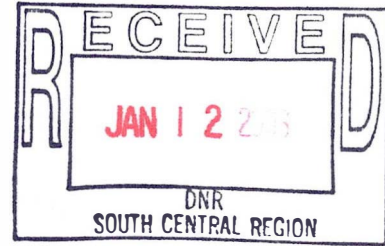




HYDROGEOLOGISTS ■ ENGINEERS ■ ENVIRONMENTAL SCIENTISTS

January 10, 2006

Mr. Hank Kuehling
DNR - South Central Region
3911 Fish Hatchery Road
Fitchburg, WI 53711



RE: **Annual Operation and Maintenance Report (July 2004 – June 2005)**
Refuse Hideaway Landfill, Town of Middleton, Dane County, Wisconsin
BRRTS #02-13-000849

Dear Mr. Kuehling:

The purpose of this letter report is to summarize operation and maintenance (O&M) activities performed by Liesch Environmental Services, Inc. (Liesch) at the Refuse Hideaway Landfill (RHL) from July 2004 through June 2005. As monthly O&M reports were previously submitted, this Annual Report provides ranges for operating parameters and highlights changing trends or operating conditions.

SUMMARY

Highlights of O&M activities completed by Liesch during the 2004 – 2005 O&M year included:

- The Blower/Flare System ran approximately 89% of the operating year.
- The Leachate Collection System ran for approximately 98% of the operating year.

BACKGROUND

Liesch began routine monitoring of RHL systems on July 1, 2003. Prior to Liesch, SCS Field Services and Environmental Sampling Corporation monitored the landfill from July 1, 1997.

LFG Recovery System

The LFG Recovery System at RHL became operational in 1991. The LFG Recovery System consists of:

- Blower/Flare Station
- Collection System
- Monitoring Locations

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The Blower/Flare Station includes one centrifugal LFG blower, an enclosed flare, a candlestick flare (previously used as a backup combustion unit but now out of service), 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 nearby Speedway buildings. Proper operation of the Collection System is verified through testing of the extraction wells. LFG withdrawal rates at individual well 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 of pneumatic pumps installed in eight of the existing LFG extraction wells. A compressor located at the Blower/Flare Station supplies compressed air for the pneumatic pumps. The collected leachate is stored onsite in a 25,000-gallon underground storage tank. Leachate is removed from the tank by a subcontractor and transported to the Madison Metropolitan Sewerage District (MMSD) for treatment and ultimate discharge.

TESTING EQUIPMENT

A Landfill Monitoring Systems (LMS) Multi-gas analyzer Model LMS 40 is utilized at the site to measure methane, carbon dioxide, and oxygen as percent by volume.

Pressure testing is measured in inches of water using Dwyer magnehelic gauges. LFG flow and temperature are measured with an Extech Model 407123 Hot Wire Thermo-Anemometer. Combustion temperatures were obtained from flare control panel instrumentation.

Leachate level was measured in one of two ways:

- For the gas extraction wells that have a leachate extraction pump, leachate levels were obtained indirectly using a bubbler tube.
- For the gas extraction wells that do not contain a leachate extraction pump, leachate levels were measured using an electric water level meter.

ON-SITE ACTIVITIES

Site/system activities generally consisted of inspecting, monitoring, maintaining, and/or

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recording data at or from various valves, meters, or sampling ports.

Weekly activities were performed at the following locations:

- Blower/Flare Control Panel
- Blower/Flare Station
- Leachate Tank
- Branch Monitoring Stations
- Flare Inlet Pipe
- Blower Inlet Pipe

Monthly activities were performed at the following locations:

- Extraction Wells
- Gas Probes
- Well Pumps/Controls
- Branch Monitoring Stations
- Flare Inlet Pipe
- Buried Control Valves
- Compressor (oil change)
- Pneumatic System (check for leaks)
- Blower Drive Belts (inspect/tighten)
- Landfill Surface (inspect)
- Monthly Report (including summary tables of system operation)

Quarterly activities were performed at the following locations:

- CV1, CV2, Branch Valves
- Well Valves, Compressor Valves
- Manual Valve (ground flare)
- Compressed Air Filter (inspect)
- Air Dryer Desiccant (inspect)
- Blower

Annual activities were performed at the following locations:

- Well pumps
- Leachate Lines, Driplegs
- Cleanouts
- Tank Loadout Station
- Padlocks

System statistics for the operating year are summarized in **Table 1** and further detailed in **Table 2** through **Table 4**:

- The average methane level at the blower was 37.0%.
- The average oxygen level at the blower was 3.0%

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- 186,321 gallons of leachate were removed from the landfill using the Leachate Collection System.
 - Laboratory analysis of leachate samples indicated that all analyzed metal compounds were below permitted discharge levels (see **Table 1a**).
 - Laboratory reports were submitted to Madison Metropolitan Sewerage District per permit requirements.

Note that after August 2004 the GW-1, GW-2, and GW-3 extraction wells have exhibited atypical flows (low) and pressure (mostly positive). Numerous troubleshooting efforts have been made but have been unsuccessful thus far.

Also, an air hose chewed by a mouse at GW-4 was replaced in December 2004.

In May 2005, the temperature gauge for the flare failed.

An evaluation of repairs and improvements needed for effectively operating the Blower/Flare System and Leachate Collection System was completed in June 2005. Implementation of the recommendations began in August 2005 and will be documented in next year's report.

The following items were noted throughout the year and may require further attention (items 1 to 6 are in the approved repair/improvement scope of work):

- 1) All of the leachate pump (compressed air) meters at individual well locations are no longer operating.
 - a. NOTE: condition does not significantly impact landfill operations.
- 2) Several of the air control valves at the individual well heads are inoperable and do not provide any control over air flows. **Table 5** notes which control valves are problematic.
 - a. NOTE: condition makes it difficult to fine tune extraction rates and optimize methane capture and removal.
- 3) The hour meter on the leachate system air compressor no longer works.
 - a. NOTE: condition does not significantly impact landfill operations.
- 4) Both buried control valves CV1 and CV2 are inoperable.
 - a. NOTE: condition makes it difficult to fine tune extraction rates and optimize methane capture and removal.

- 5) Two of the three main gas extraction header valves don't appear to have any influence on the system. It appears the valves are wide open and moving the valve controls 90 degrees has no effect on vacuums or flows.
 - a. NOTE: condition makes it difficult to fine tune extraction rates and optimize methane capture and removal.
- 6) Extraction well GW-10 has shown a substantial amount of leachate.
 - a. NOTE: condition has the potential to affect maintaining control of leachate from migrating off-site.
- 7) Methane detected in the G-1, G-2, and G-11 well nests depended heavily on the time of year. The highest readings were during the summer months with little to no methane detected during the winter months.
 - a. NOTE: condition does not significantly impact landfill operations directly but does affect the overall amount of methane underground and therefore can influence the operation of the flare.
- 8) A visual inspection of the landfill cover was performed as part of monthly activities. The only incident of note was the presence of cows and their tracks along the southern face of the landfill in November 2004. No evidence of livestock on the property has been evident since that time.
 - a. NOTE: condition did not significantly impact landfill operations.

The following items were also noted throughout the operating year:

- 1) Inconsistent flows and/or gas concentrations can fool the flame signal eye resulting in false flame failure alarms. Liesch experienced this up to four times a day since turning on the auto-dialer. Although the auto-dialer sends an alarm, the flare is running.
- 2) The flare re-start sequence is complicated by a continuously alarming high pilot gas pressure transducer. To restart the flare system we have to jump/bypass the transducer to allow the start-up sequence to proceed. The sparking mechanism appears to be working at this time.
- 3) The air compressor is slightly undersized for the environment and workload. However, a technician from Energetics said that monthly oil changes should allow the compressor to operate as needed for the foreseeable future.

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CONCLUSIONS / RECOMMENDATIONS

The Refuse Hideaway Landfill was successfully maintained within normal system/site ranges for the July 2004 – June 2005 operating year. An evaluation of repairs and improvements needed for effectively operating the Blower/Flare System and Leachate Collection System was completed in June 2005. Implementation of the recommendations will be documented in next year's report.

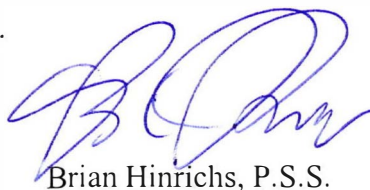
Feel free to call me at (608) 223-1532, extension 21, if you have any questions.

Sincerely,

LIESCH ENVIRONMENTAL SERVICES, INC.



David Nemetz, P.G.
Project Manager



Brian Hinrichs, P.S.S.
Project Principal

Attachments: Table 1 (System Summary)
Table 1a (Leachate Tank Laboratory Analytical Results)
Table 2 (Methane % at Wells)
Table 3 (Velocity at Wells)
Table 4 (System Hours)
Table 5 (Problematic System Components)

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**TABLE 1
REFUSE HIDEAWAY LANDFILL**

**OPERATING PARAMETERS SUMMARY
July 2004 - June 2005
System Summary**

	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Average	Min.	Max.
% Methane at Blower (average during month)	41.5	43.5	46.7	43.9	45.4	35.8	32.0	33.0	41.0	34.0	30.0	17.3	37.0	17.3	46.7
% Oxygen at Blower (average during month)	0.8	1.6	0.7	0.5	0.9	2.5	5.2	5.0	4.8	4.8	NA	5.9	3.0	0.5	5.9
Leachate Collected (gallons)	38,938	38,404	19,118	24,542	14,639	13,289	10,000	4,945	4,850	9,226	5,095	3,275	15,254	3,275	38,938
	TOTAL Leachate												186,321		

		Average	Min.	Max.			Average	Min.	Max.			Average	Min.	Max.
% Methane at Extraction Wells	GW1	53.2	51	59	Velocity (fpm) at Extraction Wells	GW1	68.6	20	150	Flow (cfm)	3.1	0.9	6.8	
	GW2	54.3	41.5	59		GW2	96.9	15	200		4.4	0.7	9.0	
	GW3	51.2	3.3	61		GW3	196.6	20	500		8.8	0.9	22.5	
	GW4(1)	38.0	18	49.5		GW4(1)	356.3	15	850		16.0	0.7	38.3	
	GW5(1)	45.6	15.5	59		GW5(1)	584.3	135	1150		26.3	6.1	51.8	
	GW6	44.3	28	59		GW6	710.6	185	1159		32.0	8.3	52.2	
	GW7(1)	31.0	5.4	46.5		GW7(1)	1536.2	303	2200		69.1	13.6	99.0	
	GW8(1)	35.6	0.1	54.5		GW8(1)	1023.0	225	1860		46.0	10.1	83.7	
	GW9(1)	40.1	30	47.5		GW9(1)	1725.6	305	2900		77.7	13.7	130.5	
	GW10	31.6	14.5	40		GW10	427.3	58	850		19.2	2.6	38.3	
	GW11(1)	44.3	16.6	67		GW11(1)	1838.8	455	2900		82.7	20.5	130.5	
	GW12(1)	34.2	19.5	57		GW12(1)	1487.0	120	2550		66.9	5.4	114.8	
	GW13(1)	40.7	9.3	55		GW13(1)	768.2	306	1575		34.6	13.8	70.9	
						TOTAL	10819				TOTAL	486.9		

	Average	Min.	Max.
LFG Blower (%)	88.8	20	100
LFG Hours per month	---counter broken---		
Leachate Compressor (%)	98.2	90	100

conversion factor 0.045

(1) wells with pneumatic leachate pumps installed.

**Table 1a
Leachate Tank Laboratory Analytical Results
Refuse Hideaway Landfill
Middleton, Wisconsin**

DATE	PARAMETER										
	Cadmium (ug/L)	Total Chromium (ug/L)	Hexavalent Chromium (ug/L)	Copper (ug/L)	Lead (ug/L)	Mercury (ug/L)	Nickel (ug/L)	Selenium (ug/L)	Silver (ug/L)	Zinc (ug/L)	Cyanide (ug/L)
Permitted Levels	250	10000	500	1500	5000	20	2000	300	3000	8000	100
9/30/2003	<0.88	54		8	<2.2	<0.030	150	<8.0	<1.8	54	
10/9/2003			<260,000								5.8
2/23/2004	<0.53	30	<270	24	<1.3	<0.030	93	<4.8	6.5	40	16
8/5/2004	<0.17	21	<27	4.1	1.9	<0.028	54	6.5	0.21	19	15
11/4/2004	<1.7	33	<2.7		2.8	<0.30		13	<0.49		5.4
12/21/2004	<1.7	52	<2.7	8.6	5.4	<0.028	180	21	<0.49	36	9.1
3/31/2005	0.68	15	<2.7	6.9*	12	<0.028					5.5*
6/30/2005	<1.00	12.8	<40	6.20	1.70	<0.07	40.5	16.7	<1.00	458	7

Notes Results in **bold** indicate levels above permit limitations.
 Blank cell indicates parameter not analyzed.
 ug/l = micrograms per liter
 * = Analyte detected between limit of detection and limit of quantitation.

**TABLE 2
REFUSE HIDEAWAY LANDFILL**

**OPERATING PARAMETERS SUMMARY
July 2004 - June 2005
Methane (%) at Wells**

	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Average	Min	Max
GW1	53	51	54	54	59	51	54	51			52	53	53.2	51	59
GW2	55	56	56	55	59	41.5	56	58	54		55	52	54.3	41.5	59
GW3	56	59	61	60	60	3.3	58	60	33.5		59	53	51.2	3.3	61
GW4 (1)	32	49.5	45	37	38	43.5	43.5	37	46.5		27.5	18	38.0	18	49.5
GW5 (1)	57	57	59	59	33	51	51	55	36		28	15.5	45.6	15.5	59
GW6	59	40	38.5	39.5	49		55	43.5	46.5		28		44.3	28	59
GW7 (1)	21	46	46.5	46	44.5	5.4	5.4	25	30		40.2		31.0	5.4	46.5
GW8 (1)	54.5	48.5	34.5	41.5	42	0.1	0.1	38	41.5		40.5	50	35.6	0.1	54.5
GW9 (1)	47.5	42	34	45	38	41	41	37	46.5		39.5	30	40.1	30	47.5
GW10	35.5	29	34	40	40			14.5	24.5		35.5		31.6	14.5	40
GW11 (1)	65	55	58	39.5	56	57	16.6	67	36		20	17.5	44.3	16.6	67
GW12 (1)	40	34	34.5	35	34	19.5	57	27.5	33.5		27		34.2	19.5	57
GW13 (1)	48.5	46	49	49.5	52	55	9.3	36	29.5		32		40.7	9.3	55

(1) wells with pneumatic leachate pumps installed

J:\5905600\Tables\System Averages 2004-2005.xls Methane (%) at Wells

**TABLE 3
REFUSE HIDEAWAY LANDFILL**

**OPERATING PARAMETERS SUMMARY
July 2004 - June 2005
Velocity (fpm) at Wells**

	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Average	Min	Max
GW1		20	150	34	40	32	33				150	90	68.6	20	150
GW2		15	200	150	40		30		60		140	140	96.9	15	200
GW3		20	475	500	45		33	100	80		216	300	196.6	20	500
GW4 (1)		15	130	115	70			120	700		850	850	356.3	15	850
GW5 (1)		135	480	390	375			1000	521		623	1150	584.3	135	1150
GW6		275	960	890	400	1159	1100	624	973		540	185	710.6	185	1159
GW7 (1)		303	2200	2100	800	2024	2024	1803	1625		1200	1283	1536.2	303	2200
GW8 (1)		225	1860	1350	430	750	750	1330	905		1360	1270	1023.0	225	1860
GW9 (1)		305	2855	2900	1200	2172	2172	2213	1209		910	1320	1725.6	305	2900
GW10		58	350	200	425	378	378	339	475		820	850	427.3	58	850
GW11 (1)		455	2230	2900	1275	2601	2601	2109	1277		1610	1330	1838.8	455	2900
GW12 (1)		120	590	1250	1100	2367	2367	1845	1131		1550	2550	1487.0	120	2550
GW13 (1)		402	1575	1280	480	550	550	306	911		908	720	768.2	306	1575
TOTAL		2348	14055	14059	6680	12033	12038	11789	9867		10877	12038			
	incomplete					incomplete	incomplete	incomplete	incomplete	incomplete					
FLOW (calculated cfm)															
TOTAL		106	632	633	301	541	542	531	444		489	542	476		

(1) wells with pneumatic leachate pumps installed.

**TABLE 4
REFUSE HIDEAWAY LANDFILL**

**OPERATING PARAMETERS SUMMARY
July 2004 - June 2005
System Hours**

	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Average	Min	Max
LFG Blower (%)	95	100	100	100	90	100	100	100	90	20	70	100	88.8	20	100
LFG Counter end	46041.5	46689.0	47333.9	48179.0	broken	broken	broken	broken	broken	broken	broken	broken			
LFG Hours	954.9	647.5	644.9	845.1	NA	NA	NA	NA	NA	NA	NA	NA	773.1		
Leachate Compressor (%)	100	100	90	90	100	100	100	100	98	100	100	100	98.2	90	100

**TABLE 5
REFUSE HIDEAWAY LANDFILL**

**OPERATING PARAMETERS SUMMARY
July 2004 - June 2005
Problematic System Components**

	Problematic air flow control valve	Problematic counter
GW1	Yes	
GW2	Yes	
GW3	Yes	
GW4 (1)		Yes
GW5 (1)		Yes
GW6		
GW7 (1)		Yes
GW8 (1)	Yes	Yes
GW9 (1)		Yes
GW10		
GW11 (1)	Yes	Yes
GW12 (1)		Yes
GW13 (1)		Yes
South Branch	Yes	
Central Branch	Yes	
North Branch	Yes	
Compressor Meter		Yes
CV1 and CV2	Yes	