97	07/22/97	1,4	System was restarted after 3 days to allow gas quality to improve
07/27/97	07/27/97	1,4	May have been caused by thunder storms
Count:	5		

APPENDIX A

FIELD DATA SHEETS

DATA SHEET A
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS WELL MONITORING

Date: 7/29/97

Time: Start - 1100 End- 1345

Temperature: 70's

Barometric Pressure: 30.02

Monitored by: [illegible]

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 7/97

Well	Well Pressure (in. WC)	Header Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
GW1	+1.0	-11.0	0.5	12	0%	-	0.0	-	-
GW2	+3.0	-11.0	15.0	14	0%	-	0.0	-	-
GW3	-7.0	-11.0	39.1	0.7	50%	-	85	68.0	-
GW4	-10.0	-11.0	54.0	1.0	70%	-	90	74.0	-
GW5	-6.0	-6.0	49.8	1.8	100%	-	80	78.0	NOTE: HEADER PRESSURE DROP BETWEEN GW-4 & GW-5
GW6	-7.6	-11.0	32.6	0.6	30%	-	80	72.0	-
GW7	-9.5	-11.0	55.0	0.5	60%	-	83	76.0	-
GW8(1)	-7.5	-11.0	53.4	0.8	75%	-	92	83.0	-
GW9(1)	-8.9	-10.0	54.9	0.4	100%	-	115	82.0	-
GW10	-2.0	-33.0	26.0	1.1	10%	-	30	79.0	-
GW11(1)	-31.1	-35.0	57.9	0.6	90%	-	100	81.0	-
GW12	-11.0	-35.0	36.4	0.7	20%	-	78	98.0	-
GW13	-29.5	-33.0	45.8	0.7	80%	-	150	78.0	-

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

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DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 7/5/97

Time: Start - 1030 End - 1200

Temperature: 70's

Barometric Pressure: 29.25 ↑

Monitored by: [signature]

Gas Detector Model No.: GEM 500
Serial No.: 052
Date Last Calibrated: 7/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+2.3	43.0	1.7		–	N/A	85	–
• Sample Port B	+2.0	43.0	1.6		–	N/A	86	–
• Sample Port C	+1.2	42.6	1.6		–	N/A	88	–
• Manual Valve				100%				
Blower								
• North Branch	-14.6	45.4	0.8	30%	–	N/A	76	–
• Central Branch	-12.2	46.5	2.2	20%	–	N/A	78	–
• South Branch	-4.5	42.7	2.8	20%	–	N/A	78	–
• Inlet Sample Port A	-30.8	44.4	1.6					
• Inlet Sample Port B	-31.5	44.5	1.6					–
• Outlet Sample Port A	+3.0	43.4	1.6					–
Pedestal Flare								
• Manual Valve				0%				

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 7/12/97

Time: Start - 930 End- 1200

Temperature: 80's

Barometric Pressure: 29.83

Monitored by: [signature]

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 7/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	-30.4	36.7	2.2		-	N/A	80	
• Sample Port B	-29.5	36.8	2.1		-	N/A	81	
• Sample Port C	+4.6	37.0	2.0		-	N/A	96	
• Manual Valve				100%				
Blower								
• North Branch	-29.0	36.7	0.8	50%	-	256	76	-
• Central Branch	-22.0	33.2	4.0	40%	-	230	78	
• South Branch	-14.0	32.8	5.0	10%	-	187	75	-
• Inlet Sample Port A	-30.4	36.7	2.2					
• Inlet Sample Port B	-31.0	36.8	2.1					-
• Outlet Sample Port A	+4.6	37.0	2.0					-
Pedestal Flare								
• Manual Valve				0%				

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 7/18/97

Time: Start - 1000 End - 1200

Temperature: 80's

Barometric Pressure: 30.00

Monitored by: [signature]

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 7/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+4.1	37.8	1.5		-	N/A	82	-
• Sample Port B	+3.8	37.6	1.5		-	N/A	84	-
• Sample Port C	+2.2	37.2	1.4		-	N/A	94	-
• Manual Valve				100%				
Blower								
• North Branch	-29.2	40.0	0.4	50%	-	210	78	-
• Central Branch	-21.6	32.7	4.0	40%	-	205	73	-
• South Branch	-13.8	31.9	4.8	10%	-	106	70	-
• Inlet Sample Port A	-30.4	37.3	1.6					-
• Inlet Sample Port B	-30.8	37.5	1.5					-
• Outlet Sample Port A	+4.8	38.0	1.4					-
Pedestal Flare								
• Manual Valve				0%				

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 7/24/97

Time: Start - 1300 End - 1400

Temperature: 80's

Barometric Pressure: 29.85

Monitored by: [signature]

Gas Detector Model No.: GEM-500
Serial No.: 092
Date Last Calibrated: 7/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
· Sample Port A	+3.3	42.3	2.1		-	N/A	103.0	
· Sample Port B	+3.0	42.0	2.0		-	N/A	103.2	
· Sample Port C	+1.8	42.3	2.0		-	N/A	105.0	
· Manual Valve				100%				
Blower								
· North Branch	-29.2	44.0	0.8	60%	-	317	83.3	-
· Central Branch	-10.0	36.0	4.8	10%	-	118	80.0	-
· South Branch	-10.6	40.2	4.0	10%	-	37	80.0	-
· Inlet Sample Port A	-30.4	42.2	2.0					-
· Inlet Sample Port B	-30.5	42.0	2.0					
· Outlet Sample Port A	+3.8	42.0	2.0					-
Pedestal Flare								
· Manual Valve				0%				

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 7/29/97

Time: Start - 1345 End- 1430

Temperature: 70's

Barometric Pressure: 30.02 ↑

Monitored by: [signature]

Gas Detector Model No.: Gem 500
Serial No.: 092
Date Last Calibrated: 7/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
· Sample Port A	+2.4	40.0	1.5		—	N/A	95.0	
· Sample Port B	+2.0	40.0	1.5		—	N/A	95.0	
· Sample Port C	+1.5	40.0	1.5		—	N/A	95.1	
· Manual Valve				10.0%				
Blower								
· North Branch	-31.4	41.1	0.6	60%	-	222	79.0	—
· Central Branch	-10.0	35.5	4.3	10%	-	160	76.0	
· South Branch	-11.0	35.2	4.3	10%	-	148	72.0	
· Inlet Sample Port A	-32.0	40.0	1.6					
· Inlet Sample Port B	-32.5	40.0	1.5					
· Outlet Sample Port A	+2.6	40.5	1.6					
Pedestal Flare								
· Manual Valve				0%				

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET C
REFUSE HIDEAWAY LANDFILL
GAS AND LEACHATE EXTRACTION SYSTEM
LEACHATE HEAD MONITORING

Date: 7/29/97
Time: Start- 1100 End- 1345
Monitored By:
Instrument Used: QED / O.T.L meter

Well Riser	Riser Depth(2) (ft)	Depth to Leachate (ft)	Leachate Head (ft)	Comments / cycles count
GW1-EAST	53.7	46.4	7.7'	—
-WEST	54.1	—	—	
GW2-EAST	53.9	48.1'	5.8'	—
-WEST	54.0	—	—	
GW3-EAST	59.7	55.0'	4.7'	—
-WEST	59.7	—	—	
GW4-EAST	61.9	—	1.2'	OK / 394,603
-WEST	61.8	—	—	
GW5-EAST	70.0	—	0.4'	OK / 314,2101
-WEST	69.9	—	—	
GW6-EAST	40.0	DRY @ 36.0'	—	—
-WEST	40.1	—	—	
GW7-EAST	60.0	—	1.9'	OK / 902, 116
-WEST	60.0	—	—	
GW8 (1)				
-EAST	69.6	—	0.6'	OK / 659,388
-WEST	69.9	—	—	
GW9(1)				
-NORTH	67.5	—	0.6'	OK / 455,343
-SOUTH	68.4	—	—	—
GW10-				
-NORTH	72.8	62.1	10.7'	—
-SOUTH	72.7	—	—	
GW11(1)				
-EAST	69.1	—	0.4'	OK / 430,494
-WEST	69.1	—	—	
GW12-EAST	80.0	—	0.4'	OK / 637,247
-WEST	80.0	—	—	
GW13-EAST	73.1	—	0.6'	OK / 764,350
-WEST	73.0	—	—	—
Leachate Tank	17.9	—	—	43"
		Tank Volume =	6,363 gal	

Notes:

(1) Wells with leachate extraction pumps and controls installed.
(2) Depth is measured from top of 1-in. dia. riser pipe. Tank riser pipe is 2-in. dia.
(3) Use Table 1 to convert leachate head in tank to a volume in gallons.

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DATA SHEET D
REFUSE HIDEAWAY LANDFILL
GAS AND LEACHATE EXTRACTION SYSTEM
LEACHATE EXTRACTION WELL MONITORING(1)

(REFER TO DATA SHEET C)

Date: 7/29/97
Monitored By: JCK

Well With Pump	Current Time	Pump-on Frequency(2)	Current Pump Time (Hrs)(2)	Previous Monitoring Date(3)	Previous Monitoring Time(3)	Previous Pump Time (Hrs)(3)	Elapsed Time (Hrs)	Elapsed Pump Time (Hrs)
GW8P	—	—	—	—	—	—	—	—
GW9P	—	—	—	—	—	—	—	—
GW11P	—	—	—	—	—	—	—	—

Notes:
(1) Refer to Data Sheet C for leachate head levels for the above listed wells.
(2) Measurements recorded from controls and equipment located inside the pump control panel at the above listed wells.
(3) Measurements recorded during previous monitoring.

DATA SHEET E
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS PROBE MONITORING

Date: 7/29/97

Time: Start - 1100 End- 1345

Temperature: 70's

Barometric Pressure: 30.02

Monitored by: [signature]

Gas Detector Model No.: GEM-500

Serial No.: 052

Date Last Calibrated: 7/97

Location	Probe Pressure (in. WC)	CH_4(1) (%)	CH_4(2) (% LEL)	O_2 (%)	Comments
G-1S	0.0	0	0	19.9	-
G-1D	0.0	0	0	17.9	-
G-6	0.0	0	0	19.8	-
G-8	0.0	0	0	19.9	-
G-9	0.0	0	0	19.0	-
G-10	0.0	0	0	20.0	-
GP-11S	0.0	9.1	-	0.8	-
GP-11D	0.0	16.9	-	1.2	-
GPW-1S	0.0	0	0	19.9	-
GPW-1M	0.0	0	0	19.0	-
GPW-1D	0.0	0	0	19.7	-
Speedway Buildings	0.0	0	0	20.0	-

Notes:
(1) Percent combustibles by volume, primarily composed of CH_4.
(2) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).

DRF/klr/JCK
[mad-402-13a]
15292.03

787 W. Sherwood
Springfield, MO 65810
417 881-7303
FAX 417 881-2821

SCS FIELD SERVICES, INC.

September 18, 1997
File No. 0797026.00

Mr. Harlan Kuehling, P.G.
Hydrogeologist
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711

Subject: Operation and Maintenance of the Refuse Hideaway Landfill Gas (LFG) and Leachate Collection System During August 1997

Dear Mr. Kuehling:

This letter report summarizes operation and maintenance (O&M) activities performed by SCS Field Services, Inc. (SCS-FS) at the Refuse Hideaway Landfill LFG and Leachate Collection System (Collection System) during August 1997.

SUMMARY

Highlights of the O&M activities completed by SCS-FS at the Collection System during August included:

- The LFG Recovery System recorded no downtime.
- Thirteen loads of leachate totaling approximately 56,500 gallons were removed from the Leachate Collection System.
- The methane content measured at GP-11S was 0.1 percent, by volume (2 percent of the lower explosive limit in air), and the methane content measured in GP-11D was 12.7 percent, by volume. No methane was detected in the other Monitoring Locations.

BACKGROUND

LFG Recovery System

The Refuse Hideaway Landfill LFG Recovery System became operational in 1991. The Refuse Hideaway Landfill LFG Recovery System is defined as the following components:

- The Blower/Flare Station;
- The Collection System; and
- Monitoring Locations.

The Blower/Flare Station consists of one centrifugal LFG blower, an enclosed flare, a candlestick flare (as a backup combustion unit), and associated controls and appurtenances. The Collection System consists of 13 extraction wells, four drip legs, and associated gas and pneumatic header piping. The Monitoring Locations include 11 wells located throughout the site, and ambient air monitoring within the nearby Speedway buildings.

Proper operation of the Collection System is verified through testing of the extraction wells. LFG withdrawal rates at individual wells are adjusted based on test results. Testing for

subsurface gas migration is done at the Monitoring Locations. Operation of the Blower/Flare Station provides vacuum necessary to withdraw the gas from the landfill, which helps control surface emissions and subsurface migration; odors and emissions are controlled by combustion of the gas at the flare.

Leachate Collection System

The current leachate collection system was installed in 1996, and is comprised pneumatic pumps installed in eight of the existing LFG extraction wells. Compressed air for the pneumatic pumps is supplied by a compressor located at the Blower/Flare Station. The collected leachate is stored onsite in a 25,000 gallon underground storage tank. Leachate is removed from the tank by a subcontractor, and is transported to the Madison Metropolitan Sewage District for treatment and ultimate discharge.

SCS-FS and our subcontractor, Environmental Sampling Corporation (ESC), began routine monitoring of the Collection System on July 1, 1997. Figure 1 indicates the approximate layout of the Collection System.

TESTING EQUIPMENT

Gas composition testing at the Recovery System was performed using a Landtec GEM-500 Infra-Red Gas Analyzer. The GEM-500 measures methane, carbon dioxide, and oxygen as percent by volume. The GEM-500 also calculates the balance gas component of the LFG (assumed to be nitrogen) and reports it as percent by volume.

Pressure testing was measured in inches of water column and was performed using the GEM-500. LFG flow was measured with the GEM-500 and a Dwyer Pitot tube. Temperature measurement was performed using a handheld, analog temperature probe. Combustion temperatures measured at the flare were obtained from the in-place instrumentation.

Leachate level determination was performed one of two ways:

- For the extraction wells that have a leachate extraction pump, leachate levels were obtained using the bubbler tube installed along with each pump.
- For the gas extraction wells that do not contain a leachate extraction pump, the leachate levels were monitored using an electric tape.

ON-SITE ACTIVITIES

Weekly LFG activities were completed on August 4, 11, 22, and 27. A summary of operational data collected during these weekly activities is shown in Table 1. Monthly activities were completed on August 22, 1997, with summaries shown in Tables 2, 3, and 4. Copies of all field data sheets are included with this report as Appendix A. The following activities were of note:

- No alarm responses occurred during the month of August. The Blower/Flare system was operational 100 percent of the month of August. LFG quality at the

Blower/Flare station remained consistent through the month. During the month of August methane concentrations at the blower inlet ranged from a high of 44.5 to a low of 36.8 percent, by volume. Oxygen levels recorded in August ranged from 1.5 to 2.1 percent, by volume.

- Thirteen loads of leachate totaling approximately 56,500 gallons were removed from the Leachate Collection System during the month of August. A summary of the loads removed is shown in Table 5.

- A visual inspection of the landfill cover did not indicate any significant erosion features. No leachate seeps were noted.

ISSUES TO RESOLVE

Field monitoring collected in July and August has indicated a significant decrease in the header pressure (vacuum) between extraction wells GW 4 and GW 5. This may indicate a partial blockage within the header pipe. SCS-FS will continue to monitor pressures in the header piping as part of our routine services. If additional investigation is warranted, SCS-FS will prepare an estimate ~~for prepare an estimate~~ to perform this investigation.

The blower shaft bearings are requiring weekly greasing, a sign that they need to be replaced. SCS-FS will prepare an estimate for procuring and installing two new bearings.

RESOLUTION TO PREVIOUS ISSUES

The issue of allowable oxygen levels was discussed in our July 1997 report. It is SCS-FS's understanding that the Department desires that no more than 1.0 percent (by volume) of oxygen be allowed from each wellhead. SCS-FS will ~~make~~ adjust the wellfield vacuums accordingly in an attempt to achieve the desired maximum oxygen level. However, we again caution the Department that the reduction of LFG flows necessary to reduce the oxygen will probably result in increased system downtime.

WORK PROJECTED FOR THE UPCOMING MONTH

SCS-FS has received an estimate from Staff Electric Company (Madison) provide and install an ammeter and hour meter for the blower motor. SCS-FS has also received an estimate from the John Zink Company (Tulsa, OK) to perform a visual inspection of the enclosed flare. John Zink has a flare technician in the Madison area. Upon approval from the Department, both of these services are currently scheduled to be performed on Monday, September 22, 1997.

To allow for cooling, the flare inspection will require the blower and flare station to be turned off on Saturday, September 20, 1997. SCS-FS anticipates restarting the flare on Monday, September 22.

Due to scheduling conflicts, the annual cleanout of the leachate collection lines will be performed in October 1997. The Department will be notified in advance of this scheduled work.

The Department has requested that SCS-FS to mow the entire landfill. We are currently requesting quotes to perform this service, and anticipate the mowing to occur in October. SCS-FS will submit an estimate for the Department's approval prior to performing this service.

STANDARD PROVISIONS

The findings described above were recorded by both SCS-FS and SCS-FS contracted parties. Changes can and do occur which affect the operation of the system. Department personnel should contact SCS-FS immediately in the event of a system malfunction or operational deficiency.

Although SCS-FS is the primary party designated to operate and maintain the subject system, Department staff may find it necessary to make adjustments to the system if conditions change. SCS-FS should be notified of any adjustments made by Department staff.

SCS-FS is pleased to provide our services to the Department and we enjoy working on the project. Should you have questions, please do not hesitate to contact either of the undersigned.

Sincerely,

William O. Reed
Regional Manager
SCS FIELD SERVICES, INC.

Galen S. Petoyan
President
SCS FIELD SERVICES, INC.

WOR:GSP;bms
Enclosures

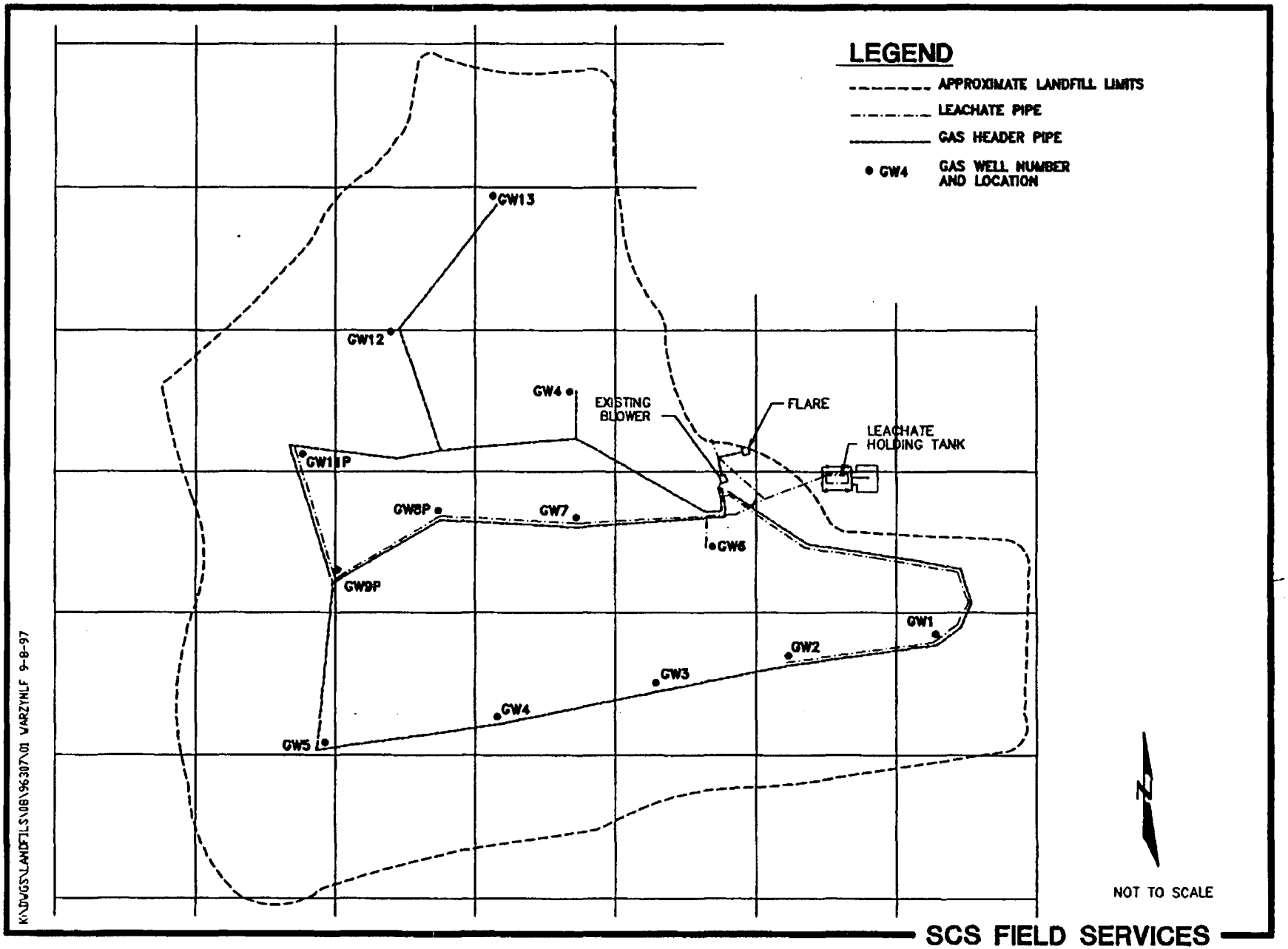


FIGURE 1

EXISTING GAS COLLECTION SYSTEM
REFUSE HIDEAWAY LANDFILL

TABLE 1.
REFUSE HIDEAWAY LANDFILL
WEEKLY BLOWER/FLARE STATION SUMMARY FOR AUGUST 1997

Date	Time	Bar. Pres. [in-Hg]	Air Temp. [Deg F]	Blower Inlet Pressure [in-W.C.]	Blower Inlet Methane [%vol]	Blower Inlet Oxygen [%vol]	Blower Outlet Pressure [in-W.C.]	Flare Inlet Valve Position	Comments
08/04/97	10:00 am	30.06	70	-32.0	39.8	2.1	2.7	100	
08/11/97	10:00 am	30.24	60	-32.5	40.8	2.0	3.0	100	
08/22/97	10:00 am		60	-32.2	39.5	2.1	2.7	100	Changed chart recorder paper
08/27/97	8:45 am	29.50	70	-31.8	44.6	2.0	2.8	100	
Average:					41.2	2.1			
Maximum:					44.6	2.1			
Minimum:					39.5	2.0			

in-Hg Inches of Mercury
Deg F Degrees Fahrenheit
in-W.C. Inches of Water Column
%vol Percent by Volume

TABLE 2.
REFUSE HIDEAWAY LANDFILL
LFG COLLECTION WELL TESTING RESULTS SUMMARY FOR AUGUST 1997

Well No.	Date	Methane [%vol]	Oxygen [%vol]	Well Pressure [in-W.C.]	Header Pressure [in-W.C.]	Flow [cfm]	Temp. [Deg F]	Valve Setting	Comments
GW-01	08/22/97	ND	20.6	-0.3	-13.3	0	83	0	
GW-02	08/22/97	ND	20.5	-1.0	-12.9	0	85	0	
GW-03	08/22/97	35.5	1.0	-5.2	-11.9	57	67	25	
GW-04	08/22/97	51.9	1.1	-8.7	-8.8	66	76	65	
GW-05	08/22/97	53.0	1.6	-3.9	-3.9	40	78	100	
GW-06	08/22/97	27.4	0.6	-5.6	-13.2	67	67	15	
GW-07	08/22/97	54.6	0.7	-13.6	-13.8	73	76	70	
GW-08	08/22/97	55.0	1.1	-10.8	-14.4	79	82	75	
GW-09	08/22/97	53.7	1.4	-14.2	-14.6	45	79	95	
GW-10	08/22/97	55.2	0.8	-1.6	-30.4	36	85	20	
GW-11	08/22/97	57.5	0.9	-30.2	-30.2	78	82	65	
GW-12	08/22/97	48.5	0.8	-4.0	-30.2	53	97	15	
GW-13	08/22/97	42.6	0.8	-29.8	-30.2	85	78	70	

%vol Percent by volume
in-W.C. Inches of water column
cfm Cubic feet per minute
Deg F Degrees Fahrenheit
ND None Detected

TABLE 3.
REFUSE HIDEAWAY LANDFILL
LEACHATE HEAD MEASUREMENT SUMMARY FOR AUGUST 1997

Well No.	Date	Leachate Level [feet, above bottom of well]	Current Pump Cycles	Previous Pump Cycles	Difference
GW-01	08/22/97	7.8			0
GW-02	08/22/97	5.7			0
GW-03	08/22/97	4.2			0
GW-04	08/22/97	1.3	443,169	394,603	48,566
GW-05	08/22/97	0.6	445,428	314,210	131,218
GW-06	08/22/97	6.0			0
GW-07	08/22/97	3.3	973,337	902,116	71,221
GW-08	08/22/97	0.4	704,616	659,388	45,228
GW-09	08/22/97	1.7	488,064	455,343	32,721
GW-10	08/22/97	11.1			0
GW-11	08/22/97	1.3	498,156	430,494	67,662
GW-12	08/22/97	0.4	682,466	637,247	45,219
GW-13	08/22/97	2.9	884,696	764,350	120,346

TABLE 4.
REFUSE HIDEAWAY LANDFILL
MONITORING WELL TESTING RESULTS FOR AUGUST 1997

Well No.	Date	Methane [%vol]	Oxygen [%vol]	Pressure [in-W.C.]	Comments
G-01D	08/22/97	ND	19.8	0.0	
G-01S	08/22/97	ND	19.5	0.0	
G-06	08/22/97	ND	20.1	0.0	
G-08	08/22/97	ND	19.5	0.0	
G-09	08/22/97	ND	20.0	0.0	
G-10	08/22/97	ND	20.0	0.0	
GP-11D	08/22/97	12.7	5.2	-0.2	
GP-11S	08/22/97	0.1	19.8	0.6	
GPW-1D	08/22/97	ND	19.5	0.0	
GPW-1M	08/22/97	ND	20.0	0.0	
GPW-1S	08/22/97	ND	20.1	0.0	
SPEEDWAY BLDGS	08/22/97	ND	21.0	0.0	

% vol Percent by volume
in-W.C. Inches of water column
ND None Detected

TABLE 5.
REFUSE HIDEAWAY LANDFILL
LEACHATE HAULING SUMMARY FOR JULY 1997

Date	Beginning Tank Depth [inches]	Ending Tank Depth [inches]	Total Gallons Hauled
08/01/97	62	41	4,498
08/04/97	68	48	4,387
08/05/97	57	37	4,192
08/07/97	69	50	4,187
08/11/97	67	47	4,374
08/14/97	76	57	4,238
08/16/97	76	57	4,238
08/18/97	69	50	4,187
	50	28	4,360
08/21/97	56	34	4,442
08/26/97	79	60	4,249
08/30/97	95	74	4,624
08/31/97	83	63	4,473
Total:			56,449
Count:			13

APPENDIX A

FIELD DATA SHEETS

DATA SHEET A
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS WELL MONITORING

Date: 8/22/97

Time: Start - 1120 End- 1500

Temperature: 70°

Barometric Pressure:

Monitored by: V. Streich, P. Hartz

Gas Detector Model No.: Gem 500
Serial No.: 092
Date Last Calibrated: 3/21/97

Well	Well Pressure (in. WC)	Header Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
GW1	-0.3	-13.3	0.0	20.6	0%	--	0.0	83°	Gate closes, won't latch
GW2	-1.0	-12.9	0.0	20.5	0%	-	0.0	84.5°	Gate/cage broken tilted
GW3	-5.2	-11.9	35.5	1.0	25%	-	57	66.6°	Gate ok, sampling port valve broken
GW4	-8.7	-8.8	51.9	1.1	65%	-	66	76°	Gate ok
GW5	-3.9	-3.9	53.0	1.6	100%	-	40	78°	Gate ok
GW6	-5.6	-13.2	27.4	0.6	15%	-	67	67°	Gate closes, won't latch
GW7	-13.6	-13.8	54.6	0.7	70%	-	73	75.9°	Gate ok
GW8(1)	-10.8	-14.4	55.0	1.1	75%	-	79	81.5°	Gate ok
GW9(1)	-14.2	-14.6	53.7	1.4	95%	-	45	79°	Gate ok
GW10	-1.6	-30.4	55.2	0.8	20%	-	36	85°	Gate ok
GW11(1)	-30.2	-30.2	57.5	0.9	65%	-	78	81.5°	Gate ok
GW12	-4.0	-30.2	48.5	0.8	15%	-	53	96.6°	Gate ok
GW13	-29.8	-30.2	42.6	0.8	70%	-	85	78.2°	Gate ok

GW-4 - dead vegetation above header line

Notes: Hissing sound near Riser (Headerside) @ GW10

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF/vlr/JCK
[mad-401-78]
15292.03

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 8/4/97

Time: Start - 1000 End - 1300

Temperature: 70's

Barometric Pressure: 30.06 ↓

Monitored by: V Streich

Gas Detector Model No.: GEM 500
Serial No.: 1892
Date Last Calibrated: 7/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
· Sample Port A	+2.1	40.0	2.3		-	N/A	94°	-
· Sample Port B	+2.0	40.1	2.3		-	N/A	94°	-
· Sample Port C	+1.1	39.7	2.3		-	N/A	96°	-
· Manual Valve				100%				
Blower								
· North Branch	-31.0	46.4	0.9	50%	-	102	79°	-
· Central Branch	-10.2	33.6	4.5	20%	-	101	76°	-
· South Branch	-10.6	33.3	3.3	30%	-	101	73°	-
· Inlet Sample Port A	-31.5	40.3	2.2					-
· Inlet Sample Port B	-32.0	39.8	2.1					-
· Outlet Sample Port A	+2.7	40.1	2.2					-
Pedestal Flare								
· Manual Valve				0%				

Leachate @ 88" per A-1
=14,251 gal.

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF:kml/JCH: [ma]-401-781] 15292.03

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 8/11/97

Time: Start - 1000 End - 1130

Temperature: 60's

Barometric Pressure: 30.24 ↑

Monitored by: V. STREICH

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 7/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
· Sample Port A	+2.4	40.8	2.1		-	N/A	83°	-
· Sample Port B	+2.3	40.7	2.4		-	N/A	83°	-
· Sample Port C	+1.4	40.8	2.0		-	N/A	86°	-
· Manual Valve				100%				
Blower								
· North Branch	-31.4	45.3	1.7	50%	-	117	69°	-
· Central Branch	-10.6	35.0	4.4	20%	-	78	69°	-
· South Branch	-10.6	32.8	4.1	30%	-	116	66°	-
· Inlet Sample Port A	-31.8	40.7	2.0					-
· Inlet Sample Port B	-32.5	40.8	2.0					-
· Outlet Sample Port A	+3.0	40.7	2.0					-
Pedestal Flare								
· Manual Valve				0%				

Leachate @ 66.5" ≅ 11,400 gals.

Notes: Greased 2 fittings @ top of blower

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 8/22/97

Time: Start - 10:00 End- 1:30

Temperature: 60's

Barometric Pressure: _____

Monitored by: _____

Gas Detector Model No.: GEM 500
Serial No.: 095
Date Last Calibrated: 8/21/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
· Sample Port A	+2.1	39.3	2.4		—	212	78.5°	—
· Sample Port B	+2.0	39.3	2.3		—	N/A	78.5°	—
· Sample Port C	+0.9	39.4	2.2		—	N/A	81.3°	—
· Manual Valve				10%				
Blower								
· North Branch	-31.2	48.4	0.8	50%	—	108	76°	—
· Central Branch	-10.3	34.0	4.8	20%	—	98	74°	—
· South Branch	-10.5	32.2	3.9	25%	—	111	70°	—
· Inlet Sample Port A	-31.7	40.1	2.2					—
· Inlet Sample Port B	-32.2	39.5	2.1					—
· Outlet Sample Port A	+2.7	39.8	2.2					—
Pedestal Flare								
· Manual Valve				0%				

Notes: Leachate @ 40 5/8"
Changed tape in control panel 8/22/97 10:40 AM

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF:kml/JCH: [ma.l-401-781] 15292.03

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 8/27/97

Time: Start - 845 End - 1000

Temperature: 70°

Barometric Pressure: 29.5 ↓

Monitored by: V. Streich, P. Hartz

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 8/26/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+2.2	43.8	2.0		—	98	99°	—
• Sample Port B	+2.1	45.8	2.0		—	N/A	99°	—
• Sample Port C	+1.3	45.3	2.0		—	N/A	99°	—
• Manual Valve				100%				
Blower								
• North Branch	-30.6	48.6	1.4	50%	—	190	75.5°	
• Central Branch	-20.0	39.9	4.1	20%	—	129	77.7°	
• South Branch	-14.2	37.2	5.6	25%	—	144	71.4°	
• Inlet Sample Port A	-31.3	46.1	2.0					
• Inlet Sample Port B	-31.8	44.6	2.0					
• Outlet Sample Port A	+2.8	44.5	2.0					
Pedestal Flare								
• Manual Valve				0%				

Notes: Leachate @ 68 1/8" Flare Temp 1362°
11,799 gal.

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET C
REFUSE HIDEAWAY LANDFILL
GAS AND LEACHATE EXTRACTION SYSTEM
LEACHATE HEAD MONITORING

Date: 8/22/97
Time: Start- 1120 End- 1500
Monitored By: V. Streicl , P. Hartz
Instrument Used: GEM 500

Well Riser	Riser Depth(2) (ft)	Depth to Leachate (ft)	Leachate Head (ft)	Comments/cycle count (Hours)
GW1-EAST	53.7	45.95'	.65'	—
-WEST	54.1	—	—	
GW2-EAST	53.9	48.20'	.48'	—
-WEST	54.0	—	—	
GW3-EAST	59.7	55.50'	.35'	—
-WEST	59.7	—	—	
GW4-EAST	61.9	—	1.25'	OK / 443,169
-WEST	61.8	—	—	
GW5-EAST	70.0	—	.58'	ok/ 445,428
-WEST	69.9	—	—	
GW6-EAST	40.0	33.99'	.5'	—
-WEST	40.1	—	—	
GW7-EAST	60.0	—	3.34'	ok/ 973,337
-WEST	60.0	—	—	
GW8 (1)				
-EAST	69.6	—	.42'	ok/ 704,616
-WEST	69.9	—	—	
GW9(1)				
-NORTH	67.5	—	1.67'	ok/ 488,064
-SOUTH	68.4	—	—	
GW10-				
-NORTH	72.8	61.70'	.93'	—
-SOUTH	72.7	—	—	
GW11(1)				
-EAST	69.1	—	1.25'	ok/ 498,156
-WEST	69.1	—	—	
GW12-EAST	80.0	—	.42'	ok/ 682,466
-WEST	80.0	—	—	
GW13-EAST	73.1	—	2.92'	ok/ 884,696
-WEST	73.0	—	—	
Leachate Tank	17.9	—	—	40 5/8"

Tank Volume = 5879 gal

Notes:

(1) Wells with leachate extraction pumps and controls installed.
(2) Depth is measured from top of 1-in. dia. riser pipe. Tank riser pipe is 2-in. dia.
(3) Use Table 1 to convert leachate head in tank to a volume in gallons.

DRF/ndj/JCK
[mad-401-78a]
15292.03

DATA SHEET E
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS PROBE MONITORING

Date: 8/22/97

Time: Start - 1340 End-

Temperature: 70's

Barometric Pressure:

Monitored by: V. STREICH

Gas Detector Model No.: GEM 500

Serial No.: 092

Date Last Calibrated: 8/21/97

Location	Probe Pressure (in. WC)	CH_4(1) (%)	CH_4(2) (% LEL)	O_2 (%)	Comments
G-1S	0.0	0	0	19.5	
G-1D	0.0	0	0	19.8	
G-6	0.0	0	0	20.1	
G-8	0.0	0	0	19.5	
G-9	0.0	0	0	20.0	
G-10	0.0	0	0	20.0	
GP-11S	+0.6	0.1	4	19.8	
GP-11D	-0.2	12.7	272	5.2	
GPW-1S	0.0	0	0	20.1	
GPW-1M	0.0	0	0	20.0	
GPW-1D	0.0	0	0	19.5	
Speedway Buildings	0.0	0	0	21.0	

Notes:
(1) Percent combustibles by volume, primarily composed of CH_4.
(2) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).

DRF/MR/JCK
[mad-402-13a]
15292.03

787 W. Sherwood
Springfield, MO 65810
417 881-7303
FAX 417 881-2821

SCS FIELD SERVICES, INC.

October 23, 1997
File No. 0797026.00

Mr. Harlan Kuehling, P.G.
Hydrogeologist
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711

Subject: Operation and Maintenance of the Refuse Hideaway Landfill Gas (LFG) and Leachate Collection System During September 1997

Dear Mr. Kuehling:

This letter report summarizes operation and maintenance (O&M) activities performed by SCS Field Services, Inc. (SCS-FS) at the Refuse Hideaway Landfill LFG and Leachate Collection System (Collection System) during September 1997.

SUMMARY

Highlights of the O&M activities completed by SCS-FS at the Collection System during September included:

- An inspection of the Linklater flare was performed on September 22, 1997. No major deficiencies were noted.
- The annual jetting of the leachate conveyance lines was performed on September 26, 1997. Approximately 1,600 feet of leachate line was jetted during this event.
- The annual leachate discharge permit with the Madison Metropolitan Sewerage District was renewed on September 28, 1997.
- Thirteen loads of leachate totaling approximately 58,700 gallons were removed from the Leachate Collection System.
- The methane content measured at GP-11S was 1.5 percent, by volume (30 percent of the lower explosive limit in air), and the methane content measured in GP-11D was 14.7 percent, by volume. These values are consistent with the previous monthly monitoring results. No methane was detected in the other Monitoring Locations.
- The LFG Recovery System recorded two hours of unplanned downtime.

BACKGROUND

LFG Recovery System

The Refuse Hideaway Landfill LFG Recovery System became operational in 1991. The Refuse Hideaway Landfill LFG Recovery System is defined as the following components:

- The Blower/Flare Station;
- The Collection System; and
- Monitoring Locations.

The Blower/Flare Station consists of one centrifugal LFG blower, an enclosed flare, a candlestick flare (as a backup combustion unit), and associated controls and appurtenances. The Collection System consists of 13 extraction wells, four drip legs, and associated gas and pneumatic header piping. The Monitoring Locations include 11 wells located throughout the site, and ambient air monitoring within the nearby Speedway buildings.

Proper operation of the Collection System is verified through testing of the extraction wells. LFG withdrawal rates at individual wells are adjusted based on test results. Testing for subsurface gas migration is done at the Monitoring Locations. Operation of the Blower/Flare Station provides vacuum necessary to withdraw the gas from the landfill, which helps control surface emissions and subsurface migration; odors and emissions are controlled by combustion of the gas at the flare.

Leachate Collection System

The current leachate collection system was installed in 1996, and is comprised pneumatic pumps installed in eight of the existing LFG extraction wells. Compressed air for the pneumatic pumps is supplied by a compressor located at the Blower/Flare Station. The collected leachate is stored onsite in a 25,000 gallon underground storage tank. Leachate is removed from the tank by a subcontractor, and is transported to the Madison Metropolitan Sewage District for treatment and ultimate discharge.

SCS-FS and our subcontractor, Environmental Sampling Corporation (ESC), began routine monitoring of the Collection System on July 1, 1997. Figure 1 indicates the approximate layout of the Collection System.

TESTING EQUIPMENT

Gas composition testing at the Recovery System was performed using a Landtec GEM-500 Infra-Red Gas Analyzer. The GEM-500 measures methane, carbon dioxide, and oxygen as percent by volume. The GEM-500 also calculates the balance gas component of the LFG (assumed to be nitrogen) and reports it as percent by volume.

Pressure testing was measured in inches of water column and was performed using the GEM-500. LFG flow was measured with the GEM-500 and a Dwyer Pitot tube. Temperature measurement was performed using a handheld, analog temperature probe. Combustion temperatures measured at the flare were obtained from the in-place instrumentation.

Leachate level determination was performed one of two ways:

- For the extraction wells that have a leachate extraction pump, leachate levels were obtained using the bubbler tube installed along with each pump.

- For the gas extraction wells that do not contain a leachate extraction pump, the leachate levels were monitored using an electric tape.

ON-SITE ACTIVITIES

Weekly LFG activities were performed on September 4, 10, 16, 27 and 30. A summary of operational data collected during these weekly activities is shown in Table 1. Monthly activities were completed on September 26, and 30, 1997, with summaries shown in Tables 2, 3, and 4. Copies of all field data sheets are included with this report as Appendix A. The following activities were of note:

- LFG quality at the Blower/Flare station remained stable throughout the month. During the month of September methane concentrations at the blower inlet ranged from a high of 47.0 to a low of 42.0 percent, by volume. Oxygen levels recorded in September ranged from 1.35 to 2.3 percent, by volume.

- Thirteen loads of leachate totaling approximately 58,700 gallons were removed from the Leachate Collection System during the month of September. A summary of the loads removed is shown in Table 5.

- One alarm response occurred during September. Aside from the planned shutdown in advance of the flare inspection, the Blower/Flare system was operational 99 percent of the month of September. A summary of this event is shown in Table 6.

- A visual inspection of the landfill cover performed as part of the monthly activities did not indicate any significant erosion features. No leachate seeps were noted.

- An inspection of the Linklater enclosed flare was performed by a technician from the John Zink Company (Zink) on September 22, 1997. A copy of the Zink letter report is included as Appendix B. No major deficiencies were noted, and a proposal to perform the services recommended by Zink will be forthcoming from SCS-FS under a separate cover.

- The annual hydraulic jetting of the leachate conveyance lines was performed by Visu-Sewer Clean & Seal, Inc. (VSI) on September 26, 1997. A total of 1,574 lineal feet of leachate line was jetted as part of this service. SCS-FS had anticipated jetting 986 lineal feet as part of it's bid for this project (the footage jetted in 1996), however SCS-FS jetted all leachate lines (including those between the landfill and the leachate storage tank), as part of this event. A copy of ESC's report of this event is included as Appendix C.

- On September 28, 1997 the Madison Metropolitan Sewerage District (MMSD) renewed the leachate discharge permit for the Refuse Hideaway Landfill. A copy of the permit is included as Appendix D. The current disposal fee of $8.94 / 1,000 gallons disposed will remain in effect, until at least December 31, 1997. MMSD will review the charges at that time, and will determine if a rate adjustment of warranted.

ISSUES TO RESOLVE

Field monitoring data collected since July has indicated a significant loss of header pressure (vacuum) between extraction wells GW 4 and GW 5. This may indicate a partial blockage within the header pipe. SCS-FS will continue to monitor pressures in the header piping as part of our routine services. If additional investigation is warranted, SCS-FS will prepare an estimate to perform this investigation.

The blower shaft bearings continues to require weekly greasing, a sign that they need to be replaced. SCS-FS will prepare an estimate for procuring and installing two new bearings.

RESOLUTION TO PREVIOUS ISSUES

The Department had requested that SCS-FS mow the entire landfill. We were unable to receive responsive quotes to perform this service, and therefore do not anticipate mowing the landfill in 1997.

WORK PROJECTED FOR THE UPCOMING MONTH

SCS-FS has contracted with Staff Electric Company (Madison) to provide and install an ammeter and hour meter for the blower motor. This service was previously approved by the Department and is scheduled to be performed on Friday, October 24, 1997.

STANDARD PROVISIONS

The findings described above were recorded by both SCS-FS and SCS-FS contracted parties. Changes can and do occur which affect the operation of the system. Department personnel should contact SCS-FS immediately in the event of a system malfunction or operational deficiency.

Although SCS-FS is the primary party designated to operate and maintain the subject system, Department staff may find it necessary to make adjustments to the system if conditions change. SCS-FS should be notified of any adjustments made by Department staff.

SCS-FS is pleased to provide our services to the Department and we enjoy working on the project. Should you have questions, please do not hesitate to contact either of the undersigned.

Sincerely,

William O. Reed
Regional Manager
SCS FIELD SERVICES, INC.

Galen S. Petoyan
President
SCS FIELD SERVICES, INC.

WOR:GSP;bms
Enclosures

TABLE 1.
REFUSE HIDEAWAY LANDFILL
WEEKLY BLOWER/FLARE STATION SUMMARY FOR SEPTEMBER 1997

Date	Time	Bar. Pres. [in-Hg]	Air Temp. [Deg F]	Blower Inlet Pressure [in-W.C.]	Blower Inlet Methane [%vol]	Blower Inlet Oxygen [%vol]	Blower Outlet Pressure [in-W.C.]	Flare Inlet Valve Position	Comments
09/04/97	10:30 am	30.26	75	-29.8	42.0	2.3	5.3	100	
09/10/97	3:00 pm	30.15	70	-31.0	44.0	1.9	2.7	100	
09/16/97	5:15 pm		80	-31.5	43.2	2.1	2.8	100	
09/27/97	4:00 pm		70	-31.4	47.0	1.3	2.9	100	
09/30/97	10:00 am		65	-32.2	44.3	1.6	2.6	100	
Average:					44.1	1.8			
Maximum:					47.0	2.3			
Minimum:					42.0	1.3			

in-Hg Inches of Mercury
Deg F Degrees Fahrenheit
in-W.C. Inches of Water Column
%vol Percent by Volume

TABLE 2.
REFUSE HIDEAWAY LANDFILL
LFG COLLECTION WELL TESTING RESULTS SUMMARY FOR SEPTEMBER 1997

Well No.	Date	Methane [%vol]	Oxygen [%vol]	Well Pressure [in-W.C.]	Header Pressure [in-W.C.]	Flow [cfm]	Temp. [Deg F]	Valve Setting	Comments
GW-01	09/30/97	3.8	19.0	0.0	-12.8	0	73	0	
GW-02	09/30/97	ND	20.1	-0.0	-12.2	0	74	0	
GW-03	09/30/97	43.6	0.7	-3.2	-12.0	19	67	25	
GW-04	09/30/97	43.2	1.4	-10.6	-11.8	0	71	60	
GW-05	09/30/97	53.0	1.6	-6.8	-7.0	0	76	100	
GW-06	09/30/97	39.4	3.0	-1.8	-27.5	0	62	10	
GW-07	09/30/97	52.0	0.7	-27.2	-27.8	70	76	60	
GW-08	09/30/97	53.3	1.8	-23.4	-28.2	60	83	50	
GW-09	09/30/97	52.2	2.4	-25.4	-28.0	73	73	60	
GW-10	09/30/97	43.7	0.6	-2.6	-2.6	0	88	25	
GW-11	09/30/97	59.3	0.7	-30.4	-30.2	52	79	80	
GW-12	09/30/97	51.0	0.8	-5.2	-29.9	78	97	20	
GW-13	09/30/97	45.5	0.7	-29.2	-29.4	115	78	70	

%vol Percent by volume
in-W.C. Inches of water column
cfm Cubic feet per minute
Deg F Degrees Fahrenheit
ND None Detected

TABLE 3.
REFUSE HIDEAWAY LANDFILL
LEACHATE HEAD MEASUREMENT SUMMARY FOR SEPTEMBER 1997

Well No.	Date	Leachate Level [feet, above bottom of well]	Current Pump Cycles	Previous Pump Cycles	Difference
GW-01	09/26/97	7.8			0
GW-02	09/26/97	5.9			0
GW-03	09/26/97	4.1			0
GW-04	09/26/97	1.7	510,641	443,169	67,472
GW-06	09/26/97	6.0			0
GW-07	09/26/97	2.5	1,108,797	973,337	135,460
GW-09	09/26/97	2.1	546,235	488,064	58,171
GW-10	09/26/97	12.6			0
GW-11	09/26/97	1.3	568,597	498,156	70,441
GW-13	09/26/97	3.0	1,036,567	884,696	151,871

TABLE 4.
REFUSE HIDEAWAY LANDFILL
MONITORING WELL TESTING RESULTS FOR SEPTEMBER 1997

Well No.	Date	Methane [%vol]	Oxygen [%vol]	Pressure [in-W.C.]	Comments
G-01D	09/30/97	ND	21.0	0.0	
G-01S	09/30/97	ND	21.0	0.0	
G-06	09/30/97	ND	19.5	0.0	
G-08	09/30/97	ND	21.0	0.0	
G-09	09/30/97	ND	21.0	0.0	
G-10	09/30/97	ND	21.0	0.0	
GP-11D	09/30/97	14.5	0.5	0.0	
GP-11S	09/30/97	1.5	17.5	0.0	
GPW-1D	09/30/97	ND	21.0	0.0	
GPW-1M	09/30/97	ND	21.0	0.0	
GPW-1S	09/30/97	ND	21.5	0.0	
SPEEDWAY BLDGS	09/30/97	ND	21.0	0.0	

% vol Percent by volume
in-W.C. Inches of water column
ND None Detected

TABLE 5.
REFUSE HIDEAWAY LANDFILL
LEACHATE HAULING SUMMARY FOR SEPTEMBER 1997

Date	Beginning Tank Depth [inches]	Ending Tank Depth [inches]	Total Gallons Hauled
09/02/97	68	58	2,225
	78	68	2,242
	58	48	2,162
	48	38	2,052
09/05/97	62	51	2,048
09/06/97	58	48	2,162
09/09/97	54	32	4,679
	75	54	4,671
09/11/97	47	24	4,414
09/15/97	56	35	4,361
09/18/97	64	42	4,741
	43	18	4,532
09/22/97	47	22	4,743
09/25/97	46	23	4,370
09/29/97	62	45	4,793
	46	22	4,533
Total:			58,728
Count:			16

SMALLER CAPACITY TRUCK USED 09/02 AND 09/05-06. FOR
BILLING PURPOSES, TWO LOADS ARE COUNTED AS ONE FULL-SIZE LOAD.
TOTAL FULL SIZE LOADS FOR THE MONTH - 13.

TABLE 6.
REFUSE HIDEAWAY LANDFILL
ALARM RESPONSES FOR SEPTEMBER 1997

Alarm Date	Response Date	Alarm Codes	Comments
09/30/97	09/30/97	N/A	DOWN 2 HOURS
Count:	1		

APPENDIX A

FIELD DATA SHEETS

DATA SHEET A
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS WELL MONITORING

Date: 9/20/97

Time: Start - 1115 End-

Temperature: 65°

Barometric Pressure:

Monitored by: V. STREICH

Gas Detector Model No.: GEM 500
Serial No.: 592
Date Last Calibrated:

Well	Well Pressure (in. WC)	Header Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
GW1	-0.0	-12.8	3.8	19.0	0%	-	0	73.2°	
GW2	-0.2	-12.2	0.0	20.1	0%	-	0	73.5°	
GW3	-3.2	-12.0	43.6	0.7	25%	-	8-19	67°	
GW4	-10.6	-11.8	43.2	1.4	60%	-	0	71°	
GW5	-6.8	-7.0	53.0	1.6	100%	-	0	76°	
GW6	-1.8	-27.5	39.4	3.0	10%	-	0	62°	
GW7	-27.2	-27.8	52.0	0.7	60%	-	70	75.5°	
GW8(1)	-23.4	-28.2	53.3	1.8	50%	-	60	83°	
GW9(1)	-25.4	-28.0	52.2	2.4	60%	-	73	73°	
GW10	-2.6	-2.6	43.7	0.6	25%	-	0	88°	
GW11(1)	-30.4	-30.2	59.3	0.7	80%	-	52	79°	
GW12	-5.2	-29.9	51.0	0.8	20%	-	78	97°	
GW13	-29.2	-29.4	45.5	0.7	70%	-	115	78°	

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF/MJr/JCK
[mad-401-78]
15292.03

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 9/4/97

Time: Start - 1030 End- 1130

Temperature: 75°

Barometric Pressure: 30.26 ↓

Monitored by: Abe Hertz

Gas Detector Model No.: GEM 500
Serial No.: [illegible]
Date Last Calibrated: [illegible]

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
· Sample Port A	+2.1	42.6	2.3		-	135	99.0	
· Sample Port B	+2.0	44.7	2.2		-	-	99.0	
· Sample Port C	+1.2	42.3	2.2		-	-	99.0	
· Manual Valve				100%				
Blower								
· North Branch	-31.0	46.7	1.6	50%		124	73.9°	
· Central Branch	-16.4	40.7	3.9	20%		134	74.1	
· South Branch	-11.5	33.9	4.6	25%		113	69.8	
· Inlet Sample Port A	-29.1	43.5	1.8					
· Inlet Sample Port B	-29.8	42.0	2.3					
· Outlet Sample Port A	+5.3	43.3	1.8					
Pedestal Flare								
· Manual Valve				0%				

Notes: Leachate Tank @ 51 3/4", Flare Temp 1485°, Compressor Hours 2595.1

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 1-16-97

Time: Start - [illegible] End- [illegible]

Temperature: 30°

Barometric Pressure: _____

Monitored by: _____

Gas Detector Model No.: [illegible]
Serial No.: [illegible]
Date Last Calibrated: [illegible]

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
· Sample Port A	+2.2	44.0	2.1		-	132	93	
· Sample Port B	+2	42.4	1.8			—	93	
· Sample Port C	+1.2	42.4	1.8			—	99.3	
· Manual Valve				100%				
Blower								
· North Branch	-29.8	47.5	1.5	50%	—	112	76.7	
· Central Branch	-19.6	43.1	3.9	10%	-	70	75.5	
· South Branch	-13.5	33.7	5.1	20%	-	42	72.5	
· Inlet Sample Port A	-32.3	42.7	2.5					
· Inlet Sample Port B	-31.5	43.2	2.1					
· Outlet Sample Port A	+2.8	43.2	2.2					
Pedestal Flare								
· Manual Valve				0%				

Notes: Leachate tank 47" w.c. Flare Temp 1475°

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRE:kml/JCK [mal-401-781] 15292.03

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 9/10/97

Time: Start - 1500 End - 1530

Temperature: 70's

Barometric Pressure: 30.15 ↑

Monitored by: Frank Rowland

Gas Detector Model No.: GEM 500
Serial No.: 692
Date Last Calibrated: 9/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
· Sample Port A	+2.2	44.5	1.6		-	295	98.9	
· Sample Port B	+2.1	44.5	1.5		-	-	98.6	
· Sample Port C	+1.2	44.3	1.5		-	-	97.8	
· Manual Valve				100%				
Blower								
· North Branch	-35.2	46.3	1.6	50%	-	170	74.6	
· Central Branch	-20.5	40.6	4.8	20%	-	64	73.6	
· South Branch	-14.7	32.4	5.7	20%	-	45	70.3	
· Inlet Sample Port A	-31.8	44.1	1.9					
· Inlet Sample Port B	-31.0	44.0	1.9					
· Outlet Sample Port A	+2.7	44.0	1.9					
Pedestal Flare								
· Manual Valve				0%				

Notes: Tank 41" Flame Temp - 1370°

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF/kml/JCH [ma.l-401-781] 15292.03

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 9/22/97

Time: Start - 1600 End - 1730

Temperature: 70°F

Barometric Pressure: _____

Monitored by: F. Wellman

Gas Detector Model No.: GEM-500
Serial No.: 5076
Date Last Calibrated: 9/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
· Sample Port A	+3.2	46.5	1.6		—	210	95.5	
· Sample Port B	+3.2	46.2	1.6		—	—	95°	
· Sample Port C	+1.3	46.4	1.6		—	—	96°	
· Manual Valve				100%				
Blower								
· North Branch	-30.2	47.9	1.2	50%	—	166	72°	
· Central Branch	-20.3	41.0	2.0	20%	—	110	70°	
· South Branch	-12.4	36.9	4.3	10%	—	45	67°	
· Inlet Sample Port A	-30.3	49.2	1.2					
· Inlet Sample Port B	-31.4	47.0	1.3					
· Outlet Sample Port A	+2.9	46.5	1.4				106°F	
Pedestal Flare								
· Manual Valve				0% closed				

TANK - 4.9

Notes: FLARE TEMP. 1400°F.

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF:kml/JCH [ma1-401-781] 15292.03

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 9/30/97

Time: Start - 1000 End- _____

Temperature: 65°

Barometric Pressure: _____

Monitored by: V. STRUCK

Gas Detector Model No.: GEM 500
Serial No.: 592
Date Last Calibrated: _____

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
· Sample Port A	+2.0	44.2	1.4		-	223	87°	
· Sample Port B	+1.9	44.8	1.6		-	-	87°	
· Sample Port C	+1.1	44.8	1.8		-	-	79.5°	
· Manual Valve				100%				
Blower								
· North Branch	-30.8	46.4	1.3	50%	-	138	64.0	
· Central Branch	-26.2	43.4	2.2	25%	-	116	64.8	
· South Branch	-13.2	33.9	4.8	20%	-	109	63.0	
· Inlet Sample Port A	-31.5	44.4	1.6					
· Inlet Sample Port B	-32.2	44.3	1.6					
· Outlet Sample Port A	+2.6	44.6	1.6					
Pedestal Flare								
· Manual Valve				0%				

Notes: Tank @ 30' Flare Temp 1334°

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRE:kml/JCH: [ma.l-401-781] 15292.03

DATA SHEET C
REFUSE HIDEAWAY LANDFILL
GAS AND LEACHATE EXTRACTION SYSTEM
LEACHATE HEAD MONITORING

Date: 9/26/97
Time: Start- 0930 End- 1545
Monitored By: Rick Hartz
Instrument Used: GEO WATER LEVEL

Well Riser	Riser Depth(2) (ft)	Depth to Leachate (ft)	Leachate Head (ft)	Comments
GW1-EAST	53.7	45.9	7.8	
-WEST	54.1			
GW2-EAST	53.9	48.1	5.9	
-WEST	54.0			
GW3-EAST	59.7	55.6	4.1	
-WEST	59.7			
GW4-EAST	61.9	–	1.7	510671 Hrs.
-WEST	61.8			
GW5-EAST	70.0	–	0.8	637479 Hrs
-WEST	69.9			
GW6-EAST	40.0	34.0	6.0	
-WEST	40.1			
GW7-EAST	60.0	–	2.5	63797 Hrs.
-WEST	60.0			
GW8 (1)				
-EAST	69.6	–	0.4	779246 Hrs.
-WEST	69.9			
GW9(1)				
-NORTH	67.5	–	2.1	546235 Hrs.
-SOUTH	68.4			
GW10-				
-NORTH	72.8	60.2	12.6	
-SOUTH	72.7			
GW11(1)				
-EAST	69.1	–	1.3	568597 Hrs.
-WEST	69.1			
GW12-EAST	80.0	–	0.3	744589 Hrs.
-WEST	80.0			
GW13-EAST	73.1	–	3.0	36567 Hrs.
-WEST	73.0			
Leachate Tank	17.9	14.6	3.3	

Tank Volume = 5753 gal

Notes: TANK @ 40"

(1) Wells with leachate extraction pumps and controls installed.
(2) Depth is measured from top of 1-in. dia. riser pipe. Tank riser pipe is 2-in. dia.
(3) Use Table 1 to convert leachate head in tank to a volume in gallons.

DRF/ndj/JCK
[mad-401-78a]
15292.03

DATA SHEET E
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS PROBE MONITORING

Date: 9/30/97

Time: Start - 1045 End- 1400

Temperature: 60's

Barometric Pressure: _____

Monitored by: P Hartz

Gas Detector Model No.: Gastech 1939DX

Serial No.: 92095

Date Last Calibrated: 9/29/97

Location	Probe Pressure (in. WC)	CH_4(1) (%)	CH_4(2) (% LEL)	O_2 (%)	Comments
G-1S	0.0	0.0	0	21.0	
G-1D	0.0	0.0	0	21.0	
G-6	0.0	0.0	0	19.5	
G-8	0.0	0.0	0	21.0	
G-9	0.0	0.0	0	21.0	
G-10	0.0	0.0	0	21.0	
GP-11S	0.0	1.5	—	17.5	
GP-11D	0.0	14.5	—	0.5	
GPW-1S	0.0	—	0	21.5	
GPW-1M	0.0	0	0	21.0	
GPW-1D	0.0	0	0	21.0	
Speedway Buildings	0.0	0.0	0	21.0	

Notes:
(1) Percent combustibles by volume, primarily composed of CH_4.
(2) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).

DRF/vlr/JCK
[mad-402-13a]
15292.03

APPENDIX B

JOHN ZINK COMPANY
FLARE INSPECTION REPORT

JOHN ZINK
A KOCH INDUSTRIES COMPANY

International Headquarters
P.O. Box 21220
Tulsa, Oklahoma 74121-1220
918/234-1800

October 16, 1997

SCS Field Services
787 W. Sherwood
Springfield, MO 65810

Attention: Bill Reed

Reference: Hideaway Landfill

Dear Mr. Reed:

Our Wisconsin technician inspected the flare system at the Hideaway Landfill in Middleton, WI on September 22nd.
His findings concluded the flare is in good condition and operating properly. There were a few items detailed in his report, as follows:

- The stack was not grounded. Recommendation was made to site personnel.
- There was no gravel in the interior/bottom of the flare, resulting in foundation breaking up. Recommendation was made to site personnel.
- Fire brick in some locations was broken up but not enough to impair the stack at this time.
- Some welds on waste gas header appeared to be cracked but overall, in good condition.
- Spark ignitor connection at plug was repaired by our technician.
- Conduit was sealed at ignition transformer panel by our technician.
- Inspected interior of control panel. Several wire terminals were loose. These were corrected by our technician. Relays appeared to be in like-new condition. Operation of the flare system controls was monitored.

Overall, the flare is in good condition. It is recommended to internally inspect the flare at any opportunity, bearing in mind that landfill flares are not shutdown on a regular basis. A qualified manufacturer's representative should inspect the flare at least on an annual basis, given the age of the flare system and the conditions of a few of the items noted.
John Zink Company appreciates the opportunity to work with SCS Field Services and look forward to the growth of our relationship is servicing landfill flare systems throughout the U.S.

Sincerely,

Les Barrett

JOHN ZINK
A KOCH INDUSTRIES COMPANY
11920 East Apache Tulsa, Oklahoma 74116-1820
918/234-1800 FAX 918/234-1868

Original SO #		New SO #	
Customer	SCS field services	P.O. #	
Invoice Address	787 West Sherwood	Site Address	
Invoice City	Springfield	Site City	
State, Zip	MO 65810	State, Zip	
Requested by	Bill Reed	Site Contact & Phone Number	Bill Reed 417-881-7303

Field Service Engineer: Bill Rosen

Are T&C's in place? ☐ Yes ☐ No If No, have the Customer sign KJZ T&C's prior to the start of ANY work. If Yes, what type of T&C's?
☐ Technical Asst Agmt ☐ PM Contract @ (rate) ☐ Blanket Contract @ (rate) ☐ Warranty ☐ Other

Type of Work:
(Check ☒ at least one in each section)

☐ Internal
☒ External

☐ TOSG
☐ Burners
☐ Flares
☒ Vapor

☐ Inspection
☐ Startup
☒ Callout
☐ Training

☐ PM
☐ Sales Call
☐ Non-JZ Equip
☐

Date	Time Interval	Chargeable Hours Reg.	Wknd	OT	Warranty Hours	Non Rev	Description of Work Performed
9.22	0830						Travel
	0900						
	0900						Inspect landfill flare - ON Checklist was - Burner integrity welds - Pilot condition - Flame scanner - waste gas header - Refractory - thermo-couple - quench air dampers - electrical - O stack was not grounded I recommend that an 8' ground rod be buried and stack grounded to it - there is no gravel in the bottom of the stack could use about 6" to keep concrete from breaking up - fire brick in fair condition some pieces are broken some welds on header are crackin but in fair condition - Replaced spark plug connection due to poor connection - sealed up conduit to Ignition transformer panel
	1630						
Sub-Total Hours							

Total Hours Worked: 7

RATE INFORMATION:
Regular Days @ $_____ Weekend Days @ $_____
Reg OT Hours @ $_____ Wknd OT Hours @ $_____

Required Parts and Sales Price
Comments or Recommendations

Work Verified By: _____ Customer Representative — 9/22/97 Date — _____ Phone (Fax)

Work Submitted By: Bill Rosen John Zink Representative — 9.22.97 Date

☐ Add'l Info. Attached

Trip Expenses:

Air Fare:	
Mileage:	
Tolls/Taxi:	
Car Rental:	
Hotel:	
Phone/Tips:	
Fuel/Parking	
Meals:	
Misc.:	
Sub-Total:	

(_____ Miles @ _____ /mile)

Leave Open ☐
Close ☒

Meals:

Date	Amount	Date	Amount

Refer to Code List for Valid Codes

Failure Codes:
Repair Codes:

Labor Total: 880.00
Expenses Total:
Parts Total:
Grand Total: 880.00

APPENDIX C

ENVIRONMENTAL SAMPLING CORP.
LEACHATE CONVEYANCE LINE JETTING REPORT

REFUSE HIDEAWAY LANDFILL
MIDDLETON, WISCONSIN
ANNUAL LEACHATE CONVEYANCE PIPE CLEAN OUT & STATUS REPORT
SEPTEMBER 1997

SYSTEM DESCRIPTION

The Leachate Extraction System at the Refuse Hideaway Landfill is designed to recover leachate and gas condensate. Leachate and gas condensate are extracted from the landfill using pneumatic air lift pumps placed in extraction wells found to have high leachate levels. The layout of the leachate and gas extraction system is shown in figure A.

Periodic maintenance and leachate conveyance pipe cleaning is required annually to keep the system operating smoothly and efficiently. Successful cleaning of the leachate conveyance piping system demonstrates that differential settlement has not occurred. On September 26, 1997, ESC personnel (F. Perugini, P. Hartz) were on-site to perform the annual leachate conveyance pipe cleaning. Visu Sewer was chosen to perform the cleaning based upon past site experience. Visu Sewer personnel Gary and Neil were on-site in truck #113. Truck #113 was loaded with 1000 gallons of water and the jetter nozzle pressure was set at approximately 2000 psi. Leachate conveyance pipe cleaning was performed by entering various clean outs on the low side and jetting upgradient. The total leachate conveyance piping system cleaned was approximately 1600 feet. Due to the rough terrain and location of Clean Out #3 (CO3) it was not entered.

I. System Clean Out Schedule

Set up #1 -- Visu Sewer truck #113 set up below Clean Out #2 (CO2). The jetter hose was walked up the slope and inserted into CO2. The jetter hose was positioned to head uphill towards GW-1 (see fig. #1). The distance traveled by the jetter hose was approx. 330 to 340 feet.

Set up #2 -- Visu Sewer truck #113 set up near the blower building. The jetter hose was inserted into Drip Leg #1 Clean Out (DL1 CO), the jetter hose was headed towards the Leachate Tank (see fig. #2). A visual confirmation was made at the Leachate tank.

Set up #3 -- Visu Sewer truck #113 remained in the same location near the blower building. The jetter hose was inserted into Clean Out #1 (CO1) heading uphill towards Clean Out #2 (CO2) (see fig. #3). A visual confirmation was made at CO2 where pressure was heard in the line and water was observed.

I. System Clean Out Schedule (cont.)

Set up #4 -- Visu Sewer truck #113 set up near Clean Out #6 (CO6). The jetter hose was inserted into CO6 heading towards GW-11 (see fig #4). The distance traveled by the hose was approx. 180 to 190 feet.

Set up #5 -- Visu Sewer truck #113 set up near the blower building. The jetter hose was inserted into Clean Out #5 (CO5). The jetter hose headed uphill towards GW-8P and then past the bend towards GW-9P (see fig. #5). A visual confirmation was noted at CO6. **Note:** There was some resistance when the jetter hose was removed from CO5. The distance traveled by the jetter hose was approx. 350 to 360 feet.

Set up #6 -- Visu Sewer truck #113 set up near the blower building. The jetter hose was inserted into Clean Out #4 (CO4) and the jetter hose headed uphill towards CO5 (see fig. #6). A visual confirmation was noted at CO5.

Set up #7 -- Visu Sewer truck #113 set up in the same location near the blower building. The jetter hose was placed into Drip Leg # 3 Clean Out (DL3-CO) which headed towards DL-1 CO (see fig. #7). The jetter hose was then placed in Drip Leg #4 Clean Out (DL4-CO) (see fig. #7). Water only was blasted through the lines. The flow was confirmed visually at the nest of clean outs.

Set up #8 -- Visu Sewer truck #113 set up inside the fenced area. The jetter hose was placed in Drip Leg #2 Clean Out (DL2-CO) which heads towards the Leachate Tank (see fig # 8).). Water only was blasted through the lines. The flow was heard and seen in the Leachate Tank.

Set up #9 -- Visu Sewer truck #113 set up on the concrete Leachate Load Out pad. Sand and debris was removed from the silt trap inside the Leachate Load Out pad manhole, and the drain was then flushed with water. The pipe heading to the Leachate Tank was also flushed with water (see fig. #9). The concrete Leachate Load Out pad was hosed off and cleaned.

Figure A

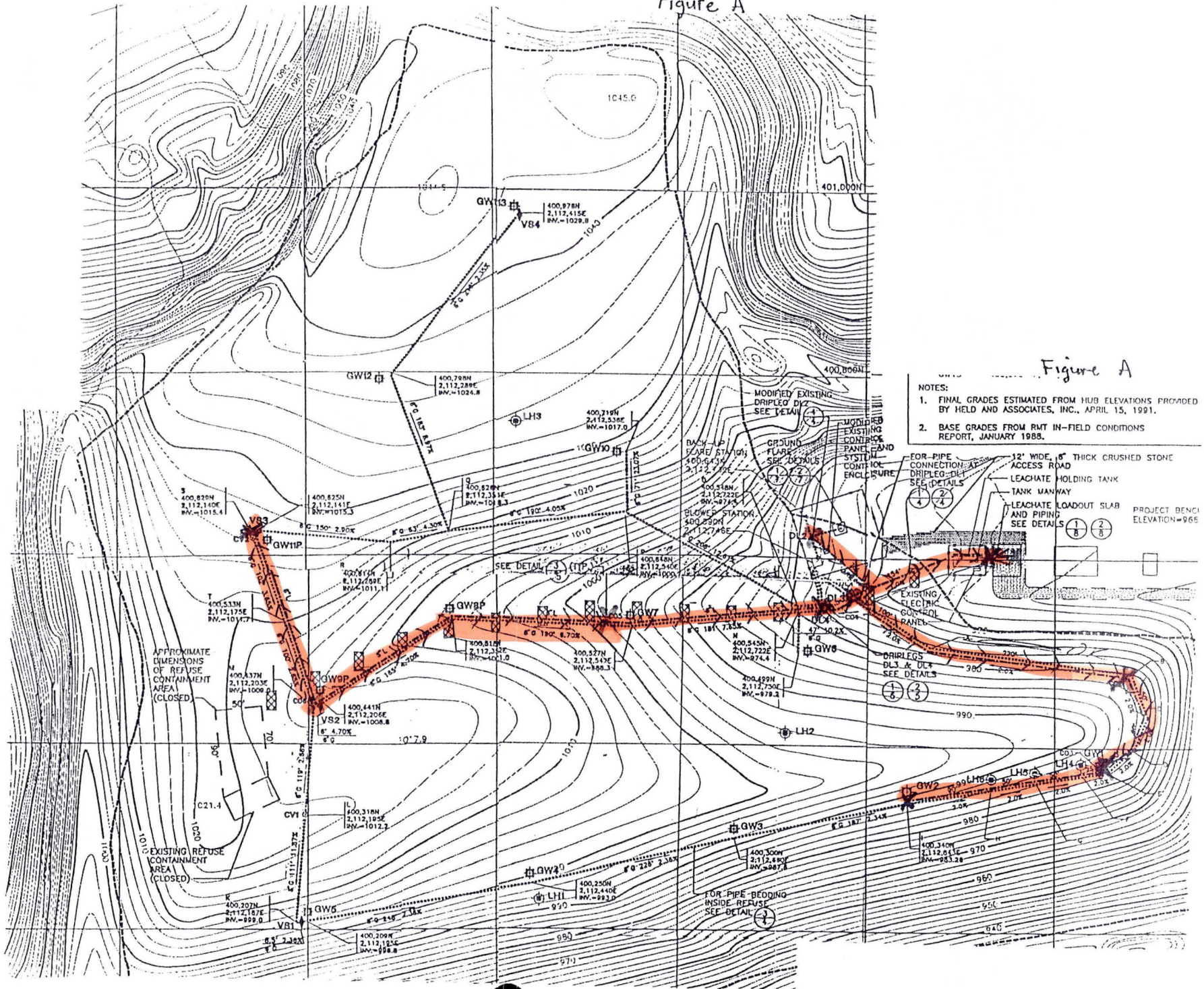

NOTES:
1. FINAL GRADES ESTIMATED FROM HUB ELEVATIONS PROVIDED BY HELD AND ASSOCIATES, INC., APRIL 15, 1991.
2. BASE GRADES FROM RMT IN-FIELD CONDITIONS REPORT, JANUARY 1988.
APPROXIMATE DIMENSIONS OF REFUSE CONTAINMENT AREA (CLOSED)
EXISTING REFUSE CONTAINMENT AREA (CLOSED)
MODIFIED EXISTING DRIPLEG DL2 SEE DETAIL
BACK-UP FLARE STATION
GROUND FLARE SEE DETAILS
BLOWER STATION
MODIFIED EXISTING CONTROL PANEL AND SYSTEM CONTROL ENCLOSURE
FOR PIPE CONNECTION AT DRIPLEG DL1 SEE DETAILS
12' WIDE, 8" THICK CRUSHED STONE ACCESS ROAD
LEACHATE HOLDING TANK
TANK MANWAY
LEACHATE LOADOUT SLAB AND PIPING SEE DETAILS
PROJECT BENCH ELEVATION=965
EXISTING ELECTRIC CONTROL PANEL
DRIPLEGS DL3 & DL4 SEE DETAILS
FOR PIPE BEDDING INSIDE REFUSE SEE DETAIL
SEE DETAIL
401,000N
400,800N
GW13
GW12
GW11P
GW10
GW9P
GW8
GW7
GW6
GW5
GW4
GW3
GW2
LH1
LH2
LH3
LH4
LH5
LH6
VS1
VS2
VS3
VS4
CV1
CV2
DL1
DL2
DL3
DL4

Figure # 1

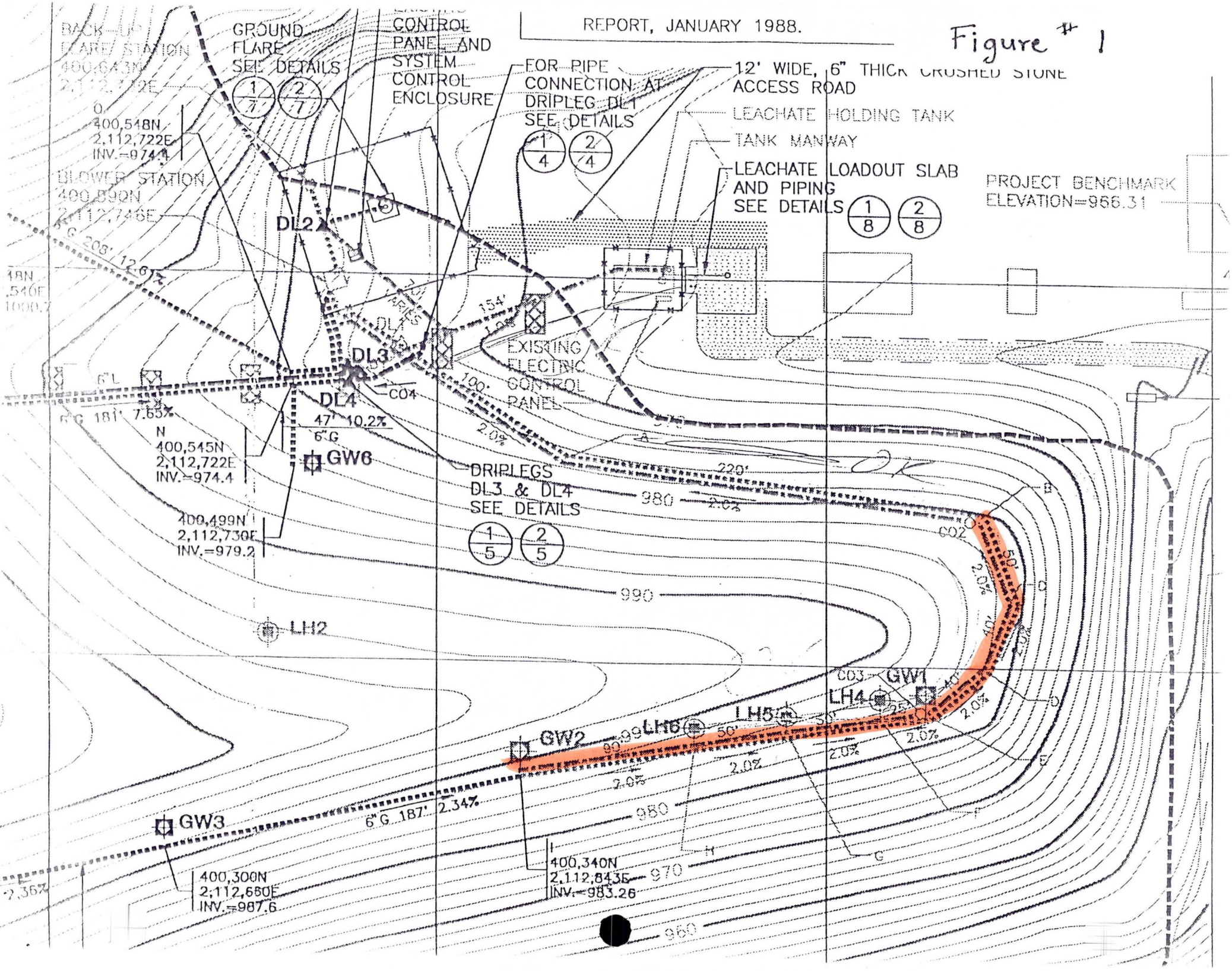

GROUND FLARE SEE DETAILS 1/7 2/7
CONTROL PANEL AND SYSTEM CONTROL ENCLOSURE
FOR PIPE CONNECTION AT DRIPLEG DL1 SEE DETAILS 1/4 2/4
12' WIDE, 6" THICK CRUSHED STONE ACCESS ROAD
LEACHATE HOLDING TANK
TANK MANWAY
LEACHATE LOADOUT SLAB AND PIPING SEE DETAILS 1/8 2/8
PROJECT BENCHMARK ELEVATION=966.31
BACK-UP FLARE STATION
400,643N
2,112,722E
0
400,548N
2,112,722E
INV.=974.4
BLOWER STATION
400,890N
2,112,746E
208' 12.6%
DL2
DL1
VARIES
DL3
DL4
154' 1.9%
EXISTING ELECTRIC CONTROL PANEL
100'
2.0%
C04
6"G 181' 7.65%
47' 10.2%
6"G
N
400,545N
2,112,722E
INV.=974.4
GW6
DRIPLEGS DL3 & DL4 SEE DETAILS 1/5 2/5
400,499N
2,112,730E
INV.=979.2
220'
980
2.0%
C02
990
LH2
C03
GW1
LH4
LH5
LH6
GW2
99'
50'
2.0%
6"G 187' 2.34%
GW3
400,300N
2,112,680E
INV.=987.6
400,340N
2,112,843E
INV.=983.26
970
960
950

Figure 2

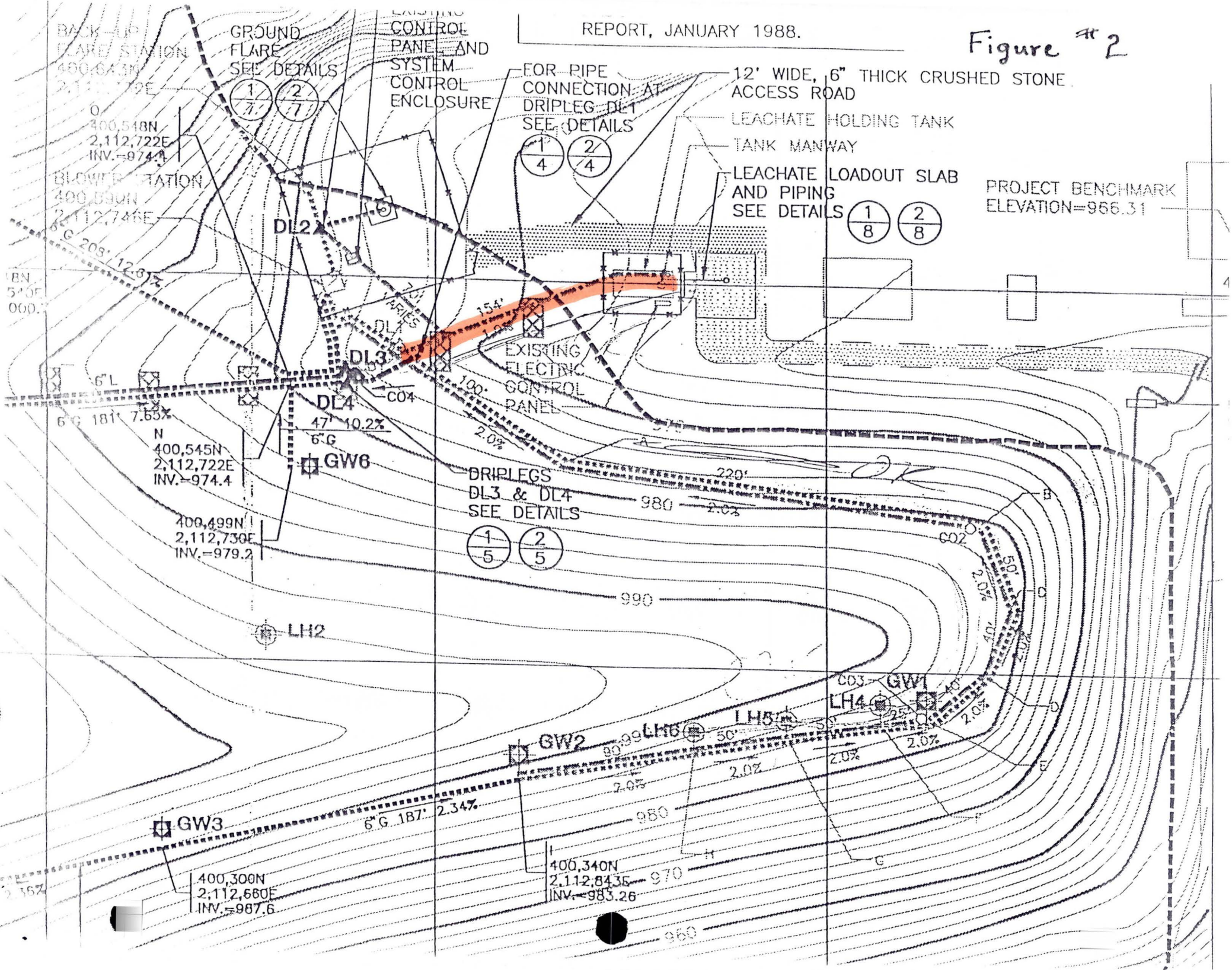

GROUND FLARE SEE DETAILS 1/7 2/7
EXISTING CONTROL PANEL AND SYSTEM CONTROL ENCLOSURE
FOR PIPE CONNECTION AT DRIPLEG DL1 SEE DETAILS 1/4 2/4
12' WIDE, 6" THICK CRUSHED STONE ACCESS ROAD
LEACHATE HOLDING TANK
TANK MANWAY
LEACHATE LOADOUT SLAB AND PIPING SEE DETAILS 1/8 2/8
PROJECT BENCHMARK ELEVATION=966.31
BACK-UP FLARE STATION
400,643N
2,112,722E
INV.=974.1
BLOWER STATION
400,539N
2,112,748E
400,548N
2,112,722E
INV.=974.1
400,545N
2,112,722E
INV.=974.4
400,499N
2,112,730E
INV.=979.2
400,340N
2,112,843E
INV.=983.26
400,300N
2,112,660E
INV.=987.6
DL1
DL2
DL3
DL4
GW1
GW2
GW3
GW6
LH2
LH4
LH5
LH6
EXISTING ELECTRIC CONTROL PANEL
DRIPLEGS DL3 & DL4 SEE DETAILS 1/5 2/5
6"G 181' 7.65%
6"G 203' 12.6%
47' 10.2%
6"G
154' 1.9%
100'
220'
2.0%
2.03
980
990
970
960
950
6"G 187' 2.34%
2.0%
50'
40'
25'
C02
C03
C04

Figure 3

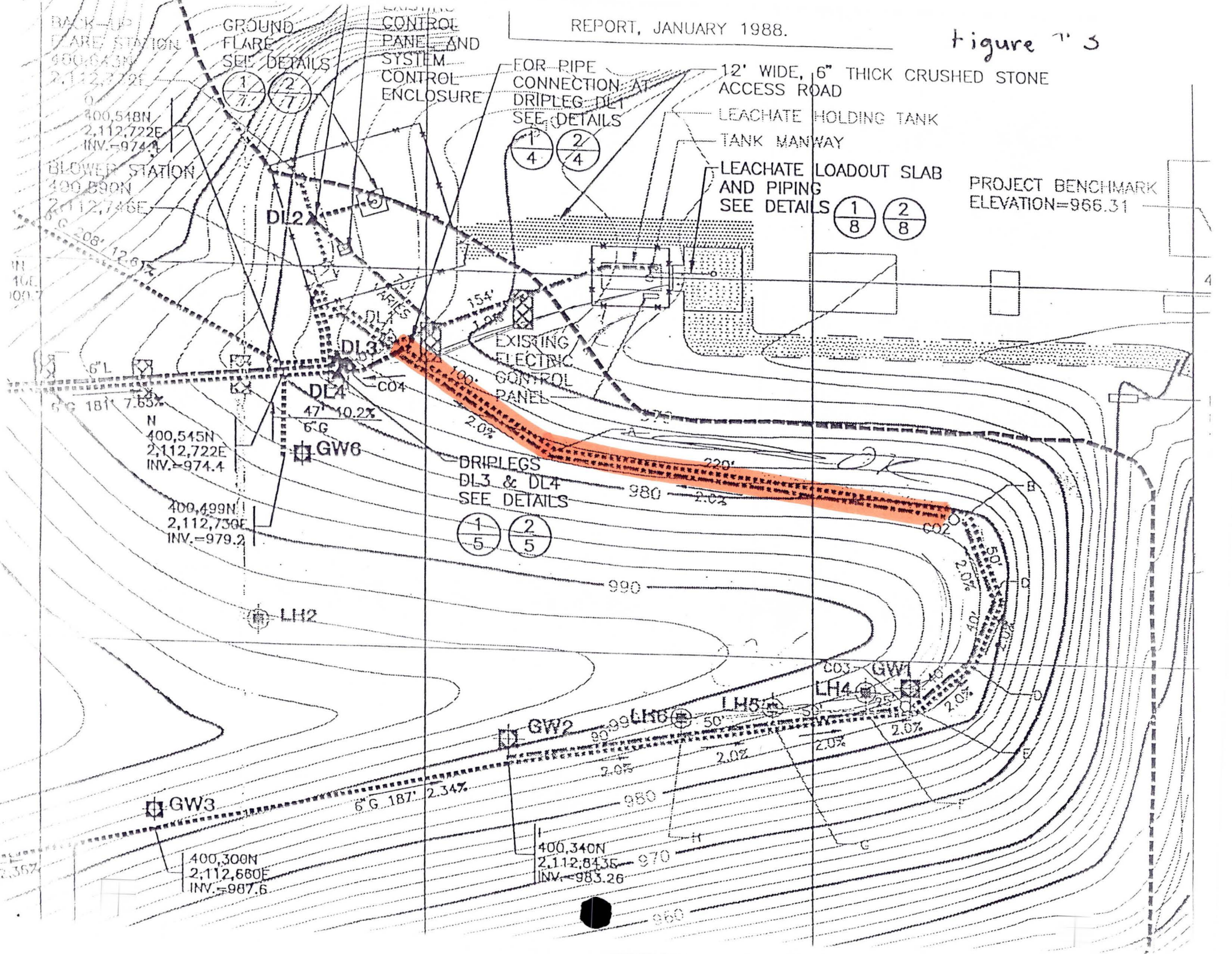
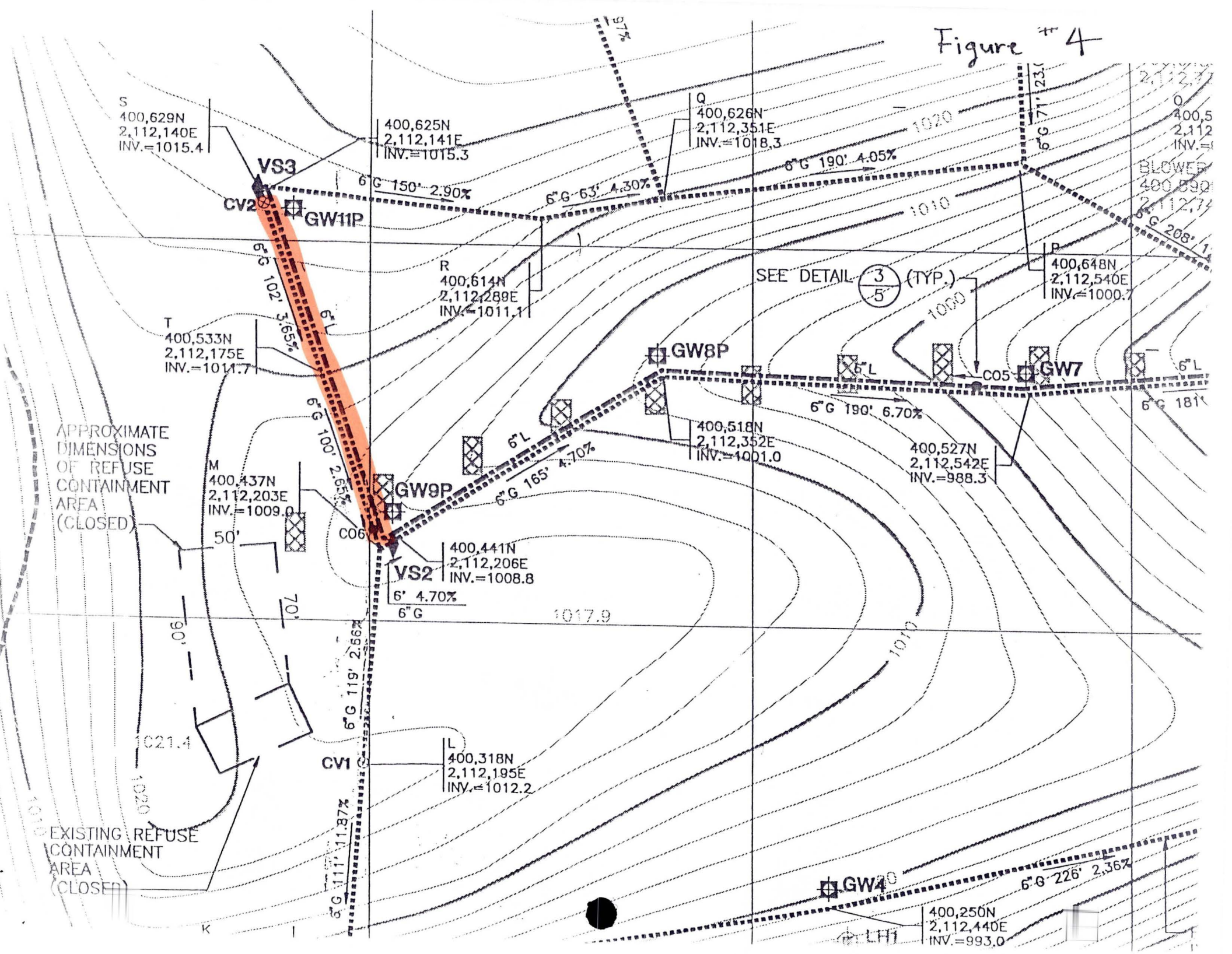

BACK-UP FLARE STATION
400,643N
2,112,722E
INV.=974.4
GROUND FLARE SEE DETAILS 1/7 2/7
CONTROL PANEL AND SYSTEM CONTROL ENCLOSURE
FOR PIPE CONNECTION AT DRIPLEG DL1 SEE DETAILS 1/4 2/4
12' WIDE, 6" THICK CRUSHED STONE ACCESS ROAD
LEACHATE HOLDING TANK
TANK MANWAY
LEACHATE LOADOUT SLAB AND PIPING SEE DETAILS 1/8 2/8
PROJECT BENCHMARK ELEVATION=966.31
400,548N
2,112,722E
INV.=974.4
BLOWER STATION
400,890N
2,112,746E
DL2
DL1
DL3
DL4
EXISTING ELECTRIC CONTROL PANEL
DRIPLEGS DL3 & DL4 SEE DETAILS 1/5 2/5
400,545N
2,112,722E
INV.=974.4
GW6
400,499N
2,112,730E
INV.=979.2
LH2
C04
C02
C03
GW1
LH4
LH5
LH6
GW2
GW3
400,300N
2,112,660E
INV.=987.6
400,340N
2,112,843E
INV.=983.26
990
980
970
960

Figure #4


S
400,629N
2,112,140E
INV.=1015.4
VS3
CV2
GW11P
400,625N
2,112,141E
INV.=1015.3
6"G 150' 2.90%
Q
400,626N
2,112,351E
INV.=1018.3
6"G 63' 4.30%
6"G 190' 4.05%
1020
1010
R
400,614N
2,112,289E
INV.=1011.1
SEE DETAIL 3/5 (TYP.)
P
400,648N
2,112,540E
INV.=1000.7
1000
T
400,533N
2,112,175E
INV.=1011.7
6"G 102' 3.65%
6"L
GW8P
GW7
CO5
6"L
6"G 190' 6.70%
400,518N
2,112,352E
INV.=1001.0
400,527N
2,112,542E
INV.=988.3
APPROXIMATE DIMENSIONS OF REFUSE CONTAINMENT AREA (CLOSED)
M
400,437N
2,112,203E
INV.=1009.0
6"G 100' 2.65%
6"L
6"G 165' 4.70%
GW9P
CO6
50'
400,441N
2,112,206E
INV.=1008.8
VS2
6' 4.70%
6"G
1017.9
70'
90'
6"G 119' 2.66%
1021.4
1020
CV1
L
400,318N
2,112,195E
INV.=1012.2
EXISTING REFUSE CONTAINMENT AREA (CLOSED)
6"G 111' 11.87%
GW4
6"G 226' 2.36%
400,250N
2,112,440E
INV.=993.0
LH1
K
L

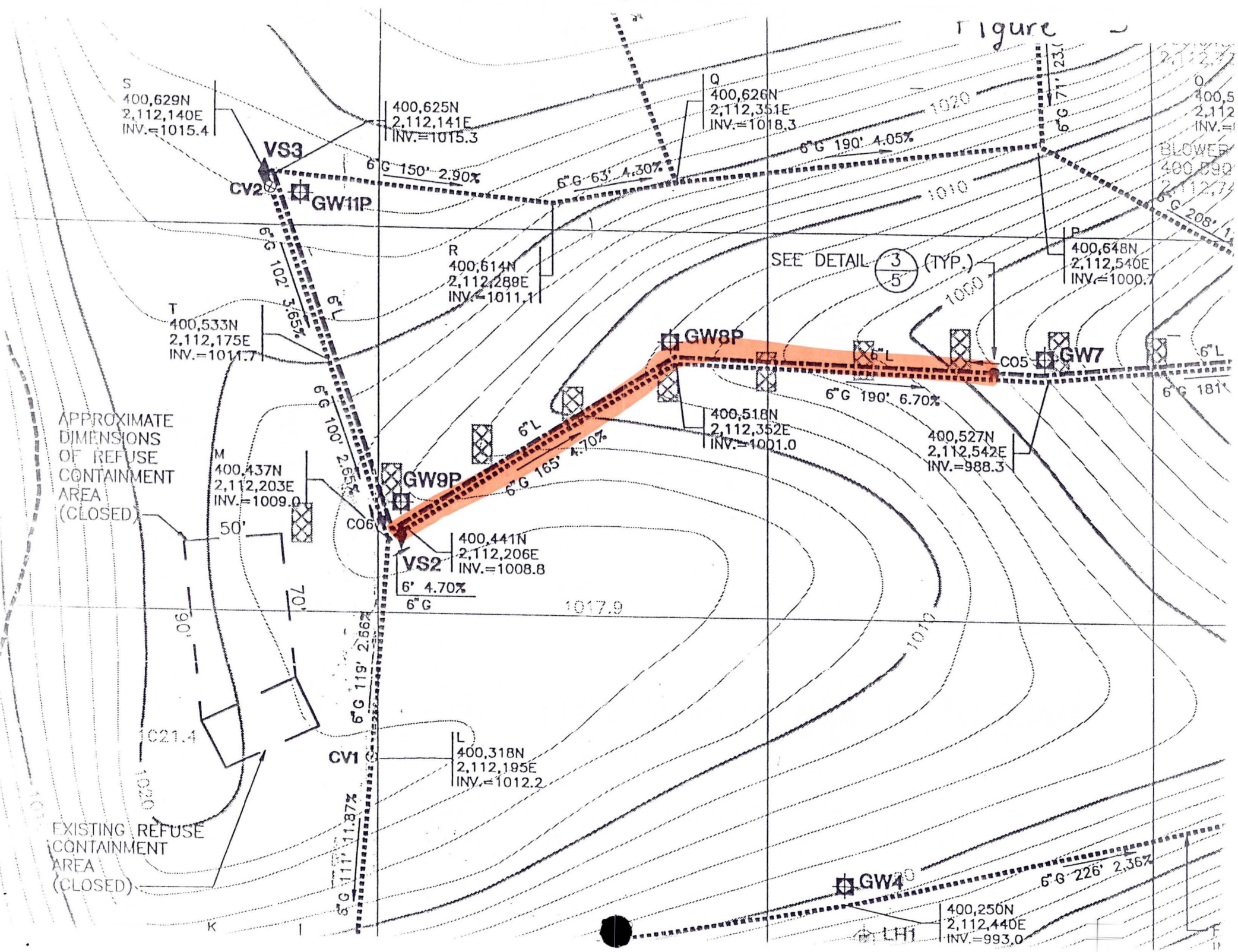


Figure
S
400,629N
2,112,140E
INV.=1015.4
400,625N
2,112,141E
INV.=1015.3
Q
400,626N
2,112,351E
INV.=1018.3
VS3
CV2
GW11P
6"G 150' 2.90%
6"G 63' 4.30%
6"G 190' 4.05%
6"G 71' 23.(
1020
1010
R
400,614N
2,112,288E
INV.=1011.1
SEE DETAIL 3/5 (TYP.)
400,648N
2,112,540E
INV.=1000.7
6"G 102' 3.65%
6"L
T
400,533N
2,112,175E
INV.=1011.7
1000
GW8P
CO5
GW7
6"L
6"G 190' 6.70%
6"G 181'
400,518N
2,112,352E
INV.=1001.0
400,527N
2,112,542E
INV.=988.3
APPROXIMATE
DIMENSIONS
OF REFUSE
CONTAINMENT
AREA
(CLOSED)
M
400,437N
2,112,203E
INV.=1009.0
6"G 100' 2.65%
6"L
6"G 165' 4.70%
GW9P
CO6
50'
400,441N
2,112,206E
INV.=1008.8
VS2
6' 4.70%
6"G
1017.9
1010
70'
90'
C21.4
6"G 119' 2.86%
CV1
L
400,318N
2,112,195E
INV.=1012.2
1020
EXISTING REFUSE
CONTAINMENT
AREA
(CLOSED)
6"G 111' 11.87%
K
I
GW4
6"G 226' 2.36%
LH1
400,250N
2,112,440E
INV.=993.0

Figure 6

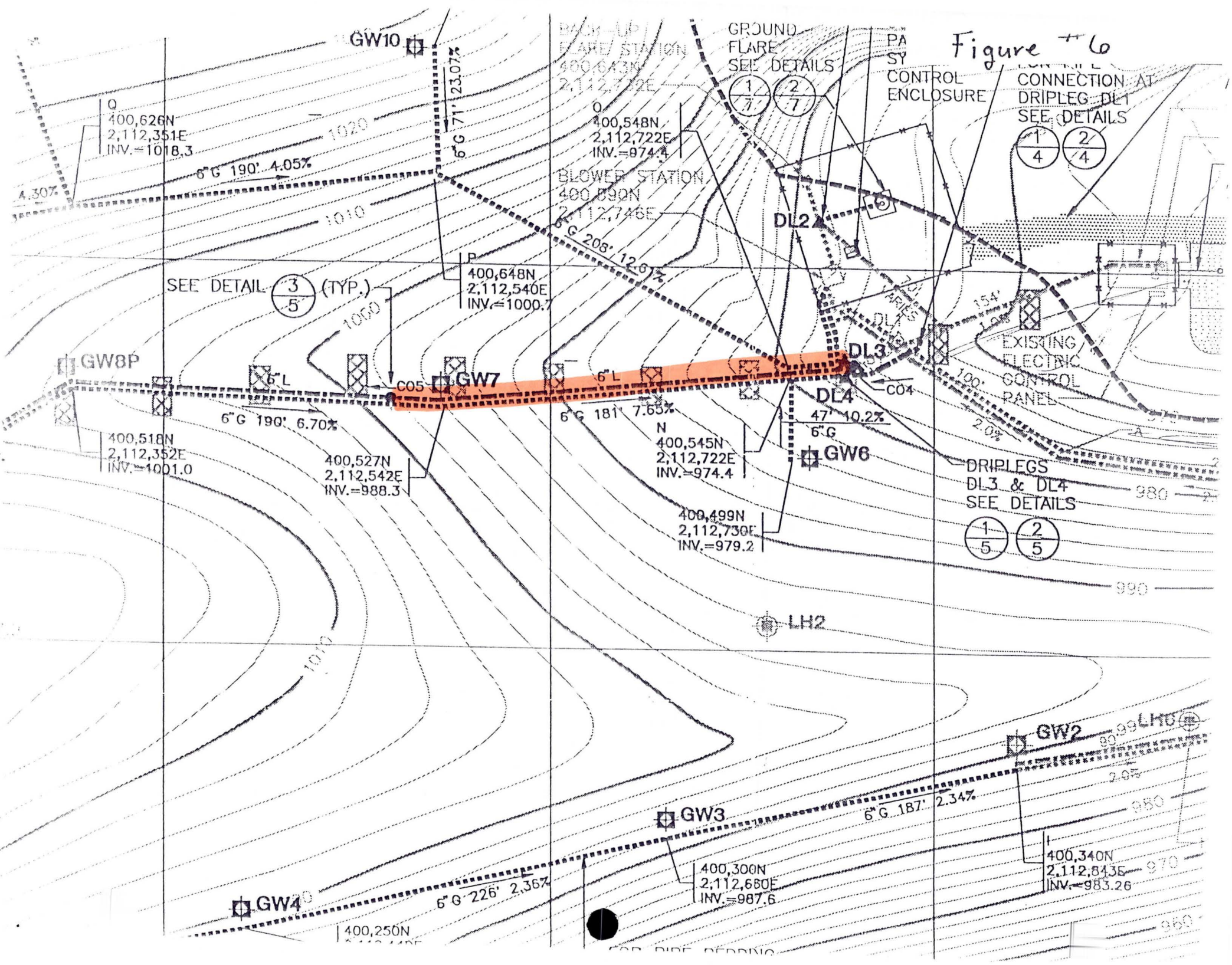
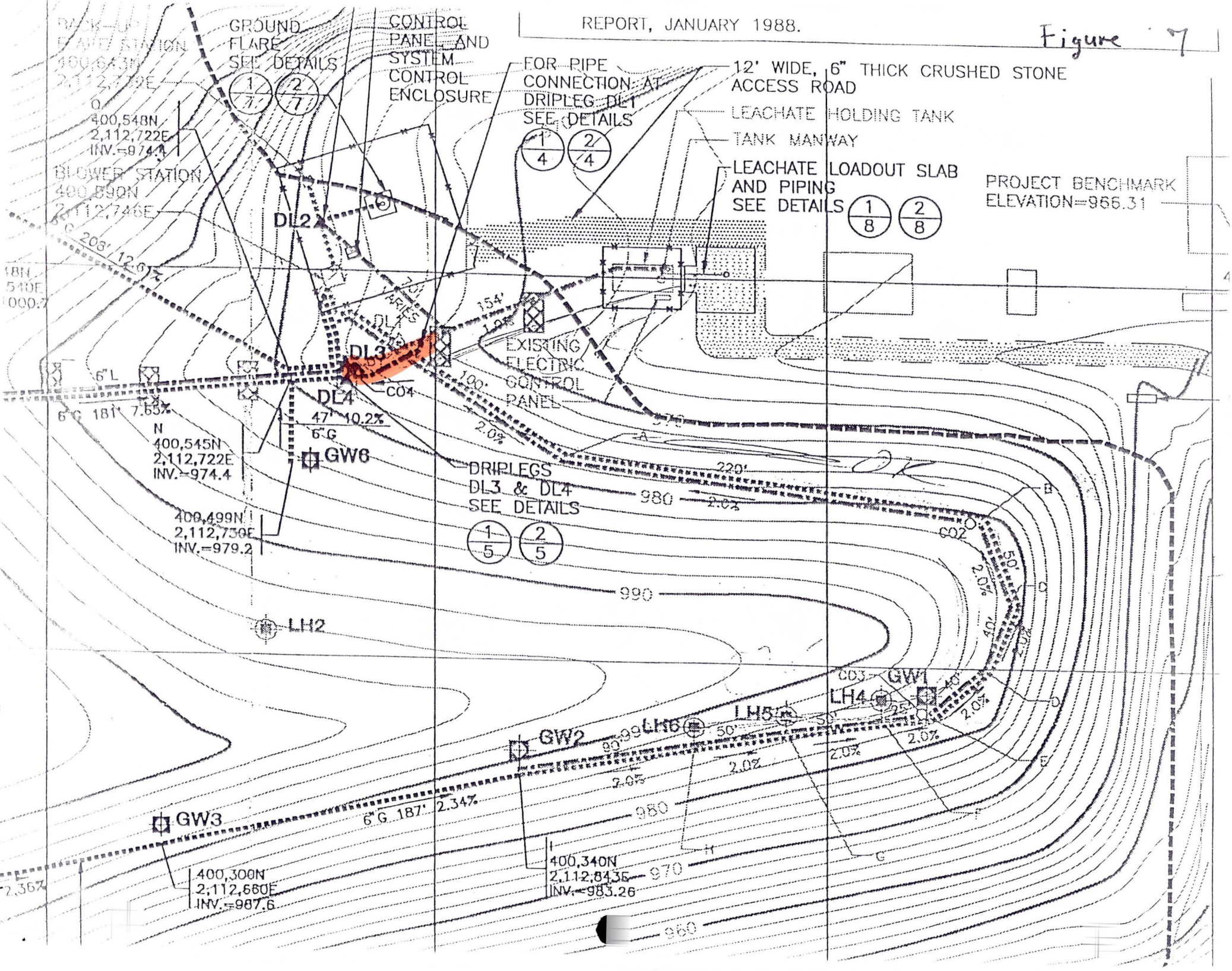
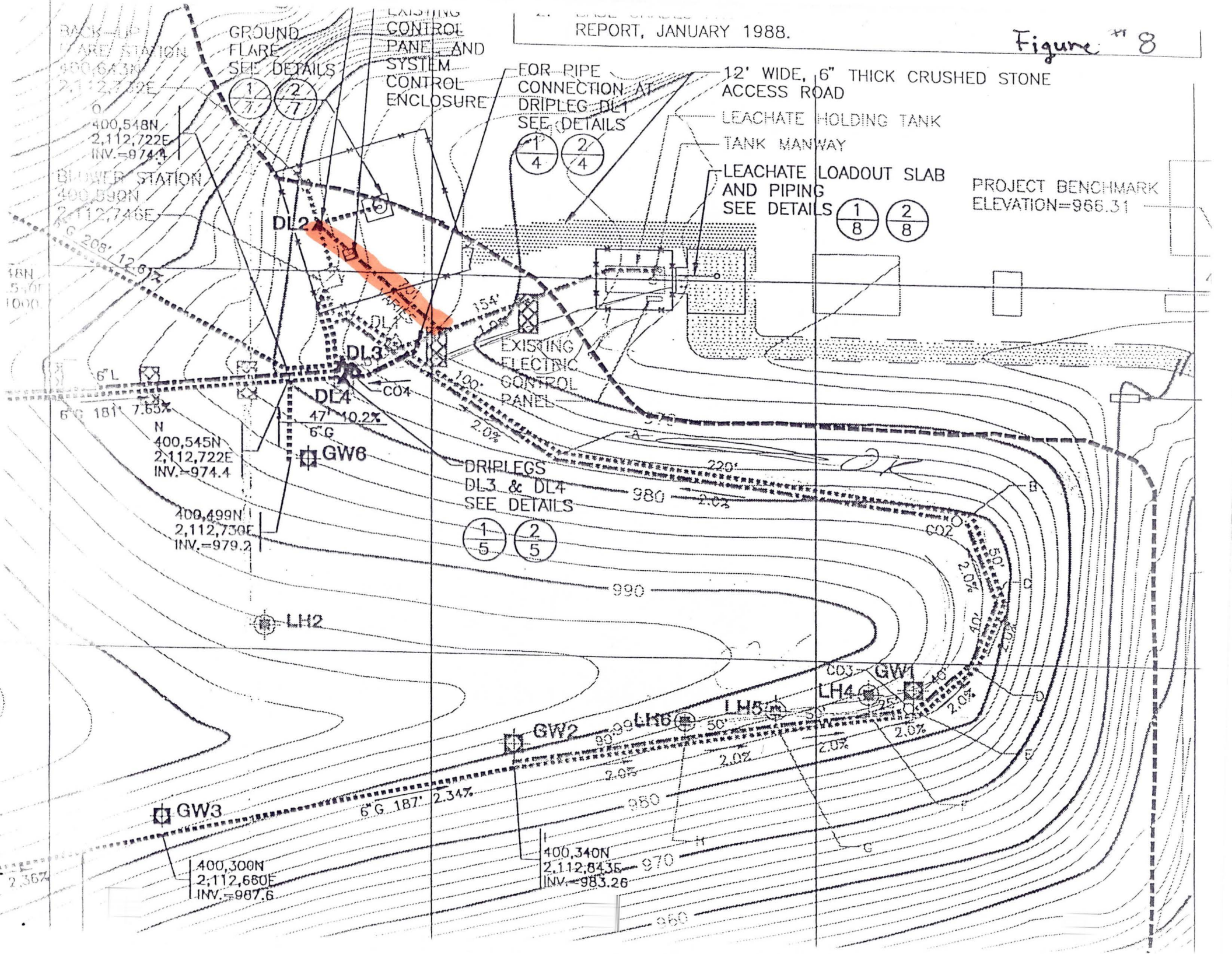

GW10
GROUND FLARE SEE DETAILS 1/7 2/7
CONTROL ENCLOSURE
CONNECTION AT DRIPLEG DL1 SEE DETAILS 1/4 2/4
O
400,626N
2,112,351E
INV.=1018.3
6"G 190' 4.05%
6"G 71' 23.07%
O
400,548N
2,112,722E
INV.=974.4
BLOWER STATION
400,690N
2,112,746E
6"G 208' 12.6%
DL2
P
400,648N
2,112,540E
INV.=1000.7
SEE DETAIL 3/5 (TYP.)
GW8P
6"L
C05
GW7
6"L
DL3
C04
DL4
47' 10.2%
6"G
GW6
6"G 190' 6.70%
6"G 181' 7.65%
400,518N
2,112,352E
INV.=1001.0
400,527N
2,112,542E
INV.=988.3
N
400,545N
2,112,722E
INV.=974.4
400,499N
2,112,730E
INV.=979.2
EXISTING ELECTRIC CONTROL PANEL
DRIPLEGS DL3 & DL4 SEE DETAILS 1/5 2/5
LH2
GW2
LH6
GW3
6"G 187' 2.34%
GW4
6"G 226' 2.36%
400,300N
2,112,680E
INV.=987.6
400,340N
2,112,843E
INV.=983.26
400,250N
1020
1010
1000
990
980
970
960

Figure 7


GROUND FLARE SEE DETAILS 1/7 2/7
CONTROL PANEL AND SYSTEM CONTROL ENCLOSURE
FOR PIPE CONNECTION AT DRIPLEG DL1 SEE DETAILS 1/4 2/4
12' WIDE, 6" THICK CRUSHED STONE ACCESS ROAD
LEACHATE HOLDING TANK
TANK MANWAY
LEACHATE LOADOUT SLAB AND PIPING SEE DETAILS 1/8 2/8
PROJECT BENCHMARK ELEVATION=966.31
400,548N 2,112,722E INV.=974.4
BLOWER STATION
400,590N
208' 12.0%
DL2
DL1
DL3
DL4
CO4
EXISTING ELECTRIC CONTROL PANEL
100'
154' 1.9%
6"L
6"G 181' 7.65%
N
400,545N
2,112,722E
INV.=974.4
47' 10.2%
6"G
GW6
400,499N
2,112,730E
INV.=979.2
DRIPLEGS DL3 & DL4 SEE DETAILS 1/5 2/5
220'
980
990
LH2
CO2
CO3
GW1
LH4
LH5
LH6
GW2
GW3
6"G 187' 2.34%
400,300N
2,112,660E
INV.=987.6
400,340N
2,112,843E
INV.=983.26
950
970
960
2.0%

REPORT, JANUARY 1988.

Figure # 8



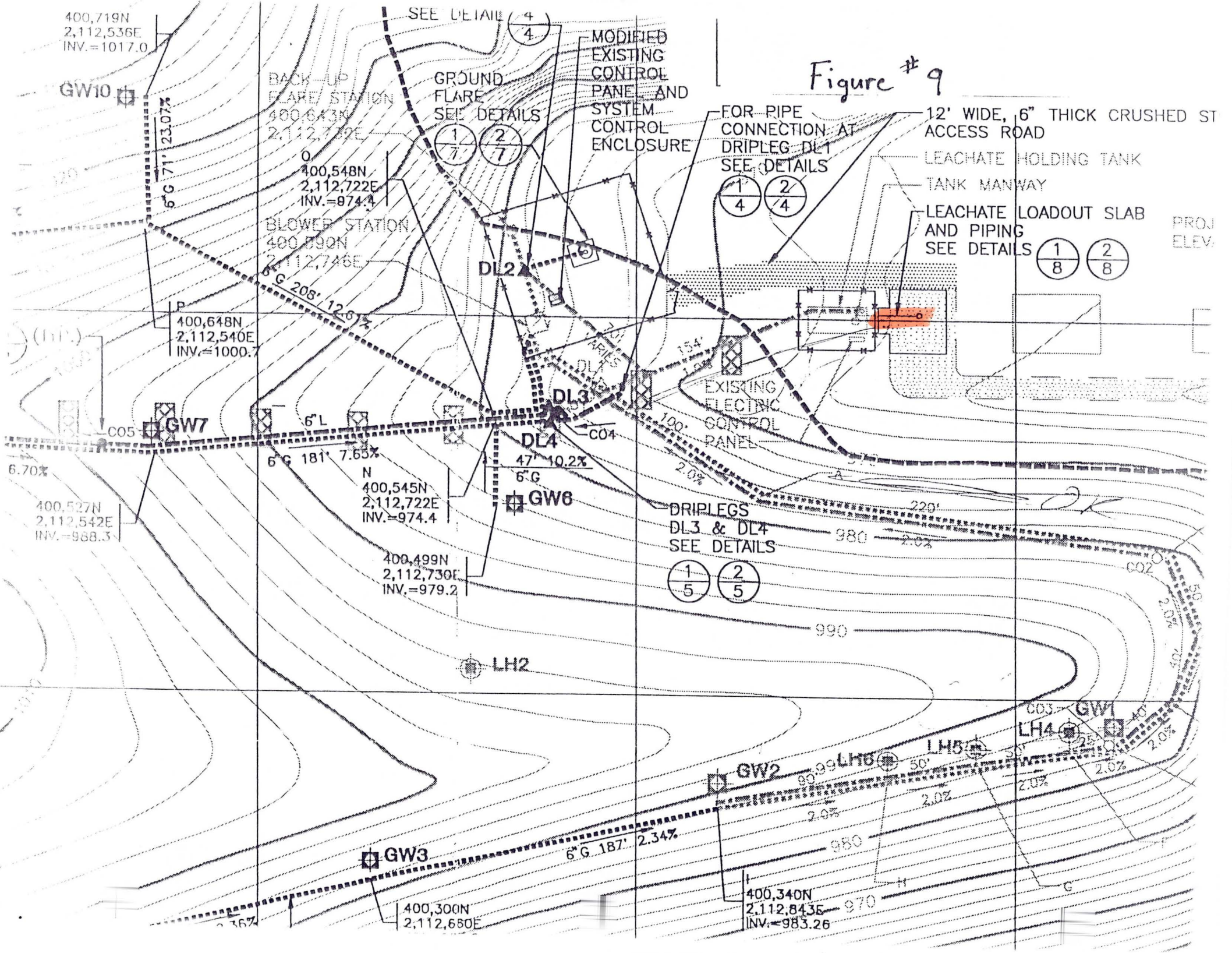


Figure # 9
400,719N
2,112,536E
INV.=1017.0
GW10
SEE DETAIL 4/4
MODIFIED EXISTING CONTROL PANEL AND SYSTEM CONTROL ENCLOSURE
GROUND FLARE SEE DETAILS 1/7 2/7
BACK-UP FLARE STATION
400,643N
2,112,722E
400,548N
2,112,722E
INV.=974.4
BLOWER STATION
400,590N
2,112,746E
FOR PIPE CONNECTION AT DRIPLEG DL1 SEE DETAILS 1/4 2/4
12' WIDE, 6" THICK CRUSHED ST ACCESS ROAD
LEACHATE HOLDING TANK
TANK MANWAY
LEACHATE LOADOUT SLAB AND PIPING SEE DETAILS 1/8 2/8
6"G 71' 23.07%
6"G 208' 12.6%
P
400,648N
2,112,540E
INV.=1000.7
DL2
DL3
DL4
DL1
EXISTING ELECTRIC CONTROL PANEL
100'
154'
CO5
GW7
6"L
6"G 181' 7.65%
N
400,545N
2,112,722E
INV.=974.4
CO4
47' 10.2%
6"G
GW6
6.70%
400,527N
2,112,542E
INV.=988.3
400,499N
2,112,730E
INV.=979.2
DRIPLEGS DL3 & DL4 SEE DETAILS 1/5 2/5
220'
980
990
950
970
LH2
LH4
LH5
LH6
GW1
GW2
GW3
CO3
CO2
6"G 187' 2.34%
400,300N
2,112,680E
400,340N
2,112,843E
INV.=983.26
2.0%

VISU-SEWER CLEAN & SEAL, INC.
W230 N4855 Betker Road • Pewaukee, Wisconsin 53072
414-695-2340 FAX 414-695-2359 1-800-876-8478

October 2, 1997

RECEIVED
10-6-97

SCS Field Services, Inc.
787 W. Sherwood
Springfield, MO 65810

Dear Sirs:

Enclosed please find the cleaning reports for the work completed for Refuse Hideaway Landfill. If you have any questions, please feel free to call.

Sincerely,

VISU-SEWER CLEAN & SEAL, INC.

Phillip S. Romagna
KB

Phillip S. Romagna
Vice President

Enc.

CLEANING REPORT

VISU-SEWER CLEAN & SEAL, INC.
N59 W14397 Bobolink Ave., Menomonee Falls, WI 53051 (414) 252-3203
2849 Hedberg Dr., Minneapolis, MN 55343 (612) 593-1907

ROOT TREATMENT REPORT

LOCATION	MANHOLE TO MANHOLE	PIPE SIZE & TYPE	FOOTAGE	CLEANING (L,M,H/TIME)	COMMENTS
DL2CO DATE: 9-26-97		6"	69'		FOAM GALS
DL3CO DATE: 9-26-97		6"	0		Water Only Flush FOAM GALS
DL4CO DATE: 9-26-97		6"	0		Water Only Flush FOAM GALS
Sewer DATE: 9-26-97		3"	15'		Flushed Out and Cleaned Basin FOAM GALS
DATE:			TOTAL 1,574'		FOAM GALS
DATE:					FOAM GALS

PROJECT SCS-REFUSE HIDEAWAY LANDFILL	CREW LEADER/EQUIPMENT	PAGE NO. 2

PG0011

CLEANING REPORT

VISU-SEWER CLEAN & SEAL, INC.
N59 W14397 Bobolink Ave., Menomonee Falls, WI 53051 (414) 252-3203
2849 Hedberg Dr., Minneapolis, MN 55343 (612) 593-1907

ROOT TREATMENT REPORT

LOCATION	MANHOLE TO MANHOLE	PIPE SIZE & TYPE	FOOTAGE	CLEANING (L,M,H/TIME)	COMMENTS
CO2 DATE: 9-26-97		6"	334'		FOAM GALS
DL-1CO DATE: 9-26-97		6"	167'		FOAM GALS
CO1 DATE: 9-26-97		6"	198'		FOAM GALS
CO6 DATE: 9-26-97		6"	181'		FOAM GALS
CO5 DATE: 9-26-97		6"	395'		FOAM GALS
CO4 DATE: 9-26-97		6"	215'		FOAM GALS

PROJECT SCS-REFUSE HIDEAWAY LANDFILL	CREW LEADER/EQUIPMENT	PAGE NO. 1

PQ-0011

APPENDIX D

MADISON METROPOLITAN SEWERAGE DISTRICT
LEACHATE DISCHARGE PERMIT RENEWAL

MADISON METROPOLITAN
SEWERAGE DISTRICT

1610 Moorland Road
Madison, WI 53713-3398
Telephone (608) 222-1201
Fax (608) 222-2703

James L. Nemke
Chief Engineer & Director

September 28, 1997

Mr. William O. Reed
SCS Field Services, Inc.
787 W. Sherwood Drive
Springfield, MO 65810

Dear Mr. Reed:

Enclosed is a permit to allow disposal of leachate from the Refuse Hideaway Landfill at the District's wastewater treatment plant. As noted in your letter of September 11, 1997, the fees for disposal for the remainder of 1997 are $8.94 per 1000 gallons. Please review the monitoring requirements of Part 2 of the permit. If you have any questions, please contact me.

Sincerely,

Paul H. Nehm
Director of Operations
and Maintenance

Permit No. NTO-5E

WASTEWATER DISCHARGE PERMIT

In compliance with the provisions of Articles 5 and 6 of the Madison Metropolitan Sewer District Sewer Use Ordinance and the District's Policy on Acceptance of Wastewater Containing Non-Typical Organic and Inorganic Constituents,

Department of Natural Resources
Post Office Box 7921
Madison, WI 53707

is hereby authorized to discharge contaminated groundwater from the above identified facility into the District sewerage system in accordance with the effluent limitations, monitoring requirements, and other conditions set forth in this permit.

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit.

This permit shall become effective on September 25, 1997, and shall expire at midnight, September 24, 1998. Any appeals to the conditions of this permit must be made to the Chief Engineer and Director within thirty days of the signature date.

The permittee shall not discharge after the date of expiration. If the permittee wishes to continue to discharge after this expiration date an application shall be filed for reissuance of this permit in accordance with the requirements of Article 5 of the Madison Metropolitan Sewerage District Sewer Use Ordinance, at least thirty days prior to the expiration date.

In accordance with Articles 5 and 6 of the Madison Metropolitan Sewerage District Sewer Use Ordinance, the District reserves the right to amend this permit from time to time or to revoke the permit.

By: James L. Nemke
James L. Nemke
Chief Engineer and Director

Dated this 29th day of September, 1997.

PART 1--APPLICABLE EFFLUENT LIMITATIONS

SECTION 1--MMSD Pretreatment Standards

(a) All wastewaters discharged to the MMSD shall not exceed the following effluent limitations:

0.25 mg/l cadmium
0.5 mg/l hexavalent chromium
10.0 mg/l total chromium
1.5 mg/l copper
0.1 mg/l cyanide
5.0 mg/l lead
0.02 mg/l mercury
2.0 mg/l nickel
0.3 mg/l selenium
3.0 mg/l silver
8.0 mg/l zinc

(b) The limitations listed in paragraph (a) apply to twenty-four hour flow proportionate samples collected from the total discharge of the permittee.

(c) In addition, the permittee shall comply with all other applicable regulations and standards contained in the MMSD Sewer Use Ordinance. Included in these regulations are limitations on pH, slug loads, and oil and grease content.

SECTION 2--Toxicity Characteristics Leaching Procedure Requirements

(a) All wastewaters discharged to the MMSD shall not exceed the limitations of the Toxicity Characteristics Leaching Procedure (TLCP) as specified in the Federal Register of March 29, 1990.

PART 2--MONITORING AND REPORTING REQUIREMENTS

SECTION 1--Monitoring Requirements

The permittee shall monitor its wastewater discharges subject to regulations under Part 1 of this permit to ascertain compliance with the applicable limitations. Said monitoring to determine compliance with the standards specified in Part 1 shall be conducted each calendar quarter. The monitoring shall consist of sampling of the regulated wastewaters for those pollutants regulated under Part 1 of this permit and reporting of the results to the District. Samples shall be obtained by collecting a representative sample of the contents of the on-site 25,000 gallon storage tank. Samples shall be collected on a quarterly basis to show compliance with Part I Section 1 and on an annual basis to show compliance with Part I Section 2.

Laboratory analysis of samples collected shall be performed in accordance with 40 CFR Part 136 or other such methods as approved by the District.

SECTION 2--Reporting Requirements

Self-monitoring results shall be reported to the District within three days of the end of the calendar quarter.

If the permittee monitors any pollutant more frequently than required by this permit, the results of such monitoring shall be submitted to the District.

If sampling performed by the permittee indicates a violation of any provisions of this permit, the permittee must notify the District of the violation within 24 hours of becoming aware of it. The permittee must also repeat the sampling and analysis and submit the results of the repeat analysis to the District within 30 days after becoming aware of the violation.

All reports shall be signed and sworn by a responsible corporate officer of the permittee. A responsible corporate officer is defined as:

1. A president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy-or decision-making functions for the permittee, or

2. The manager of one or more manufacturing, production, or operation facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million, if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

The individual signing the report shall make the following certification:

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."

All reports required by this permit shall be submitted to:

> Madison Metropolitan Sewerage District
> 1610 Moorland Road
> Madison, Wisconsin 53713

The Madison Metropolitan Sewerage District will randomly collect and analyze samples of leachate to verify leachate quality.

PART 3--MONITORING AND SAMPLING FACILITIES

SECTION 1--Sampling Facilities

In order to permit monitoring of the leachate, by the District, the permittee shall construct facilities to allow for collection of a representative sample from the on-site 25,000 gallon storage tank.

SECTION 2--Discharge Permit

Since the Refuse Hideaway Landfill is outside the District's service area, all wastewater from the site shall be hauled to the Nine Springs Wastewater Treatment Plant and disposed of at a designated location at this plant. The hauler shall have in effect a Septage Disposal Permit issued by the District.

PART 4--GENERAL CONDITIONS

1. Right of Entry

The permittee shall, after reasonable notification by the District, allow the District or its representatives, exhibiting proper credentials and identification, to enter upon the premises of the permittee at all reasonable hours, for the purposes of inspection, sampling, or records inspection. Reasonable hours in the context of inspection and sampling includes any time the permittee is operating any process which results in collection of wastewater in the on-site storage tank.

2. Records Retention

a) The permittee shall retain and preserve for no less than three (3) years, any records, books, documents, memoranda, reports, correspondence and any and all summaries thereof, relating to monitoring, sampling and chemical analyses made or by or in behalf of the permittee in connection with its discharge.

b) All records that pertain to matters that are the subject of special orders or any other enforcement or litigation activities brought by the District shall be retained and preserved by the permittee until all enforcement activities have concluded and all periods of limitation with respect to any and all appeals have expired.

3. Severability

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

4. Confidential Information

Except for data determined to be confidential under Article 7.2 MMSD Sewer Use Ordinance, all reports required by this permit shall be available for public inspection at the headquarters of the District.

5. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a) The exact place, date, and time of sampling;
b) The dates the analyses were performed;

c) The person(s) who performed the analyses;
d) The analytical techniques or methods used; and
e) The results of all required analyses.

6. Falsifying Information

Knowingly making any false statement on any report or other document required by this permit or knowingly rendering any monitoring device or method inaccurate, may result in punishment under the criminal laws of Wisconsin as well as being subjected to civil penalties and relief.

7. Modification or Revision of Permit

a) The terms and conditions of this permit may be subject to modification by the District at any time as limitations or requirements as identified in the MMSD Sewer Use Ordinance are modified or other just cause exists.

b) This permit may also be modified to incorporate special conditions resulting from the issuance of a special order.

c) Any modifications which result in new conditions in the permit shall include a reasonable time schedule for compliance if necessary.

8. Dilution

No permittee shall increase the use of potable or process water or, in any way, attempt to dilute a discharge as a partial or complete substitute for adequate treatment to achieve compliance with the limitations contained in this permit.

9. Accidental Discharges

The permittee shall provide protection from the accidental discharge of prohibited or regulated materials or substances established by the MMSD Sewer Use Ordinance. Where necessary, facilities to prevent the accidental discharge of prohibited materials shall be provided and maintained at the permittee's expense. Permittees shall notify the District immediately upon the occurrence of an accidental discharges of substances prohibited by the MMSD Sewer Use Ordinance. The District should be notified by telephone at 222-1201. During normal business hours the modification shall be made to the Director of Wastewater Treatment Operations. During other times, the notification shall be made to the operator on duty. The notification shall include location of discharge, date and time thereof, type of waste, concentration and volume, and corrective actions taken. The permittee shall also provide such notification to the appropriate local municipal officials. In addition, the

permittee should immediately notify the State of Wisconsin of the accidental spill at (608) 266-3232 (twenty-four hour number).

40 CFR 403.8(f) (v) requires the District to evaluate each significant industrial user at least once every two years to determine whether a plan to control slug discharges is necessary. If it is determined that such a plan is necessary, the plan shall contain the following:

1. A description of discharge practices including non-routine batch discharges.

2. A description of stored chemicals.

3. Procedures for immediately notifying the District of a slug discharge and procedures for follow-up written notification within five days.

4. Procedures to prevent adverse impact from accidental spills.

10. Notice of Intent

Any permittee planning to alter or change any activity at the permittee's facility that would significantly increase or decrease the volume or alter the content of any existing source of industrial wastewater discharge into the District sewerage system must file a written Request to Discharge Form in accordance with Article 5 of the MMSD Sewer Use Ordinance. A significant increase or decrease shall be defined at a twenty-five percent increase or decrease in the volume of industrial wastewater currently being discharged by a permittee. An alteration shall be defined as any change in chemicals utilized with a process which will significantly alter the characteristics of the industrial waste discharge or the addition of any new process or production wastewater discharges.

11. Proper Disposal of Pretreatment Sludges

The disposal of sludges generated within wastewater pretreatment systems shall be done in accordance with Section 405 of the Clean Water Act and Subtitles C and D of the Resource Conservation and Recovery Act.

12. Operating Upsets

Any permittee that experiences an upset in operations that places the permittee in a temporary state of noncompliance with the provisions of either this permit or the MMSD Sewer Use Ordinance shall inform the District thereof within twenty-four hours of first awareness of the commencement of the upsets in accordance with Article 5.5.5 of the MMSD Sewer Use Ordinance.

13. Limitations on Permit Transfer

Wastewater discharge permits are issued to a specific user for a specific operation and are not assignable to another user or transferable to any other location without prior written approval of the District. Sale of a user shall obligate the purchaser to seek prior written approval of the District for continued discharge to the District sewerage system.

14. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

15. Fees

The permittee will incur all costs billed by the District for leachate discharged to the District's sewerage system for leachate quantities and strengths as reported by the permittee to the District and as ascertained by the District through additional sampling. The costs shall include charges for the volume, CBOD, Total Suspended Solids, and Total Kjeldahl Nitrogen discharged and for ten (10) equivalent meters and one (1) actual customer and shall be based on the then prevailing District service charge rates. In accordance with the District's Policy on Acceptance of Wastewater Generated Outside of the District, a cumulative 10 percent surcharge shall be imposed on the discharge cost each quarter until such surcharge reaches 100 percent.

16. Hazardous Waste Notification

The permittee shall notify the District, the Department of Natural Resources, and the EPA Regional Waste Management Division Director in writing of any discharge to the sanitary sewer system of a substance which, if otherwise disposed of, would be hazardous water under 40 CFR Part 261. Such notification must include the name of the hazardous waste as set forth in 40 CFR Part 261, the EPA hazardous waste number, and the type of discharge. If the permittee discharges to the sanitary sewer more than 100 kilograms of such waste per calendar month, the additional notification requirements of 40 CFR 403.12 (p) apply. In the case of any notification made under this section, the permittee shall certify that it has a program in place to reduce the volume and toxicity of hazardous wastes generated to the degree it has determined to be economically practical.

17. Penalties

Violations of this permit are enforceable under Article XIII of the District's Sewer Use Ordinance. Included as enforcement remedies are special orders, injunctive relief, fines, and termination of service.

18. Bypass of Pretreatment Facilities

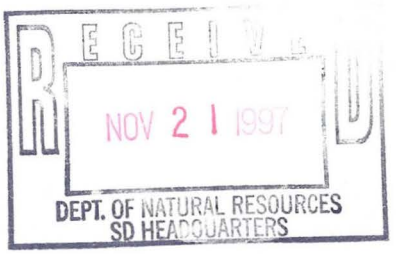
Bypassing of any permittee pretreatment facilities is only allowed in accordance with the provisions of 40 CFR 403.17. If the permittee knows in advance of the need for a bypass, it shall submit notice to the District, if possible at least ten days before the date of the bypass.

787 W. Sherwood
Springfield, MO 65810

417 881-7303
FAX 417 881-2821

SCS FIELD SERVICES, INC.

November 20, 1997
File No. 0797026.00



Mr. Harlan Kuehling, P.G.
Hydrogeologist
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711

Subject: Operation and Maintenance of the Refuse Hideaway Landfill Gas (LFG) and Leachate Collection System During October 1997

Dear Mr. Kuehling:

This letter report summarizes operation and maintenance (O&M) activities performed by SCS Field Services, Inc. (SCS-FS) at the Refuse Hideaway Landfill LFG and Leachate Collection System (Collection System) during October 1997.

SUMMARY

Highlights of the O&M activities completed by SCS-FS on the Collection System during October included:

- As approved by the Department of Natural Resources (Department), an ammeter and a hour meter were installed to monitor blower motor operation.
- The methane content measured at GP-11S was 1.5 percent, by volume (30 percent of the lower explosive limit [LEL] in air), and the methane content measured in GP-11D was 5.0 percent, by volume (100 percent of the LEL). Methane gas levels below the LEL were detected in the GPW series monitoring wells on October 31, 1997. The GPW series wells were retested on November 4, 1997, and no methane was detected.
- The LFG Recovery System was operational 97 percent of the time during the month of October.

BACKGROUND

LFG Recovery System

The Refuse Hideaway Landfill LFG Recovery System became operational in 1991. The Refuse Hideaway Landfill LFG Recovery System consists of the following components:

- The Blower/Flare Station;
- The Collection System; and
- Monitoring Locations.

The Blower/Flare Station includes one centrifugal LFG blower, an enclosed flare, a candlestick flare (as a backup combustion unit), and associated controls and appurtenances. The Collection System consists of 13 extraction wells, four drip legs, and associated gas and pneumatic header piping. The Monitoring Locations include 11 wells located throughout the site, and ambient air monitoring within the nearby Speedway buildings.

Proper operation of the Collection System is verified through testing of the extraction wells. LFG withdrawal rates at individual wells are adjusted based on test results. Testing for subsurface gas migration is done at the Monitoring Locations. Operation of the Blower/Flare Station provides vacuum necessary to withdraw the gas from the landfill, which helps control surface emissions and subsurface migration; odors and emissions are controlled by combustion of the gas at the flare.

Leachate Collection System

The current leachate collection system was installed in 1996, and is comprised pneumatic pumps installed in eight of the existing LFG extraction wells. Compressed air for the pneumatic pumps is supplied by a compressor located at the Blower/Flare Station. The collected leachate is stored onsite in a 25,000 gallon underground storage tank. Leachate is removed from the tank by a subcontractor, and is transported to the Madison Metropolitan Sewage District for treatment and ultimate discharge.

SCS-FS and our subcontractor, Environmental Sampling Corporation (ESC), began routine monitoring of the Collection System on July 1, 1997. Figure 1 indicates the approximate layout of the Collection System.

TESTING EQUIPMENT

Gas composition testing at the Recovery System was performed using either a Landtec GEM-500 Infra-Red Gas Analyzer, or a Gastech 1939OX Gas Analyzer. The GEM-500 measures methane, carbon dioxide, and oxygen as percent by volume. The GEM-500 also calculates the balance gas component of the LFG (assumed to be nitrogen) and reports it as percent by volume.

The Gastech 1939OX measures methane and oxygen, and reports the results as either percent LEL (for methane), or as percent by volume.

Pressure testing was measured in inches of water column and was performed using the GEM-500. LFG flow was measured with the GEM-500 and a Dwyer Pitot tube. Temperature measurement was performed using a handheld, analog temperature probe. Combustion temperatures measured at the flare were obtained from the in-place instrumentation.

Leachate level determination was performed one of two ways:

- For the extraction wells that have a leachate extraction pump, leachate levels were obtained using the bubbler tube installed along with each pump.

- For the gas extraction wells that do not contain a leachate extraction pump, the leachate levels were monitored using an electric tape.

ON-SITE ACTIVITIES

Weekly LFG activities were performed on October 10, 16, 21 and 31. A summary of operational data collected during these weekly activities is shown in Table 1. Monthly activities were completed on October 31, 1997, with summaries shown in Tables 2, 3, and 4. Copies of all field data sheets are included with this report as Appendix A. The following activities were of note:

- LFG quality at the Blower/Flare station remained stable throughout the month. During the month of October methane concentrations at the blower inlet ranged from a high of 40.0 to a low of 37.4 percent, by volume. Oxygen levels recorded in October ranged from 0.8 to 2.0 percent, by volume.

- ~~Thirteen~~ 9 loads of leachate totaling approximately 36,700 gallons were removed from the Leachate Collection System during the month of October. A summary of the loads removed is shown in Table 5.

- One Blower/Flare system alarm response occurred in October. The Blower/Flare system shutdown on October 24, and was restarted on October 25, 1997. The shutdown was due to low LFG flow. The Blower/Flare system was operational 97 percent of the month of October. A summary of the alarm event is shown in Table 6.

- The leachate compressor shutdown on or around October 16, 1997, requiring additional alarm response and project management time related to repairs. Materials were ordered, and repairs made by Energetics (Janesville, WI) between October 22, and October 27, 1997. The leachate compressor was successfully restarted on October 27, 1997.

- A visual inspection of the landfill cover performed as part of the monthly activities did not indicate any significant erosion features. No leachate seeps were noted.

ISSUES TO RESOLVE

Field monitoring data collected since July has indicated a significant loss of header pressure (vacuum) between extraction wells GW 4 and GW 5. This may indicate a partial blockage

within the header pipe. SCS-FS will continue to monitor pressures in the header piping as part of our routine services. If additional investigation is warranted, SCS-FS will prepare an estimate to perform this investigation.

RESOLUTION TO PREVIOUS ISSUES

SCS-FS is unaware of any previous issues requiring resolution.

WORK PROJECTED FOR THE UPCOMING MONTH

SCS-FS will be submitting to the Department, an estimate to perform recommended modifications to the flare, as discussed by the John Zink Company.

The blower shaft bearings continues to require weekly greasing, a continuing sign that they need to be replaced. SCS-FS will prepare an estimate for procuring and installing two new bearings.

STANDARD PROVISIONS

The findings described above were recorded by both SCS-FS and SCS-FS contracted parties. Changes can and do occur which affect the operation of the system. Department personnel should contact SCS-FS immediately in the event of a system malfunction or operational deficiency.

Although SCS-FS is the primary party designated to operate and maintain the subject system, Department staff may find it necessary to make adjustments to the system if conditions change. SCS-FS should be notified of any adjustments made by Department staff.

SCS-FS is pleased to provide our services to the Department and we enjoy working on the project. Should you have questions, please do not hesitate to contact either of the undersigned.

Sincerely,

William O. Reed
Regional Manager
SCS FIELD SERVICES, INC.

Galen S. Petoyan
President
SCS FIELD SERVICES, INC.

WOR:GSP;bms
Enclosures

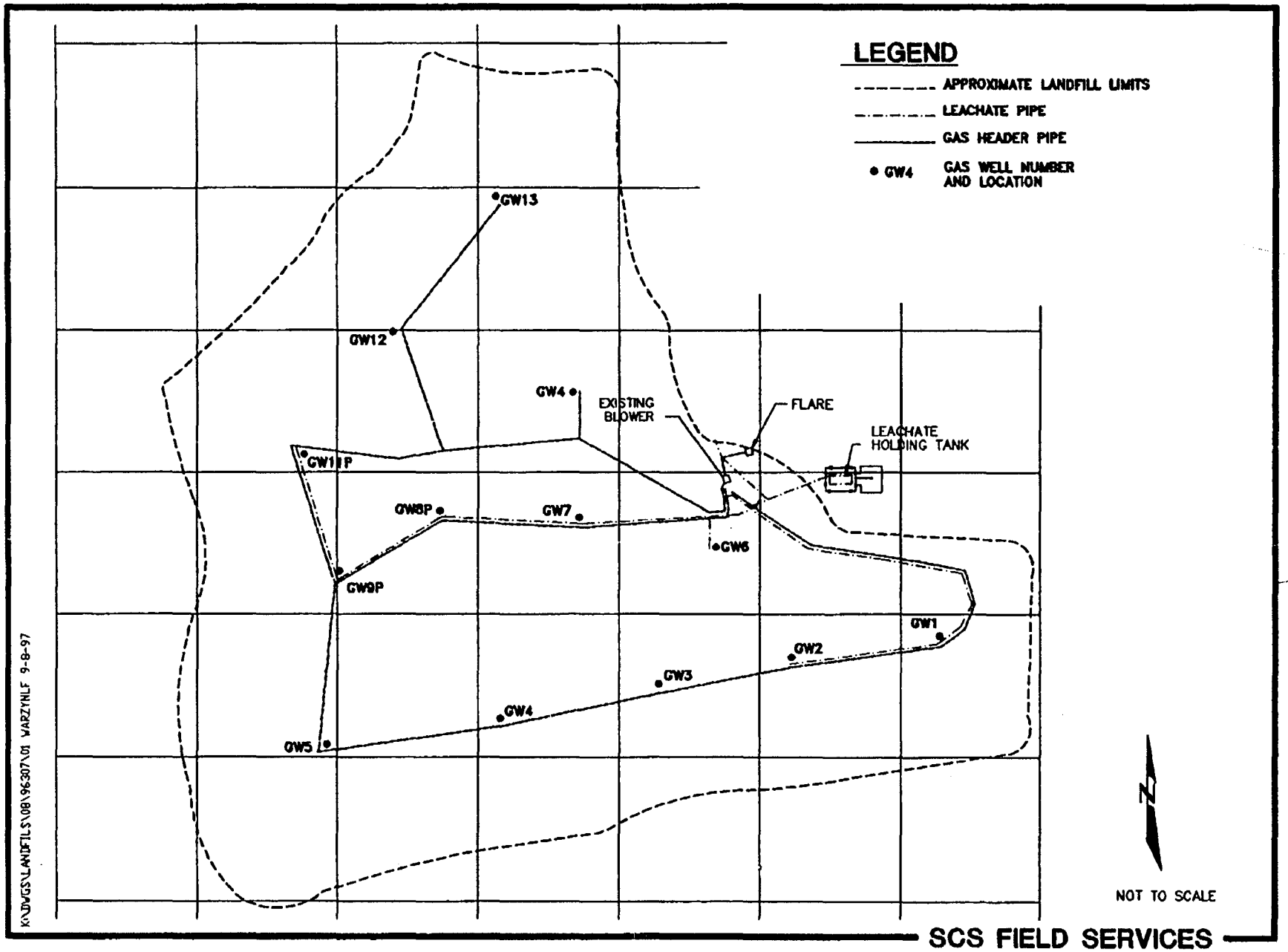


FIGURE 1

EXISTING GAS COLLECTION SYSTEM
REFUSE HIDEAWAY LANDFILL

TABLE 1.
REFUSE HIDEAWAY LANDFILL
WEEKLY BLOWER/FLARE STATION SUMMARY FOR OCTOBER 1997

Date	Bar. Pres. [in-Hg]	Blower Inlet Pressure [in-W.C.]	Blower Inlet Methane [%vol]	Blower Inlet Oxygen [%vol]	Blower Outlet Pressure [in-W.C.]	Flare Inlet Volume [cfm]	Flare Inlet Valve Position	Comments
10/10/97	30.42	-32.6	38.5	0.8	3.2	0.0	100	
10/16/97	30.43	-32.9	37.4	1.1	3.1	19.1	100	COMPRESSOR NOT RUNNING
10/21/97	30.30	-32.5	38.0	1.3	2.6	26.8	100	
10/31/97	29.70	-32.1	40.0	2.0	2.9	15.5	100	CLOSED N.BRANCH INLET 1 NOTCH
Average:			38.5	1.3				
Maximum:			40.0	2.0				
Minimum:			37.4	0.8				

in-Hg Inches of Mercury
Deg F Degrees Fahrenheit
in-W.C. Inches of Water Column
%vol Percent by Volume

TABLE 2.
REFUSE HIDEAWAY LANDFILL
LFG COLLECTION WELL TESTING RESULTS SUMMARY FOR OCTOBER 1997

Well No.	Date	Methane [%vol]	Oxygen [%vol]	Well Pressure [in-W.C.]	Header Pressure [in-W.C.]	Flow [cfm]	Temp. [Deg F]	Valve Setting	Comments
GW-01	10/31/97	55.3	1.0	0.0	-11.3	0.0	69	0	
GW-02	10/31/97	29.7	8.3	0.0	-11.1	0.0	66	0	
GW-03	10/31/97	49.7	0.7	-3.3	-12.0	4.9	65	25	
GW-04	10/31/97	39.0	1.7	-10.4	-12.0	15.9	70	60	
GW-05	10/31/97	54.0	0.9	-4.9	-6.0	5.2	74	100	
GW-06	10/31/97	25.2	10.0	-0.4	-29.9	0.0	65	10	
GW-07	10/31/97	46.1	0.7	-30.0	-30.0	4.1	73	70	
GW-08	10/31/97	53.1	1.6	-18.6	-30.0	1.9	83	50	
GW-09	10/31/97	51.9	2.4	-22.3	-30.0	0.7	75	50	
GW-10	10/31/97	25.2	0.8	-12.3	-29.8	1.6	111	30	
GW-11	10/31/97	56.6	0.7	-28.4	-30.0	9.9	76	80	
GW-12	10/31/97	39.0	0.7	-10.4	-30.0	3.2	97	30	
GW-13	10/31/97	44.5	0.7	-29.0	-29.0	2.5	78	60	
Total:						49.9			

%vol Percent by volume
in-W.C. Inches of water column
cfm Cubic feet per minute
Deg F Degrees Fahrenheit
ND None Detected

TABLE 3.
REFUSE HIDEAWAY LANDFILL
LEACHATE HEAD MEASUREMENT SUMMARY FOR OCTOBER 1997

Well No.	Date	Leachate Level [feet, above bottom of well]	Current Pump Cycles	Previous Pump Cycles	Difference
GW-01	10/31/97	7.6			0
GW-02	10/31/97	7.4			0
GW-03	10/31/97	5.1			0
GW-04	10/31/97	1.7	551,674	510,641	41,033
GW-06	10/31/97	6.3			0
GW-07	10/31/97	3.2	232,162	108,797	123,365
GW-09	10/31/97	2.1	594,647	546,235	48,412
GW-10	10/31/97	27.6			0
GW-11	10/31/97	1.3	619,869	568,597	51,272
GW-13	10/31/97	3.0	144,981	36,567	108,414

TABLE 4.
REFUSE HIDEAWAY LANDFILL
MONITORING WELL TESTING RESULTS FOR OCTOBER 1997

Well No.	Date	Methane [%vol]	Oxygen [%vol]	Pressure [in-W.C.]	Comments
G-01D	10/31/97	ND	21.0	0.0	
G-01S	10/31/97	ND	21.0	0.0	
G-06	10/31/97	0.5	19.5	0.0	
G-08	10/31/97	ND	21.0	0.0	
G-09	10/31/97	ND	21.0	0.0	
G-10	10/31/97	ND	20.5	0.0	
GP-11D	10/31/97	5.0	2.5	0.0	
GP-11S	10/31/97	1.5	16.5	0.0	
GPW-1D	10/31/97	1.5	18.0	1.0	
GPW-1M	10/31/97	1.0	17.5	0.9	
GPW-1S	10/31/97	0.5	21.0	0.0	
SPEEDWAY BLDGS	10/31/97	ND	21.0		

% vol Percent by volume
in-W.C. Inches of water column
ND None Detected

TABLE 5.
REFUSE HIDEAWAY LANDFILL
LEACHATE HAULING SUMMARY FOR OCTOBER 1997

Date	Beginning Tank Depth [inches]	Ending Tank Depth [inches]	Total Gallons Hauled
10/02/97	45	19	4,795
10/07/97	61	39	4,679
	40	12	4,743
10/13/97	64	43	4,382
10/16/97	40	12	4,743
10/24/97	58	38	4,214
10/27/97	41	15	4,552
10/31/97	54	31	4,625
Total:			36,733
Count:			8

TABLE 6.
REFUSE HIDEAWAY LANDFILL
ALARM RESPONSES FOR OCTOBER 1997

Alarm Date	Response Date	Alarm Codes	Comments
10/16/97	10/17/97	N/A	Leachate compressor evaluation.
10/24/97	10/25/97	1,4	Low LFG Flow
Count:	2		

APPENDIX A

FIELD DATA SHEETS

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 10/10/97

Time: Start - 1025 End - 1210

Temperature: 70°

Barometric Pressure: 30.42 ↓

Monitored by: Peter Hartz

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 9/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+2.4	38.7	0.9		-	NO DATA	96	
• Sample Port B	+2.3	38.2	0.9		-	NO DATA	96	
• Sample Port C	+1.3	38.4	1.0		-	NO DATA	95	
• Manual Valve				100%				
Blower								
• North Branch	-31.4	32.7	1.1	80	-	NO DATA	72°	
• Central Branch	-29.1	34.6	4.5	26	-	NO DATA	74°	
• South Branch	-11.7	34.4	3.9	15	-	NO DATA	72°	
• Inlet Sample Port A	-31.6	38.8	1.6					
• Inlet Sample Port B	-32.6	38.5	0.8					
• Outlet Sample Port A	+3.2	38.7	0.9					
Pedestal Flare								
• Manual Valve				0				

Flare 1448°
Leachate tank @ 40%

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF/kmf/JCH [ma4-401-781] 15292.03

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 10/16/97

Time: Start - 1030 End - 1130

Temperature: 60's

Barometric Pressure: 30.43 ↓

Monitored by: Peter Hartz

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 9/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+2.6	38.2	0.7		–	1.37 103	86°	
• Sample Port B	+2.4	37.8	0.9		–	–	86°	
• Sample Port C	+1.3	38.1	0.8		–	–	90°	
• Manual Valve				100%				
Blower								
• North Branch	-31.3	33.8	0.3	75%	–	140/150	73°	
• Central Branch	-28.5	40.7	3.5	25%	–	150/153	74°	
• South Branch	-12.3	34.6	3.6	15%	–	46/97	77°	
• Inlet Sample Port A	-31.8	38.0	1.0					
• Inlet Sample Port B	-32.9	37.4	1.1					
• Outlet Sample Port A	+3.1	37.9	0.9					
Pedestal Flare								
• Manual Valve				0%				

Tank @ 40"
Flare Temp = 1232

Notes: Compressor not running

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 10/21/97

Time: Start - 930 End: _____

Temperature: 40's

Barometric Pressure: 30.3 ↔

Monitored by: J. [signature]

Gas Detector Model No.: GEM-500
Serial No.: 092
Date Last Calibrated: 10/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+2.0"	38.6	1.0		—	145	70	
• Sample Port B	+1.6	38.4	1.1		—	—	70	
• Sample Port C	+1.0	38.5	1.0		—	—	75	
• Manual Valve				100%				
Blower								
• North Branch	-31.5"	34.0	0.7	75%	—	145	65	
• Central Branch	-28.5"	40.9	3.6	25%	—	130	65	
• South Branch	-12.6"	34.7	4.0	15%	—	75	65	
• Inlet Sample Port A	-31.9"	38.6	1.2					
• Inlet Sample Port B	-32.5	38.0	1.3					
• Outlet Sample Port A	+2.6	37.9	1.4					
Pedestal Flare								
• Manual Valve				0%				

Notes: TANK - 17"
FLARE TEMP - 1280°

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 10/31/97 (INITIAL)

Time: Start - 0945 End - 1050

Temperature: 50

Barometric Pressure: 29.7 ↓

Monitored by: V. STREICH

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: _____

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+2.4	41.4	1.8			84	84.7	
• Sample Port B	+2.3	40.2	1.4			-	-	
• Sample Port C	+1.4	40.4	1.6			-	84.6	
• Manual Valve				100%				
Blower								
• North Branch	-30.5	33.2	2.3	~~80%~~ 70%		165	64.0	HIGH O2 closed one pin
• Central Branch	-30.2	45.7	3.4	50%		128	60.6	
• South Branch	-11.6	39.1	3.8	25%		122	60.1	
• Inlet Sample Port A	-31.0	39.6	2.2				60.6	
• Inlet Sample Port B	-32.1	40.0	2.0				63.5	
• Outlet Sample Port A	+2.9	39.4	1.8					

FLARE TEMP 1424
Paper OK

Pedestal Flare

• Manual Valve 0%

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 10/31/97 (Final)

Time: Start - 1300 End - 1315

Temperature: 60's

Barometric Pressure: 29.7 ↓

Monitored by: P. Haertz

Gas Detector Model No.: _____
Serial No.: _____
Date Last Calibrated: _____

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A								
• Sample Port B								
• Sample Port C								
• Manual Valve								
Blower								
• North Branch	-29.9	36.2	1.3	70 %	-	-	-	
• Central Branch	-29.5	45.2	2.8	50 %	-	-	-	
• South Branch	-11.9	38.3	4.5	25 %	-	-	-	
• Inlet Sample Port A	-30.6	41.5	1.7					
• Inlet Sample Port B	-	-	-					
• Outlet Sample Port A	-	-	-					
Pedestal Flare								
• Manual Valve								

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET A
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS WELL MONITORING

Date: 10/31/97

Time: Start - 1045 End-

Temperature: 50°

Barometric Pressure: 29.70

Monitored by: V. STREICH

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated:

Well	Well Pressure (in. WC)	Header Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
GW1	0	-11.3	55.3	1.0	0%		0	69.2	
GW2	0	-11.1	29.7	8.3	0%		0	66.0	
GW3	-3.3	-12	49.7	0.7	25%		109	65.2	
GW4	-10.4	-12	39.0	1.7	60%		354	69.8	
GW5	-4.9	-6.	54.0	0.9	100%		115	73.5	flow reading varies from 108 to 120
GW6	-0.4	-29.9	25.2	10.0	10%		0	64.5	
GW7	-30.0	-30.0	46.1	0.7	70%		91	73.3	
GW8(1)	-18.6	-30.0	53.1	1.6	50%		42	82.5	
GW9(1)	-22.3	-30.0	51.9	2.4	50%		161	75.2	
GW10	-12.3	-29.8	25.2	0.8	30%		36	111.2	
GW11(1)	-28.4	-30	56.6	0.7	80%		220	75.5	
GW12	-10.4	-30	39.0	0.7	30%		72	96.8	
GW13	-29.0	-29"	14.5	0.7	60%		56	77.7	

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF/MR/JCK
[mad-401-78]
15292.03

DATA SHEET E
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS PROBE MONITORING

Date: 10/31/97

Time: Start - 0945 End- 1045

Temperature: 60's

Barometric Pressure: 29.70 ↓

Monitored by: Pete Hartz

Gas Detector Model No.: 19390Y

Serial No.: 92075

Date Last Calibrated: 10/97

Location	Probe Pressure (in. WC)	CH_4(1) (%)	CH_4(2) (% LEL)	O_2 (%)	Comments
G-1S	0.0	0.0	0.0	21.0	
G-1D	0.0	0.0	0.0	21.0	
G-6	0.0	0.5	0.0	19.5	
G-8	0.0	0.0	0.0	21.0	
G-9	0.0	0.0	0.0	21.0	
G-10	0.0	0.0	0.0	20.5	
GP-11S	0.0	1.5	—	16.5	
GP-11D	0.0	5.0	—	2.5	
GPW-1S	0.0	0.5	0.0	21.0	
GPW-1M	+0.9	1.0	—	17.5	
GPW-1D	+1.0	1.5	—	18.0	
Speedway Buildings	0.0	0.0	0.0	21.0	

Notes:
(1) Percent combustibles by volume, primarily composed of CH_4.
(2) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).

DRF/vlr/JCK
[mad-402-13a]
15292.03

DATA SHEET C
REFUSE HIDEAWAY LANDFILL
GAS AND LEACHATE EXTRACTION SYSTEM
LEACHATE HEAD MONITORING

Date: 10/31/97
Time: Start- 1105 End- 1200
Monitored By: Peter Hartz
Instrument Used: water level tape; model # 51453 serial # 15476 Liquid level indicator model # 6020 serial # 13807

Well Riser	Riser Depth(2) (ft)	Depth to Leachate (ft)	Leachate Head (ft)	Comments
GW1-EAST	53.7	46.10'	7.6'	–
~~-WEST~~	54.1			
GW2-EAST	53.9	46.50'	7.4'	–
~~-WEST~~	54.0			
GW3-EAST	59.7	54.60'	5.1'	–
~~-WEST~~	59.7			
GW4-EAST	61.9	–	1.7'	551674 ~~Hrs.~~
-WEST	61.8			
GW5-EAST	70.0	–	0.8'	793913 ~~Hrs.~~
~~-WEST~~	69.9			
GW6-EAST	40.0	33.70'	6.3'	–
-WEST	40.1			
GW7-EAST	60.0	–	3.2'	232162 ~~Hrs.~~
-WEST	60.0			
GW8 (1)				
-EAST	69.6	–	.06'	840,495 ~~Hrs.~~
~~-WEST~~	69.9			
GW9(1)				
-NORTH	67.5	–	2.1'	594647 ~~Hrs.~~
~~-SOUTH~~	68.4			
GW10-				
-NORTH	72.8	45.20'	27.6'	–
-SOUTH	72.7			
GW11(1)				
-EAST	69.1	–	1.25'	619869 ~~Hrs.~~
~~-WEST~~	69.1			
GW12-EAST	80.0	–	0.4'	799044 ~~Hrs.~~
~~-WEST~~	80.0			
GW13-EAST	73.1	–	3.0'	144981 ~~Hrs.~~
~~-WEST~~	73.0			
Leachate Tank	17.9	13.4'	4.5'	

Tank Volume = 8693 gal

Notes: tank @ 54"

(1) Wells with leachate extraction pumps and controls installed.
(2) Depth is measured from top of 1-in. dia. riser pipe. Tank riser pipe is 2-in. dia.
(3) Use Table 1 to convert leachate head in tank to a volume in gallons.

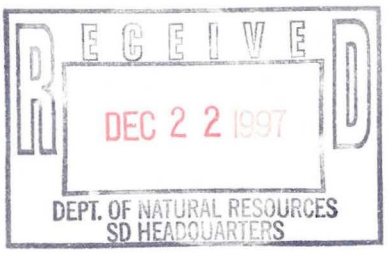
DRF/ndj/JCK
[mad-401-78a]
15297.01

787 W. Sherwood
Springfield, MO 65810

417 881-7303
FAX 417 881-2821

SCS FIELD SERVICES, INC.

December 15, 1997
File No. 0797026.00



Mr. Harlan Kuehling, P.G.
Hydrogeologist
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711

Subject: Operation and Maintenance of the Refuse Hideaway Landfill Gas (LFG) and Leachate Collection System During November 1997

Dear Mr. Kuehling:

This letter report summarizes operation and maintenance (O&M) activities performed by SCS Field Services, Inc. (SCS-FS) at the Refuse Hideaway Landfill LFG and Leachate Collection System (Collection System) during November 1997.

SUMMARY

Highlights of the O&M activities completed by SCS-FS on the Collection System during November included:

- No methane was detected in any of the Monitoring Locations. This is the first month that SCS-FS has not detected methane in GP-11S or GP-11D.
- The LFG Recovery System was operational 652 hours, or approximately 90 percent of the time during the month of November.
- New caps and seals were installed on the leachate and LFG collection line cleanouts. These caps were installed to reduce the amount of air being drawn into the LFG collection system.

BACKGROUND

LFG Recovery System

The Refuse Hideaway Landfill LFG Recovery System became operational in 1991. The Refuse Hideaway Landfill LFG Recovery System consists of the following components:

- The Blower/Flare Station;
- The Collection System; and
- Monitoring Locations.

The Blower/Flare Station includes one centrifugal LFG blower, an enclosed flare, a candlestick flare (as a backup combustion unit), and associated controls and appurtenances. The Collection System consists of 13 extraction wells, four drip legs, and associated gas and

pneumatic header piping. The Monitoring Locations include 11 wells located throughout the site, and ambient air monitoring within the nearby Speedway buildings.

Proper operation of the Collection System is verified through testing of the extraction wells. LFG withdrawal rates at individual wells are adjusted based on test results. Testing for subsurface gas migration is done at the Monitoring Locations. Operation of the Blower/Flare Station provides vacuum necessary to withdraw the gas from the landfill, which helps control surface emissions and subsurface migration; odors and emissions are controlled by combustion of the gas at the flare.

Leachate Collection System

The current leachate collection system was installed in 1996, and is comprised pneumatic pumps installed in eight of the existing LFG extraction wells. Compressed air for the pneumatic pumps is supplied by a compressor located at the Blower/Flare Station. The collected leachate is stored onsite in a 25,000 gallon underground storage tank. Leachate is removed from the tank by a subcontractor, and is transported to the Madison Metropolitan Sewage District for treatment and ultimate discharge.

SCS-FS and our subcontractor, Environmental Sampling Corporation (ESC), began routine monitoring of the Collection System on July 1, 1997. Figure 1 indicates the approximate layout of the Collection System.

TESTING EQUIPMENT

Gas composition testing at the Recovery System was performed using a Landtec GEM-500 Infra-Red Gas Analyzer. The GEM-500 measures methane, carbon dioxide, and oxygen as percent by volume. The GEM-500 also calculates the balance gas component of the LFG (assumed to be nitrogen) and reports it as percent by volume.

Pressure testing was measured in inches of water column and was performed using the GEM-500. LFG flow was measured with a Dwyer 471-1 Digital Thermo Anemometer. Temperature measurement was performed using a handheld, analog temperature probe. Combustion temperatures measured at the flare were obtained from the in-place instrumentation.

Leachate level determination was performed one of two ways:

- For the extraction wells that have a leachate extraction pump, leachate levels were obtained using the bubbler tube installed along with each pump.

- For the gas extraction wells that do not contain a leachate extraction pump, the leachate levels were monitored using an electric tape.

ON-SITE ACTIVITIES

Weekly LFG activities were performed on November 4, 11, 20 and 26. A summary of operational data collected during these weekly activities is shown in Table 1. Monthly activities were completed on November 20, 1997, with summaries shown in Tables 2, 3, and 4.

Copies of all field data sheets are included with this report as Appendix A. The following activities were of note:

- LFG quality at the Blower/Flare station remained stable throughout the month. During the month of November methane concentrations at the blower inlet ranged from a high of 40.5 to a low of 37.7 percent, by volume. Oxygen levels recorded in November ranged from 1.2 to 1.3 percent, by volume.

- Based on pump cycle readings, the pneumatic leachate pump in GW-07 was not operational between October 31, and November 20, 1997. SCS-FS will investigate the cause of this during December. In general, leachate levels were higher during November. This may be due to the air compressor being down for repairs in October. A summary of leachate head measurements is shown in Table 3.

- Five loads of leachate totaling approximately 22,600 gallons were removed from the Leachate Collection System during the month of November. A summary of the loads removed is shown in Table 5.

- Two Blower/Flare system alarm responses occurred in November. Both shutdowns were reported as General Alarms, and were interpreted by SCS-FS to be due to low LFG flow. Based on readings recorded by the hour meter installed in October, the Blower/Flare system was operational for 652 hours for the month, or approximately 90 percent of the month of November. A summary of the alarm events is shown in Table 6.

- A visual inspection of the landfill cover performed as part of the monthly activities did not indicate any significant erosion features. No leachate seeps were noted.

ISSUES TO RESOLVE

Field monitoring data collected since July has indicated a significant loss of header pressure (vacuum) between extraction wells GW 4 and GW 5. This may indicate a partial blockage within the header pipe. SCS-FS will continue to monitor pressures in the header piping as part of our routine services. If additional investigation is warranted, SCS-FS will prepare an estimate to perform this investigation.

RESOLUTION TO PREVIOUS ISSUES

SCS-FS is unaware of any previous issues requiring resolution.

WORK PROJECTED FOR THE UPCOMING MONTH

As discussed in a previous section of this report, the leachate levels were generally elevated during November. This is most likely due to the air compressor being down for repairs between October 16 and October 27, 1997 (see SCS-FS's October monthly report). Based on cycle counter readings, It was also noted that one of the pneumatic pumps (GW-07) was not operating during the month of November. SCS-FS will pay particularly close attention to the pumping activities, as well as leachate head measurements throughout the month of December.

At the request of the Department, SCS-FS will begin preparing and submitting quarterly reports summarizing O&M activities at the Refuse Hideaway Landfill. The first quarterly report will cover the period of July 1997, through September 1997.

STANDARD PROVISIONS

The findings described above were recorded by both SCS-FS and SCS-FS subcontracted parties. Changes can and do occur which affect the operation of the system. Department personnel should contact SCS-FS immediately in the event of a system malfunction or operational deficiency.

Although SCS-FS is the primary party designated to operate and maintain the subject system, Department staff may find it necessary to make adjustments to the system if conditions change. SCS-FS should be notified of any adjustments made by Department staff.

SCS-FS is pleased to provide our services to the Department and we enjoy working on the project. Should you have questions, please do not hesitate to contact either of the undersigned.

Sincerely,

William O. Reed
Regional Manager
SCS FIELD SERVICES, INC.

Galen S. Petoyan
President
SCS FIELD SERVICES, INC.

WOR:GSP;bms
Enclosures

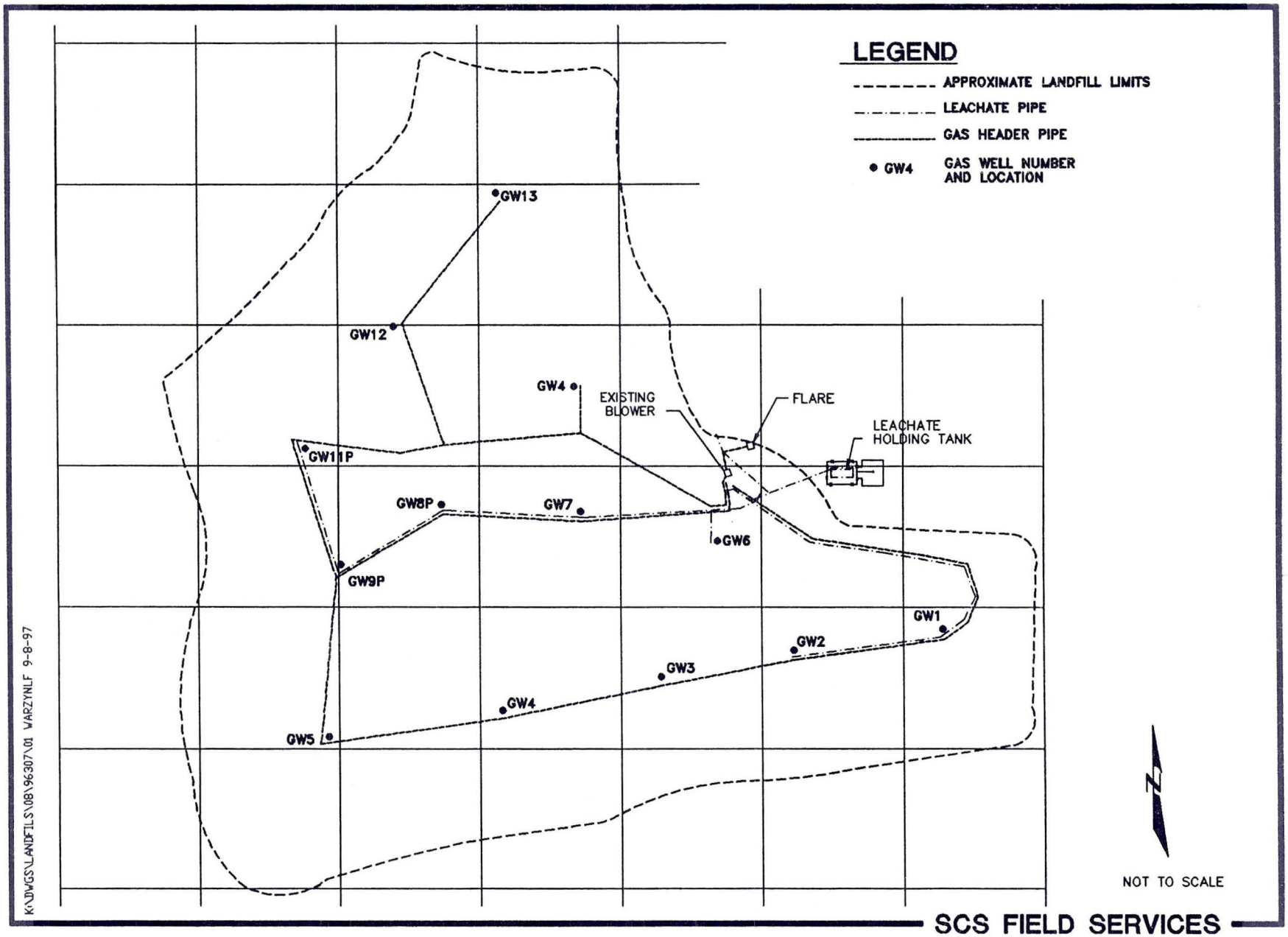


FIGURE 1

EXISTING GAS COLLECTION SYSTEM
REFUSE HIDEAWAY LANDFILL

TABLE 1.
REFUSE HIDEAWAY LANDFILL
WEEKLY BLOWER/FLARE STATION SUMMARY FOR NOVEMBER 1997

Date	Bar. Pres. [in-Hg]	Blower Inlet Pressure [in-W.C.]	Blower Inlet Methane [%vol]	Blower Inlet Oxygen [%vol]	Blower Outlet Pressure [in-W.C.]	Flare Inlet Volume [cfm]	Flare Inlet Valve Position	Comments
11/04/97	30.10	-33.2	38.8	1.2	3.3	202.0	100	
11/11/97	29.80	-32.9	38.0	1.2	3.8	13.0	100	Probable incorrect flow reading
11/20/97	30.30	-32.6	40.5	1.3	3.9	266.4	100	
11/26/97	30.30	-32.5	37.7	1.3	4.0	277.5	100	
Average:			38.8	1.3				
Maximum:			40.5	1.3				
Minimum:			37.7	1.2				

in-Hg Inches of Mercury
Deg F Degrees Fahrenheit
in-W.C. Inches of Water Column
%vol Percent by Volume

TABLE 2.
REFUSE HIDEAWAY LANDFILL
LFG COLLECTION WELL TESTING RESULTS SUMMARY FOR NOVEMBER 1997

Well No.	Date	Methane [%vol]	Oxygen [%vol]	Well Pressure [in-W.C.]	Header Pressure [in-W.C.]	Flow [cfm]	Temp. [Deg F]	Valve Setting [% open]	Comments
GW-01	11/20/97	59.9	0.2	-0.2	-12.5	6.8	45	10	
GW-02	11/20/97	32.1	7.7	-0.2	-12.5	0.0	40	5	
GW-03	11/20/97	53.7	0.1	-3.5	-12.5	44.1	63	30	
GW-04	11/20/97	39.7	1.2	-10.8	-12.5	13.1	56	60	
GW-05	11/20/97	56.1	0.9	-5.7	-6.0	10.8	56	100	
GW-06	11/20/97	51.1	2.7	-2.0	-24.0	18.0	52	20	
GW-07	11/20/97	46.8	0.4	-19.3	-20.5	19.4	64	65	
GW-08	11/20/97	57.4	1.1	-9.0	-20.0	25.7	67	50	
GW-09	11/20/97	59.4	0.5	-14.5	-20.0	13.3	44	50	
GW-10	11/20/97	25.5	0.4	-11.9	-28.0	31.3	97	25	
GW-11	11/20/97	56.0	0.2	-28.7	-30.5	13.3	45	80	
GW-12	11/20/97	31.1	0.2	-14.6	-30.5	31.5	82	30	
GW-13	11/20/97	47.6	0.2	-28.1	-29.0	20.3	74	65	
Total:						247.6			

%vol Percent by volume
in-W.C. Inches of water column
cfm Cubic feet per minute
Deg F Degrees Fahrenheit
ND None Detected

TABLE 3.
REFUSE HIDEAWAY LANDFILL
LEACHATE HEAD MEASUREMENT SUMMARY FOR NOVEMBER 1997

Well No.	Date	Leachate Level [feet, above bottom of well]	Current Pump Cycles	Previous Pump Cycles	Difference
GW-01	11/20/97	11.9			0
GW-02	11/20/97	6.9			0
GW-03	11/20/97	4.2			0
GW-04	11/20/97	3.1	577,459	551,674	25,785
GW-05	11/20/97	21.1	893,078	793,913	99,165
GW-06	11/20/97	3.5			0
GW-07	11/20/97	8.9	232,162	232,162	0
GW-08	11/20/97	9.2	880,487	840,445	40,042
GW-09	11/20/97	5.8	602,208	594,647	7,561
GW-10	11/20/97	12.9			0
GW-11	11/20/97	7.0	650,594	619,869	30,725
GW-12	11/20/97	7.7	844,760	799,044	45,716
GW-13	11/20/97	10.9	219,530	144,981	74,549

TABLE 4.
REFUSE HIDEAWAY LANDFILL
MONITORING WELL TESTING RESULTS FOR NOVEMBER 1997

Well No.	Date	Methane [%vol]	Oxygen [%vol]	Pressure [in-W.C.]	Comments
G-01D	11/20/97	ND	21.0	0.0	
G-01S	11/20/97	ND	21.0	0.0	
G-06	11/20/97	ND	20.0	0.0	NO LOCK ON PROBE
G-08	11/20/97	ND	20.5	0.0	
G-09	11/20/97	ND	20.5	0.0	
G-10	11/20/97	ND	20.5	0.0	
GP-11D	11/20/97	ND	18.0	0.0	
GP-11S	11/20/97	ND	17.5	0.6	
GPW-1D	11/20/97	ND	17.5	0.3	LOCK DOES NOT CLOSE
GPW-1M	11/20/97	ND	18.0	0.2	
GPW-1S	11/20/97	ND	20.5	0.0	LOCK DOES NOT CLOSE
SPEEDWAY BLDGS	11/20/97	ND	21.0	0.0	

% vol Percent by volume
in-W.C. Inches of water column
ND None Detected

TABLE 5.
REFUSE HIDEAWAY LANDFILL
LEACHATE HAULING SUMMARY FOR NOVEMBER 1997

Date	Initial Tank Depth [inches]	Initial Tank Volume [gallons]	Final Tank Depth [inches]	Final Tank Volume [gallons]	Total Gallons Hauled
11/03/97	53	8477	30	3831	4,646
11/06/97	46	6985	23	2615	4,370
11/10/97	44	6569	20	2135	4,434
11/13/97	39	5553	12	1010	4,543
11/24/97	NR		NR		4,620
Total:					22,613
Count:					5

KEY: NR = Not Reported by Hauler

TABLE 6.
REFUSE HIDEAWAY LANDFILL
ALARM RESPONSES FOR NOVEMBER 1997

Alarm Date	Response Date	Alarm Codes	Alarm Text	Comments
11/06/97	11/07/97	04	General Alarm	
11/14/97	11/17/97	04	General Alarm	Allowed LFG to recover.
Count:	2			

APPENDIX A

FIELD DATA SHEETS

DATA SHEET A
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS WELL MONITORING

Date: 11/4/97

Time: Start - 1020 End- 1046

Temperature: 55°

Barometric Pressure: 30.10 ↓

Monitored by: Peter Hartz

Gas Detector Model No.: Gen 500
Serial No.: 092
Date Last Calibrated: 11/3/97

Well	Well Pressure (in. WC)	Header Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
	-0.2	-9.0	59.0	0.6	@ 0%				
GW1	-1.0	-10.0	52.7	0.4	@ 10%	—	140/20	53.5	opened valve 3 notches
	-0.6	-10.3	47.8	1.4	@ 0%				
GW2	-0.8	-6.0	48.9	0.3	@ 10%	—	10/9	55.8	opened valve 2 notches
GW3									
GW4									
GW5									
GW6									
GW7									
GW8(1)									
GW9(1)									
GW10									
GW11(1)									
GW12									
GW13									

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF/vlr/JCK
[mad-401-78]
15292.03

DATA SHEET A
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS WELL MONITORING

Date: 11/20/97

Time: Start - 1200 End- 1530

Temperature: 35°

Barometric Pressure: 30.3

Monitored by: V. STREICH

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 11/97

Well	Well Pressure (in. WC)	Header Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
GW1	~~-0.0~~ -0.2	-12.5	59.9	0.2	~~5%~~ 10%	~~0~~ 150	—	45°	
GW2	-0.2	-12.5	32.1	7.7	5%	0	—	40	
GW3	-3.5	-12.5	53.7	0.1	30%	980	—	63	
GW4	-10.8	-12.5	39.7	1.2	60%	290	—	56	
GW5	-5.7	-6.0	56.1	0.9	100%	240	—	56	
GW6	~~-0.4~~ -2.0	-24.0	51.1	2.7	~~10%~~ 20%	400	—	52	
GW7	-19.3	-20.5	46.8	0.4	65%	430	—	64	
GW8(1)	-9.0	-20.0	57.4	1.1	50%	570	—	67	
GW9(1)	-14.5	-20.0	59.4	0.5	50%	295	—	44	
GW10	-11.9	-28.0	25.5	0.4	25%	695	—	97	
GW11(1)	-28.7	-30.5	56.0	0.2	80%	295	—	45	
GW12	-14.6	-30.5	31.1	0.2	30%	700	—	82	
GW13	-28.1	-29.0	47.6	0.2	65%	450	—	74	

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF/vlr/JCK
[mad-401-78]
15292.03

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 11/4/97

Time: Start - 0920 End- 1015

Temperature: 55°

Barometric Pressure: 30.10 ↓

Monitored by: Peter Hartz

Gas Detector Model No.: Gem 500
Serial No.: 092
Date Last Calibrated: 11/3/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
· Sample Port A	+2.7	38.7	1.4		-	202	78.2	
· Sample Port B	+2.5	38.2	1.2		-	-	-	
· Sample Port C	+1.4	38.5	1.2		-	-	69.1	
· Manual Valve				100%				
Blower								
· North Branch	-31.0	31.2	0.8	70%	-	13/14	61.3°	
· Central Branch	-30.8	46.4	2.8	50%	-	101	56.3°	
· South Branch	-12.4	39.3	3.9	20%	-	98/102	54.8°	
· Inlet Sample Port A	-31.6	39.1	1.1				56.6°	
· Inlet Sample Port B	-33.2	38.8	1.2					
· Outlet Sample Port A	+3.3	38.7	1.2					
Pedestal Flare								
· Manual Valve				0%				

Flare Temp 1256°
Tank @ 37 3/4"

AMPS 9
Hours - started at .5
Complete at 12:00

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 11/11/97

Time: Start - 1530 End- 1605

Temperature: 30's

Barometric Pressure: 29.80 ↑

Monitored by: F. Perrin

Gas Detector Model No.: GEM 500+ Dwyer Flow
Serial No.: 097
Date Last Calibrated: 11/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+30	38.0	1.5		70	—	72.5	
• Sample Port B	+2.9	37.9	1.4		6.1	—	72.5	
• Sample Port C	+1.4	37.7	1.2		—	—	70.5	
• Manual Valve				100%				
Blower								
• North Branch	-30.5	38.9	0.9	70%	230	—	59°	
• Central Branch	-21.8	38.3	4.4	20%	240	—	58°	
• South Branch	-10.8	39.5	3.0	10%	40	—	55°	
• Inlet Sample Port A	-31.6	38.4	0.9					
• Inlet Sample Port B	-32.9	38.0	1.2					
• Outlet Sample Port A	+3.8	37.6	1.2					
Pedestal Flare								
• Manual Valve				0%				

TDNR 28"
HHS - 149.4
Notes: HHPS - 210

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

B2F-1

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 11/20/97

Time: Start - 1115 End- 1200

Temperature: 35°

Barometric Pressure: 30.30

Monitored by: V. STREICH

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 11/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+3.0	39.0	1.7		1440	—	73.5	
• Sample Port B	+2.9	39.6	1.6		—	—	—	
• Sample Port C	+1.8	39.1	1.7		—	—	62.5	
• Manual Valve				—				
Blower								
• North Branch	-30.6	33.2	1.6	80%	1457	—	53.0	
• Central Branch	-28.0	34.6	6.0	~~90%~~ 20%	485	—	46.0	
• South Branch	-12.0	40.9	4.1	20%	1085	—	49.8	
• Inlet Sample Port A	-31.4	40.1	1.5					
• Inlet Sample Port B	-32.6	40.5	1.3					
• Outlet Sample Port A	+3.9	39.7	1.7					
Pedestal Flare								
• Manual Valve				—				

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

AP-78

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 11/20/97

Time: Start - 1530 End - 1600

Temperature: 35°

Barometric Pressure: 30.30

Monitored by: P. HARTZ

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 11/57

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A								
• Sample Port B								
• Sample Port C								
• Manual Valve								
Blower								
• North Branch	-29.5	38.0	1.9					
• Central Branch	-16.6	40.9	4.0					
• South Branch	-10.4	41.4	3.3					
• Inlet Sample Port A								
• Inlet Sample Port B	-32.2	40.3	1.2					
• Outlet Sample Port A								
Pedestal Flare								
• Manual Valve								

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 11/26/97

Time: Start - 1130 End: _____

Temperature: 40°

Barometric Pressure: 30.3

Monitored by: J STREICH

Gas Detector Model No.: GEM 500
Serial No.: 0912
Date Last Calibrated: 11/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+3.3	36.9	1.5		1500		75°	
• Sample Port B	+3.0	36.4	1.5					
• Sample Port C	+1.9	37.0	1.5				66.7	
• Manual Valve				10.0 %				
Blower								
• North Branch	-30.5	29.8	1.9	75%	1960		56.2	
• Central Branch	-19.1	44.3	2.4	20%	575		53.0	
• South Branch	-11.9	36.2	4.0	10%	1220		51.8	
• Inlet Sample Port A	-31.2	37.4	1.4					
• Inlet Sample Port B	-32.5	37.7	1.3					
• Outlet Sample Port A	+4.0	37.0	1.5					
Pedestal Flare								
• Manual Valve				0				

RMPS = 610
HR METER = 429.7

Notes: Temp = 1360
Leachate @ 34.5" before 19.0" after pumping

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET C
REFUSE HIDEAWAY LANDFILL
GAS AND LEACHATE EXTRACTION SYSTEM
LEACHATE HEAD MONITORING

Date: 11/20/97
Time: Start- 1:15 End- 2:30
Monitored By: P. H.
Instrument Used: QED + O.T.C. M575M

Well Riser	Riser Depth(2) (ft)	Depth to Leachate (ft)	Leachate Head (ft)	cycle count ~~Comments~~
GW1-EAST	53.7	45.4'	11.9'	
-WEST	54.1			
GW2-EAST	53.9	47.0'	6.9'	
-WEST	54.0			
GW3-EAST	59.7	55.5'	4.2'	
-WEST	59.7			
GW4-EAST	61.9	58.8'	3.1'	577,459
-WEST	61.8			
GW5-EAST	70.0	48.9'	21.1'	893,078
-WEST	69.9			
GW6-EAST	40.0	36.5'	3.5'	
-WEST	40.1			
GW7-EAST	60.0	51.1'	8.9'	232,162
-WEST	60.0			
GW8 (1)				
-EAST	69.6	60.4	9.2'	880,487
-WEST	69.9			
GW9(1)				
-NORTH	67.5	61.7	5.8'	602,208
-SOUTH	68.4			
GW10-				
-NORTH	72.8	59.9	12.9'	
-SOUTH	72.7			
GW11(1)				
-EAST	69.1	62.1	7.0'	650,594
-WEST	69.1			
GW12-EAST	80.0	72.3'	7.7'	844,760
-WEST	80.0			
GW13-EAST	73.1	62.2	10.9'	219,530
-WEST	73.0			
Leachate Tank	17.9	4.1	13.8	

Tank Volume = 7618 gal

Notes: Tank @ 49.5"

(1) Wells with leachate extraction pumps and controls installed.
(2) Depth is measured from top of 1-in. dia. riser pipe. Tank riser pipe is 2-in. dia.
(3) Use Table 1 to convert leachate head in tank to a volume in gallons.

DRF/ndj/JCK
[mad-401-78a]

DATA SHEET E
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS PROBE MONITORING

Date: 11/4/97

Time: Start - 1200 End- 1210

Temperature: 55°

Barometric Pressure: 30.00 ↓

Monitored by: Pete Hoxtz

Gas Detector Model No.: Gem 500

Serial No.: 092

Date Last Calibrated: 11/3/97

Location	Probe Pressure (in. WC)	CH_4(1) (%)	CH_4(2) (% LEL)	O_2 (%)	Comments
G-1S					
G-1D					
G-6					
G-8					
G-9					
G-10					
GP-11S					
GP-11D					
GPW-1S	0.6	0.0	0.0	19.7	
GPW-1M	-0.3	0.0	0.0	20.0	
GPW-1D	+0.3	0.0	0.0	19.8	
Speedway Buildings	0.0		0.0		

Notes:
(1) Percent combustibles by volume, primarily composed of CH_4.
(2) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).

DRF/MJr/JCK
[mad-402-13a]
15292.03

DATA SHEET E
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS PROBE MONITORING

Date: 11/20/97

Time: Start - 11:00 End- 1:00

Temperature: 40's

Barometric Pressure: 30.3 →

Monitored by: P. Hantz

Gas Detector Model No.: 1939 oxy

Serial No.: 92075

Date Last Calibrated: 11/97

Location	Probe Pressure (in. WC)	CH_4(1) (%)	CH_4(2) (% LEL)	O_2 (%)	Comments
G-1S	0.0	0.0	-	21.0	
G-1D	0.0	0.0	-	21.0	
G-6	0.0	0.0	-	20.0	
G-8	0.0	0.0	-	20.5	
G-9	0.0	0.0	-	20.5	
G-10	0.0	0.0	-	20.5	
GP-11S	+0.6	0.0	-	17.5	
GP-11D	0.0	0.0	-	18.0	
GPW-1S	0.0	0.0	-	20.5	
GPW-1M	+ 0.2	0.0	-	18.0	
GPW-1D	+ 0.3	0.0	-	17.5	
Speedway Buildings	0.0	0.0	-	21.0	

Notes:
(1) Percent combustibles by volume, primarily composed of CH_4.
(2) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).

- No lock on G-6
- lock on GP 11S, 11D Does not shut.

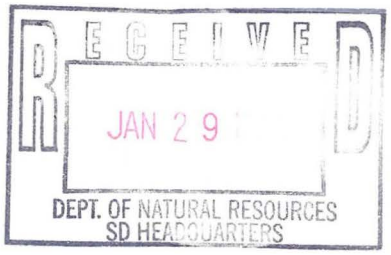
DRF/vlr/JCK
[mad-402-13a]
15292.03

787 W. Sherwood
Springfield, MO 65810

417 881-7303
FAX 417 881-2821

SCS FIELD SERVICES, INC.

January 26, 1998
File No. 0797026.00



Mr. Harlan Kuehling, P.G.
Hydrogeologist
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711

Subject: Operation and Maintenance of the Refuse Hideaway Landfill Gas (LFG) and Leachate Collection System During December 1997

Dear Mr. Kuehling:

This letter report summarizes operation and maintenance (O&M) activities performed by SCS Field Services, Inc. (SCS-FS) at the Refuse Hideaway Landfill LFG and Leachate Collection System (Collection System) during December 1997.

SUMMARY

Highlights of the O&M activities completed by SCS-FS on the Collection System during December included:

- For a second consecutive month, no methane was detected in any of the Monitoring Locations.
- The LFG Recovery System was operational 644 hours, or approximately 87 percent of the time during the month of December (not including the planned shutdown beginning December 29, 1997).
- SCS-FS began replacement of the blower bearings on December 29, 1997. Due to unplanned circumstances encountered during the bearing replacement, the Blower/Flare station was inoperable between December 29, 1997, and January 5, 1998.
- Contract specified quarterly O&M activities including the collection of a quarterly leachate sample was performed on December 18, 1997.

BACKGROUND

LFG Recovery System

The Refuse Hideaway Landfill LFG Recovery System became operational in 1991. The Refuse Hideaway Landfill LFG Recovery System consists of the following components:

- The Blower/Flare Station;
- The Collection System; and
- Monitoring Locations.

The Blower/Flare Station includes one centrifugal LFG blower, an enclosed flare, a candlestick flare (as a backup combustion unit), and associated controls and appurtenances. The Collection System consists of 13 extraction wells, four drip legs, and associated gas and pneumatic header piping. The Monitoring Locations include 11 wells located throughout the site, and ambient air monitoring within the nearby Speedway buildings.

Proper operation of the Collection System is verified through testing of the extraction wells. LFG withdrawal rates at individual wells are adjusted based on test results. Testing for subsurface gas migration is done at the Monitoring Locations. Operation of the Blower/Flare Station provides vacuum necessary to withdraw the gas from the landfill, which helps control surface emissions and subsurface migration; odors and emissions are controlled by combustion of the gas at the flare.

Leachate Collection System

The current leachate collection system was installed in 1996, and is comprised pneumatic pumps installed in eight of the existing LFG extraction wells. Compressed air for the pneumatic pumps is supplied by a compressor located at the Blower/Flare Station. The collected leachate is stored onsite in a 25,000 gallon underground storage tank. Leachate is removed from the tank by a subcontractor, and is transported to the Madison Metropolitan Sewage District (MMSD) for treatment and ultimate discharge.

SCS-FS and our subcontractor, Environmental Sampling Corporation (ESC), began routine monitoring of the Collection System on July 1, 1997. Figure 1 indicates the approximate layout of the Collection System.

TESTING EQUIPMENT

Gas composition testing at the Recovery System was performed using a Landtec GEM-500 Infra-Red Gas Analyzer. The GEM-500 measures methane, carbon dioxide, and oxygen as percent by volume. The GEM-500 also calculates the balance gas component of the LFG (assumed to be nitrogen) and reports it as percent by volume.

Pressure testing was measured in inches of water column and was performed using the GEM-500. LFG flow was measured with a Dwyer 471-1 Digital Thermo Anemometer. Temperature measurement was performed using a handheld, analog temperature probe. Combustion temperatures measured at the flare were obtained from the in-place instrumentation.

Leachate level determination was performed one of two ways:

- For the extraction wells that have a leachate extraction pump, leachate levels were obtained using the bubbler tube installed along with each pump.

- For the gas extraction wells that do not contain a leachate extraction pump, the leachate levels were monitored using an electric tape.

ON-SITE ACTIVITIES

Weekly LFG activities were performed on December 5, 11, 18, 23 and 29. A summary of operational data collected during these weekly activities is shown in Table 1. Monthly activities were completed on December 23, 1997, with summaries shown in Tables 2, 3, and 4.

Copies of all field data sheets are included with this report as Appendix A. The following activities were of note:

- LFG quality at the Blower/Flare station varied somewhat throughout the month. This could be attributed to adjustments made during the month. During the month of December methane concentrations at the blower inlet ranged from a high of 59.9 to a low of 39.7 percent, by volume. Oxygen levels recorded in December ranged from 0.4 to 1.8 percent, by volume.

- The pneumatic leachate pump in GW-07 was not operational during December. In December, SCS-FS and subcontracted parties determined that the cause of the problem was not due to either the air compressor system, or wellhead freezing. The pneumatic pump will be removed from the well and inspected in January.

- A summary of leachate head measurements is shown in Table 3.

- Methane monitoring was performed on December 23, 1997. No methane was detected at any of the monitoring locations. This marks the second consecutive month that no methane was detected in monitoring probes GP-11S and GP-11D. A summary of the monthly methane monitoring is shown in Table 4.

- Seven loads of leachate totaling approximately 28,900 gallons were removed from the Leachate Collection System during the month of December. A summary of the loads removed is shown in Table 5.

- Four Blower/Flare system alarm responses occurred in December. All shutdowns were reported as General Alarms, and were interpreted by SCS-FS to be due to low LFG flow. Based on readings recorded by the hour meter, the Blower/Flare system was operational for 644 hours for the month, or approximately 87 percent of the month of December. A summary of the alarm events is shown in Table 6.

- Quarterly O&M Services were performed on December 18, 1998. A summary of this event is shown in Table 7.

- A quarterly leachate sample was collected from the underground leachate storage tank. All analyzed parameters are within the limits specified by the MMSD permit number NTO-5E. A copy of the laboratory report and chain of custody is included as Appendix B.

- A visual inspection of the landfill cover performed as part of the monthly activities did not indicate any significant erosion features. No leachate seeps were noted.

ISSUES TO RESOLVE

As referred to in the summary section of this report, the replacement of the blower bearings was finished on January 5, 1998. Completion of the work was performed by a representative from the J.W. Deabler Company (Waukesha, WI, an authorized New York Blower representative). Subsequent to that replacement, Deabler personnel have been called to the site to review bearing alignment and temperatures. Additional work on the bearings may be required in late January 1998.

RESOLUTION TO PREVIOUS ISSUES

SCS-FS is unaware of any issues requiring resolution.

WORK PROJECTED FOR THE UPCOMING MONTH

Aside from the routine services planned for the month, ESC will remove the pneumatic pump from GW-07 for additional inspection.

STANDARD PROVISIONS

The findings described above were recorded by both SCS-FS and SCS-FS subcontracted parties. Changes can and do occur which affect the operation of the system. Department personnel should contact SCS-FS immediately in the event of a system malfunction or operational deficiency.

Although SCS-FS is the primary party designated to operate and maintain the subject system, Department staff may find it necessary to make adjustments to the system if conditions change. SCS-FS should be notified of any adjustments made by Department staff.

SCS-FS is pleased to provide our services to the Department and we enjoy working on the project. Should you have questions, please do not hesitate to contact either of the undersigned.

Sincerely,

William O. Reed
Regional Manager
SCS FIELD SERVICES, INC.

Galen S. Petoyan
President
SCS FIELD SERVICES, INC.

WOR:GSP;bms
Enclosures

TABLE 1.
REFUSE HIDEAWAY LANDFILL
WEEKLY BLOWER/FLARE STATION SUMMARY FOR DECEMBER 1997

Date	Bar. Pres. [in-Hg]	Blower Inlet Pressure [in-W.C.]	Blower Inlet Methane [%vol]	Blower Inlet Oxygen [%vol]	Blower Outlet Pressure [in-W.C.]	Flare Inlet Volume [cfm]	Flare Inlet Valve Position	Comments
12/05/97	29.93	-33.0	44.5	1.8	4.5	373.0	100	
12/11/97	30.15	-29.0	39.8	0.4	4.1	291.4	100	
12/18/97		-31.2	59.9	0.7	4.6	367.4	100	
12/23/97	30.20	-32.5	42.4	0.8	5.6	373.7	100	BEFORE WELLFIELD
12/29/97	29.60	-31.9	39.7	0.7	5.9	331.7	100	SHUT DOWN AT 1030 TO REPLACE BLOWER BEARINGS
Average:			45.3	0.9				
Maximum:			59.9	1.8				
Minimum:			39.7	0.4				

in-Hg Inches of Mercury
Deg F Degrees Fahrenheit
in-W.C. Inches of Water Column
%vol Percent by Volume

TABLE 2.
REFUSE HIDEAWAY LANDFILL
LFG COLLECTION WELL TESTING RESULTS SUMMARY FOR DECEMBER 1997

Well No.	Date	Methane [%vol]	Oxygen [%vol]	Well Pressure [in-W.C.]	Header Pressure [in-W.C.]	Flow [cfm]	Temp. [Deg F]	Valve Setting [% open]	Comments
GW-01	12/23/97	23.4	0.7	-1.4	-12.0	9.9	58	10	
GW-02	12/23/97	8.6	15.9	-1.5	-12.0	1.8	33	<10	VALVE FROZEN
GW-03	12/23/97	45.3	0.4	-9.6	-12.0	73.4	64	75	
GW-04	12/23/97	44.1	1.2	-10.9	-12.0	14.6	69	40	
GW-05	12/23/97	58.3	1.3	-8.0	-8.0	8.4	57	100	
GW-06	12/23/97	46.3	0.5	-5.4	-28.0	10.6	56	25	
GW-07	12/23/97	49.3	0.5	-28.3	-28.0	12.4	57	70	
GW-08	12/23/97	63.3	0.8	-17.5	-28.0	10.8	76	70	
GW-09	12/23/97	59.2	1.7	-20.5	-28.0	8.3	40	60	
GW-10	12/23/97	29.0	0.5	-12.2	-29.0	21.8	108	30	
GW-11	12/23/97	56.5	0.4	-28.8	-29.0	12.8	63	100	
GW-12	12/23/97	32.6	0.4	-15.0	-29.0	37.8	96	25	
GW-13	12/23/97	51.3	0.4	-28.0	-29.0	15.8	74	90	
Total:						238.4			

%vol Percent by volume
in-W.C. Inches of water column
cfm Cubic feet per minute
Deg F Degrees Fahrenheit
ND None Detected

TABLE 3.
REFUSE HIDEAWAY LANDFILL
LEACHATE HEAD MEASUREMENT SUMMARY FOR DECEMBER 1997

Well No.	Date	Leachate Level [feet, above bottom of well]	Current Pump Cycles	Previous Pump Cycles	Difference
GW-01	12/23/97	5.5			0
GW-02	12/23/97	5.1			0
GW-03	12/23/97	4.2			0
GW-04	12/23/97	0.9	596,412	577,459	18,953
GW-05	12/23/97	0.8	972,707	893,078	79,629
GW-06	12/23/97	5.8			0
GW-07	12/23/97	2.9	232,164	232,162	2
GW-08	12/23/97	0.4	914,808	880,487	34,321
GW-09	12/23/97	2.1	605,205	602,208	2,997
GW-10	12/23/97	10.0			0
GW-11	12/23/97	1.0	676,536	650,594	25,942
GW-12	12/23/97	0.6	886,992	844,760	42,232
GW-13	12/23/97	2.6	286,445	219,530	66,915

TABLE 4.
REFUSE HIDEAWAY LANDFILL
MONITORING WELL TESTING RESULTS FOR DECEMBER 1997

Well No.	Date	Methane [%vol]	Oxygen [%vol]	Pressure [in-W.C.]	Comments
G-01D	12/23/97	ND	19.5	0.0	
G-01S	12/23/97	ND	19.5	0.0	
G-06	12/23/97	ND	19.5	0.0	
G-08	12/23/97	ND	19.5	0.0	
G-09	12/23/97	ND	19.5	0.0	
G-10	12/23/97	ND	19.5	-0.6	
GP-11D	12/23/97	ND	19.5	0.0	
GP-11S	12/23/97	ND	19.0	0.0	
GPW-1D	12/23/97	ND	19.5	-0.5	
GPW-1M	12/23/97	ND	19.5	-0.5	
GPW-1S	12/23/97	ND	19.0	0.0	
SPEEDWAY BLDGS	12/23/97	ND	19.0	0.0	

% vol Percent by volume
in-W.C. Inches of water column
ND None Detected

TABLE 5.
REFUSE HIDEAWAY LANDFILL
LEACHATE HAULING SUMMARY FOR DECEMBER 1997

Date	Initial Tank Depth [inches]	Initial Tank Volume [gallons]	Final Tank Depth [inches]	Final Tank Volume [gallons]	Total Gallons Hauled
12/04/97	46	6,985	26	3,120	3,865
12/08/97	48	7,406	23	2,615	4,791
12/11/97	37	5,157	8	555	4,602
12/16/97	41	5,955	13	1,137	4,818
12/18/97	22	2,452	8	555	1,897
12/23/97	35	4,769	8	555	4,214
12/29/97	44	6,569	18	1,831	4,738
Total:					28,925
Count:					7

KEY: NR = Not Reported by Hauler

TABLE 6.
REFUSE HIDEAWAY LANDFILL
ALARM RESPONSES FOR DECEMBER 1997

Alarm Date	Response Date	Alarm Codes	Alarm Text	Comments
11/28/97	12/02/97	04	General Alarm	Allowed LFG to recover
12/09/97	12/10/97	04	General Alarm	
12/17/97	12/18/97	04	General Alarm	
12/24/97	12/26/97	04	General Alarm	
Count:	4			

TABLE 7.
REFUSE HIDEAWAY LANDFILL
QUARTERLY COLLECTION SYSTEM O&M

Date of Service:	12/18/97
Exercise CV1, CV2, Branch Valves:	Yes
Exercise Well Valves:	Yes
Exercise Blower Inlet and Outlet Valves:	Yes
Exercise Flare Inlet Valves:	Yes
(Enclosed and Candlestick Flares)	
Inspect Air Dryer Dessicant:	Yes
Status of Air Dryer Dessicant:	Good
Inspect Blower (Visual):	Yes
Comments:	Replacement of blower bearing recommended

APPENDIX A

FIELD DATA SHEETS

DATA SHEET A
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS WELL MONITORING

Date: 12/5/97

Time: Start - 11:00 End- 11:30

Temperature: 30's lower

Barometric Pressure: 29.93 ↓ * (WELL FIELD ADJUSTMENT)*

Monitored by: Peter Hartz

Gas Detector Model No.: _____
Serial No.: _____
Date Last Calibrated: _____

Well	Well Pressure (in. WC)	Header Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
GW1									
GW2									
GW3					50%				
GW4					55%				
GW5									
GW6									
GW7									
GW8(1)									
GW9(1)					60%				
GW10									
GW11(1)					100%				
GW12									
GW13					80%				

Notes: GEW 9 has leaking around the Header

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF/vlr/JCK
[mad-401-78]
15292.03

DATA SHEET A
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS WELL MONITORING

Date: 12/11/97

Time: Start - 1205 End-

Temperature:

Barometric Pressure:

Monitored by:

Gas Detector Model No.:
Serial No.:
Date Last Calibrated:

Well	Well Pressure (in. WC)	Header Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm) FPM	Gas Flow Temperature (°F)	Comments
	-0.5				15%	(more noted)	321		After upper
GW1	-0.3				10%	—	231		Before lower
GW2									
	-5.0				70%		1717		
GW3	-4.7				50%	-	1565		
GW4									
GW5									
GW6									
									cycle count @
GW7									232162
GW8(1)									
	-20.0				75%		286		
GW9(1)	-16.6				65%		205		
GW10									
GW11(1)	-29.5				100%		397		
GW12									
GW13									

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF/MR/JCK
[mad-401-78]
15292.03

DATA SHEET A
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS WELL MONITORING

Date: 23 DEC 97

Time: Start - 1010 End- 1245

Temperature: HIGH 20'S

Barometric Pressure: 30.2 →

Monitored by: V. STREICH

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: _____

Well	Well Pressure (in. WC)	Header Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
GW1	-1.4	-12	23.4	0.7	10%	220	—	58.0	VALVE STUCK OR FROZEN
GW2	-1.5	-12	8.6	15.9	<10%	40	—	33.3	UNABLE TO CLOSE
GW3	-9.6	-12	45.3	0.4	75%	1630	—	64.4	
GW4	~~-11.8~~ -10.9	-12	44.1	1.2	~~50%~~ 40%	325	—	68.6	
GW5	-8.0	-8	58.3	1.3	100%	187	—	57.4	
GW6	-5.4	-28	46.3	0.5	25%	235	—	56.0	
GW7	-28.3	-28	49.3	0.5	70%	275	—	56.5	
GW8(1)	~~-16.5~~ -17.5	-28	63.3	0.8	~~50%~~ 70%	240	—	76.1	
GW9(1)	~~-26.2~~ -20.5	-28	59.2	1.7	~~80%~~ 60%	185	—	39.5	
GW10	-12.2	-29	29.0	0.5	30%	485	—	108.0	
GW11(1)	-28.8	-29	56.5	0.4	100%	285	—	62.5	
GW12	-15.0	-29	32.6	0.4	25%	840	—	95.5	
GW13	-28.0	-29	51.3	0.4	90%	350	—	74.1	

NOTE: SNOW MELTED AROUND GW-8
COMPRESSOR VENTING AIR AT TOP OF GW-4

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF/vlr/JCK
[mad-401-78]
15292.03

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 12/5/97

Time: Start - 11:30 End - 12:20

Temperature: 30's lower

Barometric Pressure: 29.93 ↓

Monitored by: Peter Hartz

Gas Detector Model No.: 1939 OXY
Serial No.: 92075
Date Last Calibrated: 12/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) ~~(cfm)~~ FPM	Gas Flow Temperature (°F)	Comments
Ground Flare								
· Sample Port A	+3.5	45.0	1.8		-	2016	62.5	
· Sample Port B	+3.0	44.5	1.9		-	-	62.0	
· Sample Port C	+2.5	45.0	1.9		-	-	57.5	
· Manual Valve				100%				
Blower								
· North Branch	-30.5	36.0	2.4	75%	-	1290	54.5	
· Central Branch	-19.0	52.0	2.5	25%	-	564	45.3	
· South Branch	-7.8	52.5	1.7	25%	-	1076	42.1	
· Inlet Sample Port A	-31.5	44.0	1.9					
· Inlet Sample Port B	-33.0	44.5	1.8					
· Outlet Sample Port A	+4.5	43.5	1.5					
Pedestal Flare								
· Manual Valve				0%				
- GW9 - Sucking air around well - Duct taped				- Flare Temp 1530° - Leachate Tank 33.1"				

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF:kml/JCH: [mal-401-781] 15292.03

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 12/10/97

Time: Start - 1245 End - 1:30

Temperature: UPPER 20's

Barometric Pressure: 29.95 ↑

Monitored by: Pete Hontz

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 11/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+3.3	47.2	0.6		-	120	62.3	
• Sample Port B	+3.2	47.7	0.6		-	-	62.3	
• Sample Port C	+1.7	47.5	0.6		-	-	65.1	
• Manual Valve				100%				
Blower								
• North Branch	-29.0	53.4	0.7	75%	-	53	58.3	
• Central Branch	-17.2	52.6	0.5	25%	-	59	59.1	
• South Branch	-6.1	44.6	2.0	15%	-	60	57.7	
• Inlet Sample Port A	-30.2	50.5	0.5					
• Inlet Sample Port B	-31.5	50.1	0.5					
• Outlet Sample Port A	+4.5	49.6	0.6					
Pedestal Flare								
• Manual Valve				0%				

- Flare Temp = 1495°
AMPS = 10 hrs 649.6
- Repaired conifex hose on GEM #9

Leachate Tank = 33.5'

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 12/11/97

Time: Start - 1135 End - 1200

Temperature: UPPER 20's

Barometric Pressure: 30.15 ↑

Monitored by: P.Hartz

BEFORE

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 11/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) ~~(cfm)~~ FPM	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+3.2	37.5	0.8		-	1595	70.3	
• Sample Port B	+3.1	37.2	0.8		-	-	-	
• Sample Port C	+1.9	38.1	0.7		-	-	64.2	
• Manual Valve				100%				
Blower								
• North Branch	-30.2	32.2	0.8	75%	-	1899	53.6	
• Central Branch	-27.2	44.6	0.5	25%	-	565	45.9	
• South Branch	-7.2	37.9	2.8	15%	-	1124	46.8	
• Inlet Sample Port A	-30.9	38.1	0.8				48.9 47.1	
• Inlet Sample Port B	-31.9	38.2	0.7					
• Outlet Sample Port A	+4.1	37.9	0.8					
Pedestal Flare								
• Manual Valve				0%				

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 12/11/97

Time: Start - 1100 End - 1130

Temperature: UPPER 20's

Barometric Pressure: 30.15 ↑

Monitored by: P Hartz

AFTER

Gas Detector Model No.: GEM 506
Serial No.: 092
Date Last Calibrated: 11/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm) FPM	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+3.2	38.9	0.4		-	1575	71.3	
• Sample Port B	+3.0	38.8	0.4		-	-	-	
• Sample Port C	+1.8	38.9	0.4		-	-	-	
• Manual Valve				100%				
Blower								
• North Branch	-27.2	34.8	0.4	75%	-	1578	54.4	
• Central Branch	-18.2	47.1	0.3	25%	-	528	46.4	
• South Branch	-7.6	39.5	2.3	15%	-	1227	46.2	
• Inlet Sample Port A	-31.9	39.4	0.4					
• Inlet Sample Port B	-29.0	39.8	0.4					
• Outlet Sample Port A	+4.1	39.4	0.4					
Pedestal Flare								
• Manual Valve				0%				

- Amp meter 9.0 274.2 Hrs.
- Flare Temp 1225°

Notes: (pump ran for an average of 90 sec.)

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 12/18/97

Time: Start - 12:00 End - 1225

Temperature: 40's°

Barometric Pressure: _____

Monitored by: Peter Hartz, Frank Pratuini

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 12/17/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) ~~(cfm)~~ FPM	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+3.6	59.3	0.8		-	1986	63.2	
• Sample Port B	NA	NA	NA		-	-	-	
• Sample Port C	+1.9	58.2	0.8		-	-	54.5	
• Manual Valve				100%				
Blower								
• North Branch	-28.8	63.4	0.8	75%	-	3190	50.1°	
• Central Branch	-16.1	64.7	0.7	25%	-	764	44.8	
• South Branch	- 4.6	52.1	2.0	25%	-	1568	46.9	
• Inlet Sample Port A	-30.0	59.2	1.2					
• Inlet Sample Port B	-31.2	59.9	0.7					
• Outlet Sample Port A	+4.6	59.6	0.8					
Pedestal Flare								
• Manual Valve				0%				system down 24 hrs, re-start after running for 1 hrs.
- Leachate Tank @								
- Flare Temp @ 1505								
- Blower Amps 9:0								
Notes: Hours 8117								

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 12/23/97

BEFORE WELL FIELD

Time: Start - 0930 End - 1010

Temperature: HIGH 20'S

Barometric Pressure: 30.2 ↔

Monitored by: V. STRETCH

Gas Detector Model No.: GEM500
Serial No.: 092
Date Last Calibrated: _____

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A	+4.2	42.0	0.9		2020		68.0	
• Sample Port B	+4.0	41.9	0.9					
• Sample Port C	+2.2	42.4	0.8				59.0	
• Manual Valve								
Blower								
• North Branch	-30.2	37.9	0.7	75%	1305		43.7	
• Central Branch	-28.5	50.0	1.2	30%	630		40.4	
• South Branch	-15.6	34.2	5.2	25%	1850		41.0	
• Inlet Sample Port A	-30.9	42.5	0.8					
• Inlet Sample Port B	-32.5	42.4	0.8					
• Outlet Sample Port A	+5.6	42.3	0.9					
Pedestal Flare								
• Manual Valve				0				

Temp = 1473
Amp = 9.0
Hours = 906.3

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 12/23/97

Time: Start - 1245 End- _____

Temperature: HIGH 20'S

Barometric Pressure: 30.2 ↔

Monitored by: J. STREICH

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: _____

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) (cfm)	Gas Flow Temperature (°F)	Comments
Ground Flare								
• Sample Port A								
• Sample Port B								
• Sample Port C								
• Manual Valve								
Blower								
• North Branch	-30.0	36.1	0.5	75%				
• Central Branch	~~-27.9~~ -28.9	50.8	0.8	~~25%~~ 40%				OPENED 1 MORE PIN
• South Branch	-15.0	34.4	4.0	20%				
• Inlet Sample Port A	-30.8	41.7	0.6					
• Inlet Sample Port B								
• Outlet Sample Port A								
Pedestal Flare								
• Manual Valve								

Notes:

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DATA SHEET B
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
BLOWER AND FLARE STATION GAS MONITORING

Date: 12/29/97

Time: Start - 0915 End- 0935

Temperature: 30's lower

Barometric Pressure: 29.60 ↑

Monitored by: Peter Hartz

Gas Detector Model No.: GEM 500
Serial No.: 092
Date Last Calibrated: 12/97

Location	Pressure (in. WC)	CH_4(2) (%)	O_2 (%)	Valve Setting (fraction Open)	Gas Velocity (fpm)	Gas Flow(3) ~~(cfm)~~ FPM	Gas Flow Temperature (°F)	Comments
Ground Flare								
· Sample Port A	+4.8	39.1	0.8		-	1793	69.8	
· Sample Port B	+4.7	39.2	0.8		-	-	-	
· Sample Port C	+2.7	39.4	0.7		-	-	59.5	
· Manual Valve				100%				
Blower								
· North Branch	-30.4	36.3	0.7	75%	-	1395	51.8°	
· Central Branch	-28.9	48.7	0.8	40%	-	798	41.9	
· South Branch	-17.0	29.2	5.4	25%	-	1835	44.1	
· Inlet Sample Port A	-30.9	39.1	0.7					
· Inlet Sample Port B	-31.9	39.7	0.7					
· Outlet Sample Port A	+5.9	39.3	0.7					
Pedestal Flare								
· Manual Valve				0%				

Flare temp = 1455°
Amps = 9.0 Hours - 1002.9
leachate tank @ 16.5"

Notes: - SYSTEM SHUT DOWN @ 10:30 for repairs to blower bearings

(1) Wells with leachate pumps and controls.
(2) Percent combustibles by volume, primarily composed of CH_4.
(3) Gas velocity is converted to gas flow by multiplying FPM X .045 @ 3" PVC
.078 @ 4" PVC
.185 @ 6" HDPE

DRF/kml/JCH: [ma1-401-781] 15292.03

DATA SHEET C
REFUSE HIDEAWAY LANDFILL
GAS AND LEACHATE EXTRACTION SYSTEM
LEACHATE HEAD MONITORING

Date: 12/23
Time: Start- 1045 End- 1200
Monitored By: Peter Hantz

Instrument Used:	model #	serial #
Rust water level indicator	51423	19476
(4EG remote liquid level indicator	6026	13807

Well Riser	Riser Depth(2) (ft)	Depth to Leachate (ft)	Leachate Head (ft)	Comments/cycle count
GW1-EAST	53.7	48.2'	5.5'	
-WEST	54.1			
GW2-EAST	53.9	48.8'	5.1'	
-WEST	54.0			
GW3-EAST	59.7	55.5'	4.2'	
-WEST	59.7			
GW4-EAST	61.9	–	0.92'	596,412
-WEST	61.8			
GW5-EAST	70.0	–	0.75'	972,707
-WEST	69.9			
GW6-EAST	40.0	34.2'	5.8'	
-WEST	40.1			
GW7-EAST	60.0	–	2.87'	pump not cycling - 232,164
-WEST	60.0			
GW8 (1)				
-EAST	69.6	–	0.4'	914,808
-WEST	69.9			
GW9(1)				
-NORTH	67.5	–	2.1'	605,205
-SOUTH	68.4			
GW10-				
-NORTH	72.8	62.8'	10.0'	
-SOUTH	72.7			
GW11(1)				
-EAST	69.1	–	1.0'	676,536
-WEST	69.1			
GW12-EAST	80.0	–	0.58'	886,992
-WEST	80.0			
GW13-EAST	73.1	–	2.58'	286,445
-WEST	73.0			
Leachate Tank	17.9	–	0.8'	

Tank Volume = <25.0 gal

Notes:

(1) Wells with leachate extraction pumps and controls installed.
(2) Depth is measured from top of 1-in. dia. riser pipe. Tank riser pipe is 2-in. dia.
(3) Use Table 1 to convert leachate head in tank to a volume in gallons.

DRF/ndj/JCK
[mad-401-78a]

DATA SHEET E
REFUSE HIDEAWAY LANDFILL

GAS WELL AND LEACHATE EXTRACTION SYSTEM
GAS PROBE MONITORING

Date: 12/23/97

Time: Start - 0930 End- 1030

Temperature: 20's upper

Barometric Pressure: _____

Monitored by: P. Hartz

Gas Detector Model No.: 1939 ox

Serial No.: 92075

Date Last Calibrated: 12/97

Location	Probe Pressure (in. WC)	CH_4(1) (%)	CH_4(2) (% LEL)	O_2 (%)	Comments
G-1S	0.0	0.0	-	19.5	
G-1D	0.0	0.0	-	19.5	
G-6	0.0	0.0	-	19.5	No lock -
G-8	0.0	0.0	-	19.5	
G-9	0.0	0.0	-	19.5	
G-10	-0.6	0.0	-	19.5	
GP-11S	0.0	0.0	-	19.0	
GP-11D	0.0	0.0	-	19.5	
GPW-1S	0.0	0.0	-	19.0	
GPW-1M	-0.5	0.0	-	19.5	
GPW-1D	-0.5	0.0	-	19.5	
Speedway Buildings	0.0	0.0	-	19.0	

Notes:
(1) Percent combustibles by volume, primarily composed of CH_4.
(2) Percent of lower explosive limit of CH_4 (100% LEL = 5% CH_4 by volume).

DRF/Mr/JCK
[mad-402-13a]
15292.03

APPENDIX B

QUARTERLY LEACHATE ANALYTICAL REPORT

Commonwealth Technology, Inc.
Laboratory Division
Accredited Lab Data for Today's Environment

1230 Lange Court
Baraboo, WI 53913-3901
Phone: 800-228-3012
Fax: 608-356-2766
email: fyi@ctienv.com

ANALYTICAL REPORT

Client I.D. No.: LE0000000001
Work Order No.: 9712000534
Report Date: 01/13/98
Date Received: 12/19/97
Arrival Temperature: On Ice

ESC
FRANK PERUGINI
PO BOX 12
MUSKEGO, WI 53150

Project Name: **REFUSE HIDEAWAY** Project Number:

Sample I.D. #:182145 Sample Description:LEACHATE TANK **Date Sampled:**12/18/97

Analyte	Result	Units	LOD	LOQ	Method
Conductivity	13400	umhos/cm	1	NA	9050
Analysis Date Conductivity	12/23/97				9050
Cyanide	<0.025	mg/L	0.025	0.065	9010
Sample was diluted 1:5.					
Analysis Date Cyanide	12/24/97				9010
Hexavalent Chromium	130	µg/L	5	17	7196
Estimated value: concentration was less than LOQ. Sample was diluted 1:10.					
Analysis Date Hexavalent Chromium	12/19/97				7196
Mercury	<0.2	µg/L	0.2	0.7	7470
Matrix interference:sample outside of lab control limits for spike recovery.					
Analysis Date Mercury	1/06/98				7470
Analysis Date Metals Sample Preparation	12/22/97				3020
pH (Lab)	7.7	S.U.'s	NA	NA	9045
Analysis Date pH	12/24/97				9045
Chromium, Total	50	µg/L	1	3	6010B
Analysis Date Chromium	12/21/97				6010B
Copper, Total	68	µg/L	1	3	6010B
Analysis Date Copper	12/21/97				6010B
Lead, Total	39	µg/L	1	5	6010B
Analysis Date Lead	12/21/97				6010B
Nickel, Total	105	µg/L	2	7	6010B
Analysis Date Nickel	12/21/97				6010B
Silver, Total	<0.5	µg/L	0.5	1.7	6010B
Analysis Date Silver	12/21/97				6010B
Zinc, Total	222	µg/L	1	3	6010B
Analysis Date Zinc	12/21/97				6010B
Selenium, Total	5	µg/L	3	10	6010B
Analysis Date Selenium	12/21/97				6010B

Comments for entire Work Order:
NONE

Submitted By:

Commonwealth Technology, Inc. (CTI)

Formerly the Laboratory Division of Mid-State Associates, Inc.

ENVIRONMENTAL AND ANALYTICAL SERVICES
1230 Lange Court
Baraboo, WI 53913
1-800-228-3072 (608) 356-2760 FAX: (608) 356-2766

Remarks: 1228

534

Project #:

Proj. Name: Refuse Hideaway Landfill

Client Name / Number:

~~Environ~~ Frank Rongini ESC (414) 427-5033

FILL IN ANALYSIS NEEDED BELOW

Date	Time	Comp	Grab	Sample Description	Sample #	Number of Containers	CYANIDE	pH, specific conductivity	Hexavalent Chromium	Total chromium, Copper, Zinc, Lead, Mercury, Nickel, Silver, Selenium	Pres.	Space Below For Laboratory Use: Sample I.D. #'s:
12/16	1240		X	Leachate Tank		3	1	1	1			182145
				LRS								182146

Sampled By: Frank Rongini Peter Hartz

Relinquished By: [signature] Date: 12/19/97 Time:

Received By: [signature] Date: 12/16/97 Time: 1120

Received By Lab: O. Dill Date: 12/19/97 Time: 8:25

Remarks:

Date Sample Disposed of:

Sample Shipped Via: ____ UPS ____ Fed. Exp. X Hand ____ U.S. Mail

Sublab: ____

Is this a PECFA project? (Please indicate "Yes" or "No") ____

Sample Status: on ice

Deg. C: ____ pH: ____

787 W. Sherwood
Springfield, MO 65810

417 881-7303
FAX 417 881-2821

SCS FIELD SERVICES, INC.

January 28, 1998
File No. 0797026.00

Mr. Paul H. Nehm
Director of Operations and Maintenance
Madison Metropolitan Sewerage District
1610 Moorland Road
Madison, WI 53713

Subject: Results of Leachate Analysis - Refuse Hideaway Landfill, Permit NTO-5E

Dear Mr. Nehm:

For our client, the Wisconsin Department of Natural Resources, SCS Field Services, Inc. (SCS-FS), hereby submits the laboratory analytical results of a leachate sample collected from the subject site. All analyzed compounds are below the effluent limitations contained in the site's discharge permit.

The sample was collected on December 18, 1997, and received by the laboratory the same day. Copies of the analysis, and chain of custody are attached.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.

If you have any questions, please feel free to contact me at (417) 881-7303.

Sincerely,

William O. Reed
Regional Manager
SCS FIELD SERVICES, INC.

WOR:bms
Enclosure

cc: Harlan Kuehling, P.G. - WDNR

E:\PROJECTS\0797026.00\1297leach.wpd

Commonwealth Technology, Inc.
Laboratory Division
Accredited Lab Data for Today's Environment

1230 Lange Court
Baraboo, WI 53913-3901
Phone: 800-228-3012
Fax: 608-356-2766
email: fyi@ctienv.com

ANALYTICAL REPORT

Client I.D. No.: LE0000000001
Work Order No.: 9712000534
Report Date: 01/13/98
Date Received: 12/19/97
Arrival Temperature: On Ice

ESC
FRANK PERUGINI
PO BOX 12
MUSKEGO, WI 53150

Project Name: **REFUSE HIDEAWAY** Project Number:

Sample I.D. #:182145 **Sample Description:**LEACHATE TANK **Date Sampled:**12/18/97

Analyte	Result	Units	LOD	LOQ	Method
Conductivity	13400	umhos/cm	1	NA	9050
Analysis Date Conductivity	12/23/97				9050
Cyanide	<0.025	mg/L	0.025	0.065	9010
Sample was diluted 1:5.					
Analysis Date Cyanide	12/24/97				9010
Hexavalent Chromium	130	µg/L	5	17	7196
Estimated value: concentration was less than LOQ. Sample was diluted 1:10.					
Analysis Date Hexavalent Chromium	12/19/97				7196
Mercury	<0.2	µg/L	0.2	0.7	7470
Matrix interference:sample outside of lab control limits for spike recovery.					
Analysis Date Mercury	1/06/98				7470
Analysis Date Metals Sample Preparation	12/22/97				3020
pH (Lab)	7.7	S.U.'s	NA	NA	9045
Analysis Date pH	12/24/97				9045
Chromium, Total	50	µg/L	1	3	6010B
Analysis Date Chromium	12/21/97				6010B
Copper, Total	68	µg/L	1	3	6010B
Analysis Date Copper	12/21/97				6010B
Lead, Total	39	µg/L	1	5	6010B
Analysis Date Lead	12/21/97				6010B
Nickel, Total	105	µg/L	2	7	6010B
Analysis Date Nickel	12/21/97				6010B
Silver, Total	<0.5	µg/L	0.5	1.7	6010B
Analysis Date Silver	12/21/97				6010B
Zinc, Total	222	µg/L	1	3	6010B
Analysis Date Zinc	12/21/97				6010B
Selenium, Total	5	µg/L	3	10	6010B
Analysis Date Selenium	12/21/97				6010B

Comments for entire Work Order:
NONE

Submitted By: MM

Commonwealth Technology, Inc.

Formerly the Laboratory Division of Mid-State Associates, Inc.
ENVIRONMENTAL AND ANALYTICAL SERVICES
1230 Lange Court
Baraboo, WI 53913
1-800-228-3072 (608) 356-2760 FAX: (608) 356-2766

FILL IN ANALYSIS NEEDED BELOW

Remarks: 12281

534

Project #:

Proj. Name: Refuse Hideaway Landfill

Client Name / Number:

~~Wiser~~ Frank Rongini ESC (414) 427-5033

Date	Time	Comp	Grab	Sample Description	Sample #	Number of Containers	CYANIDE	pH, specific conductivity	Hexavalent Chromium	Total chromium, copper, zinc, lead, Mercury, Nickel, Silver	Selenium
12/18	1240		X	Leachate Tank		3	1	1	1		
				LRS							

Space Below For Laboratory Use

Pres.	Sample I.D. #'s:
	182145
	182146

Sampled By: Frank Rongini Peter Hartz

Relinquished By: [signature] Date: 12/19/97 Time:

Received By: [signature] Date: 12/18/97 Time: 1320

Received By Lab: O. Dill Date: 12/19/97 Time: 8:25

Remarks:

Date Sample Disposed of:

Sample Shipped Via: ____ UPS ____ Fed. Exp. X Hand ____ U.S. Mail

Sublab:

Is this a PECFA project? (Please indicate "Yes" or "No")

Sample Status:

Deg. C: on ice pH: