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SCS FIELD SERVICES

March 18, 2003
File No. 07197026.00

Mr. Harlan Kuehling, P.G.
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711-5397

Subject: Final 2002 Annual Report of Operations for the Refuse Hideaway Landfill

Dear Hank:

Enclosed, please find our final annual report for Refuse Hideaway Landfill. I have incorporated your comments or corrections from the draft into this version.

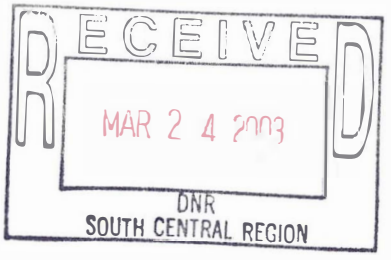
Thank you again for the opportunity to work with you on this site. If you have any questions, please contact me at (800) 339-3034.

Sincerely,

William O. Reed
Regional Manager
SCS FIELD SERVICES

cc: Frank Perugini - ESC

2002 ANNUAL OPERATION REPORT FOR THE LANDFILL GAS AND LEACHATE COLLECTION SYSTEMS AT THE REFUSE HIDEAWAY LANDFILL MIDDLETON, WISCONSIN



Prepared for:
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, Wisconsin 53711-5397

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CONTENTS

I. INTRODUCTION

SCS Field Services (SCS-FS) is the current operator of the landfill gas (LFG) and leachate collection systems at the Refuse Hideaway Landfill (Site), in Middleton, Wisconsin. This report is prepared to summarize the system operations during the calendar year 2002. This report will highlight the data collected during 2002, and will show trending data that will be used to formulate operational goals for the upcoming years.

II. SITE BACKGROUND

The Site was an active landfill between 1974 and 1988. The current LFG and leachate collection systems were installed in 1991. The LFG collection system was modified in 1994 with the installation of a shallow gas recovery system, and the leachate collection system was modified in 1996 with the installation of down-hole pneumatic pumps in eight of the vertical wells.

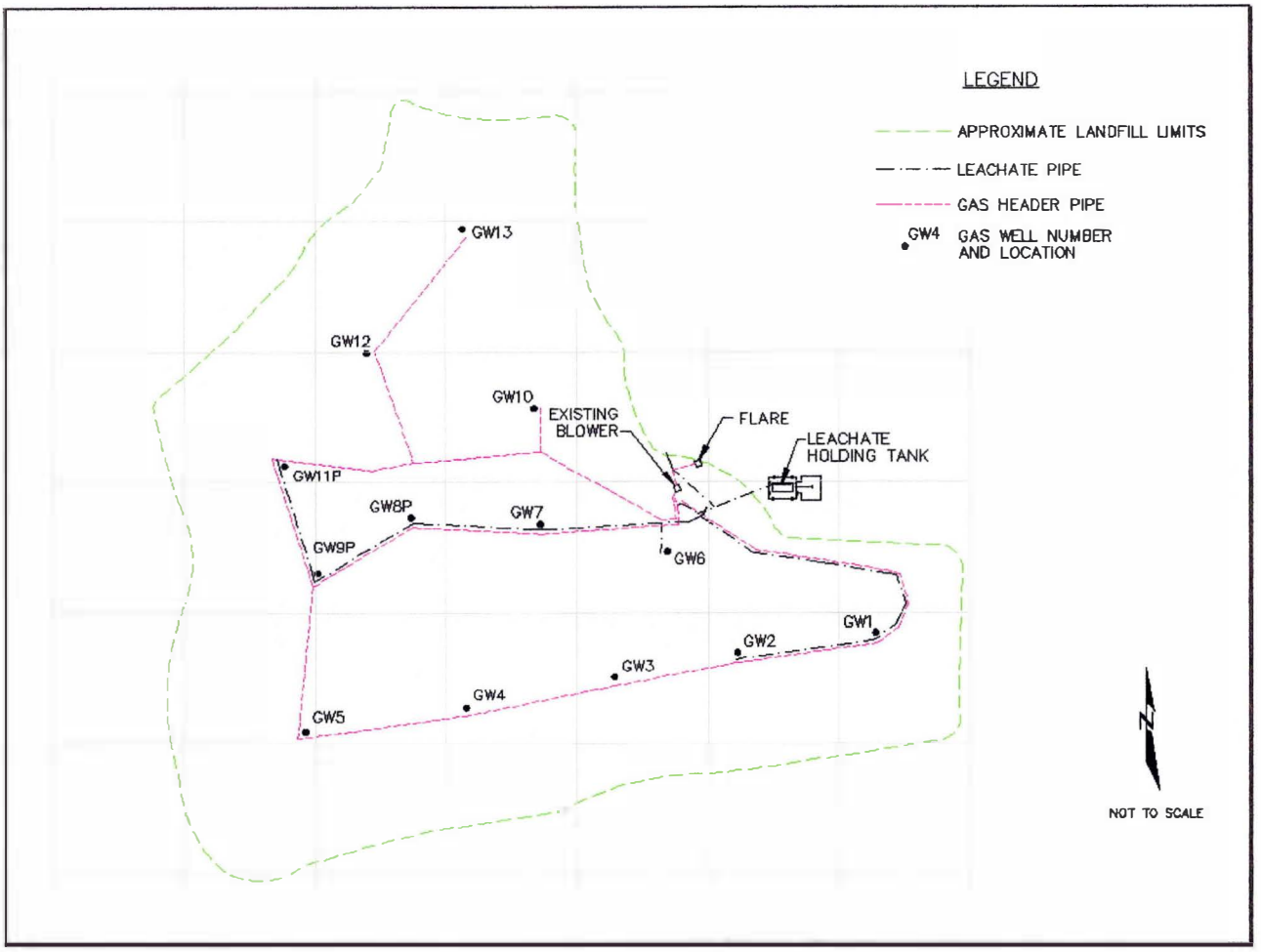
LFG and leachate is collected primarily to prevent and/or minimize off-site migration of contaminants. Given this, it is desirous to operate both collection systems continuously (greater than 90 percent runtime), and to maintain "moderate" LFG quality (methane greater than 40 percent, oxygen less than 1 percent, and balance gases less than 20 percent).

Currently, the LFG collection system consists of 13 vertical LFG collection wells (8 of which are dual LFG and leachate extraction wells), 4 condensate drip legs, and associated below-grade gas and pneumatic header piping. Figure 2-1 shows the approximate layout of the LFG collection system.

The LFG is collected using a 10-horsepower New York® blower, and combusted in a 650 cubic feet per minute (cfm) Linklater® enclosed flare. Proper operation of the LFG collection system is verified through testing of the extraction wells, with adjustments made to the LFG flows based on that testing.

The overall effectiveness of the LFG collection system is determined, in part, through the routine monitoring of 11 methane monitoring probes located on the perimeter of the site. Ambient air monitoring is also performed in the onsite buildings occupied by Speedway Sand and Gravel.

Figure 2-1. Site Layout



III. LFG SYSTEM OPERATIONS

A. Blower/Flare Station

The blower/flare station (BFS) was operational throughout 2002, and the overall system runtime was consistent with the values calculated for 2001 (91 percent for 2002, versus 89 percent for 2001). The improvement in run times is primarily associated with mechanical and instrumentation modifications made in September 2001. In fact, those months with less than 100 percent operational time were problems associated with items other than the working components of the BFS.

The monthly runtimes are shown below in figure 3-1. At this time, only routine maintenance issues need to be continued with the BFS; no large capital expenses are anticipated. We anticipate that continuing operations should remain in the 90-plus percent of the available time. Again, SCS-FS and Environmental Sampling Corporation (ESC) will continue to monitor the BFS runtime.

Figure 3-1
Refuse Hideaway 2002
Average Monthly Runtime

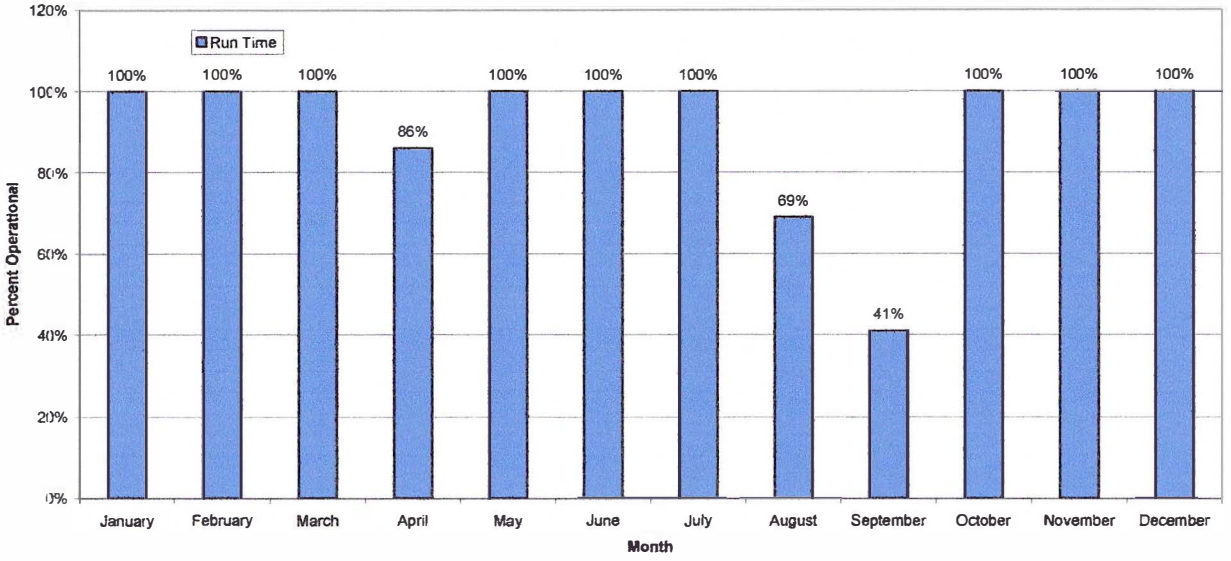
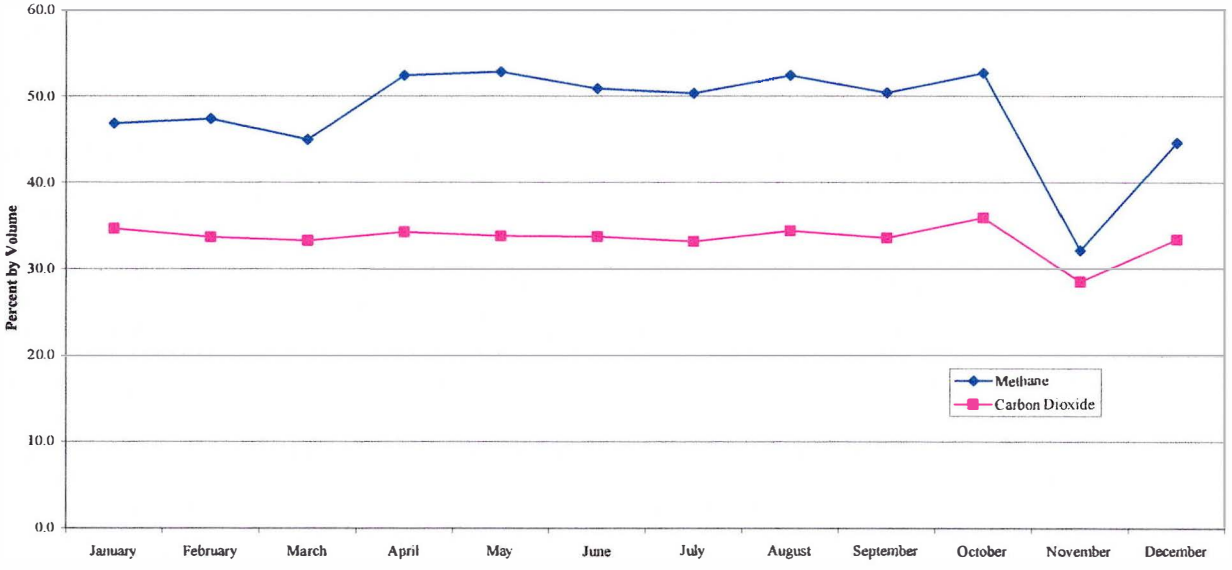


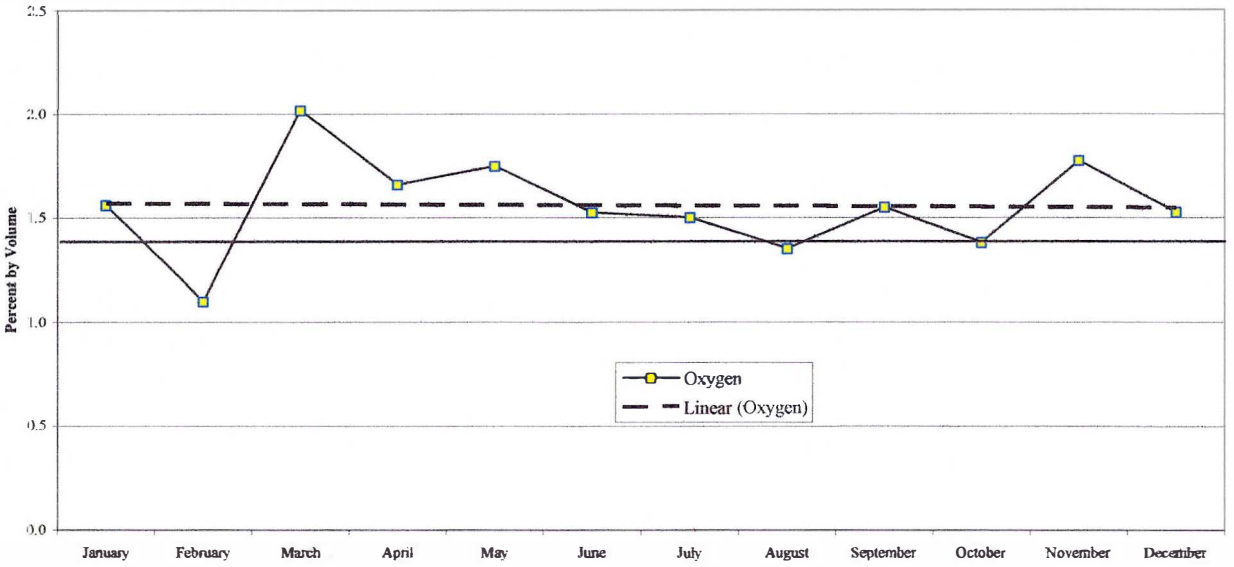
Figure 3-2
Refuse Hideaway 2002
Average Monthly LFG Quality



Throughout 2002, the average methane and carbon dioxide quality remained relatively consistent. Historically, an LFG control system such as the LFG system at the Site should operate with methane greater than 40 percent, by volume. The carbon dioxide should remain relatively constant, and stay greater than 30 percent. Operationally, we were able to meet those goals, excepting the month of November 2002. In November, the average methane quality dropped below 40 percent, and was relatively poor throughout much of the collection system. It is possible that the analyzer used to monitor the system was malfunctioning. Both the methane and carbon dioxide levels were returned to acceptable levels in December. A summary of the weekly BFS LFG quality readings is shown in Figure 3-2.

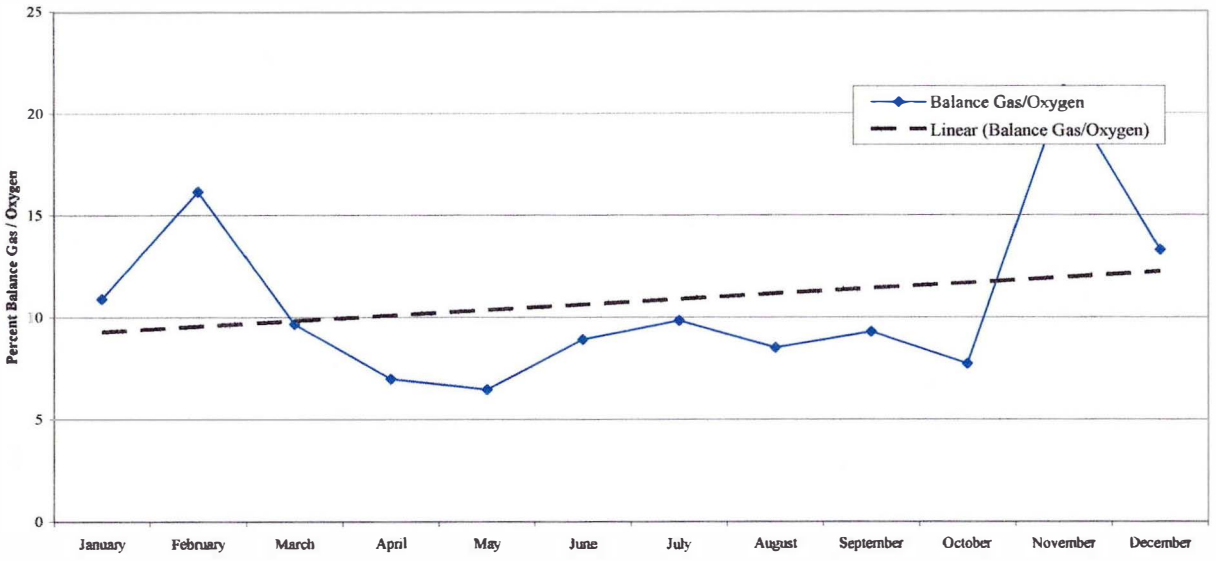
The oxygen level in the LFG is required to remain below 1 percent, by volume. As the overall LFG generation within the Site continues to decrease, this is becoming increasingly more difficult. As shown in Figure 3-3, the average monthly oxygen level at the BFS exceeded 1 percent during all twelve months of 2002. The good news is that a linear trendline indicates that oxygen may is remaining consistent. It appears that higher oxygen levels will continue to be a reality while the BFS is in consistent operation. This will continue to be monitored on a monthly basis.

Figure 3-3
Refuse Hideaway 2002
Average Monthly LFG Quality



A potentially more indicative parameter may be examining the balance gas to oxygen ratio. Balance gas as measured in LFG is primarily considered to be nitrogen, and is most often linked to air intrusion into the waste mass. In ambient air, the ratio of nitrogen to oxygen is approximately 4 to 1. When this ratio is plotted in LFG, higher balance gas to oxygen ratios may indicate excessive collection of the LFG, or potential leaks in the Site cap. Excessive

Figure 3-4
Refuse Hideaway 2002
Average Monthly LFG Quality



balance gas levels may indicate that air (oxygen and nitrogen) is being drawn into the waste mass, with the oxygen being utilized in an aerobic manner. The effect of this could ultimately reduce the amount of methane generated and collected, as oxygen halts the anaerobic process.

Throughout all of 2002, the ratio of balance gas to oxygen was higher than in ambient air. This is not uncommon in older, closed sites. While we had shown a relatively stabilized oxygen level at the BFS, the trending of the balance gas to oxygen ratio indicates that the balance gas was slightly increasing throughout 2002. This indicates that overpulling is ocurring, or more LFG is being collected than is being produced; at least in the vicinity of the extraction wells. Attention will need to be paid to this, as we continually attempt to maximize the amount of LFG collected from the Site.

B. LFG Collection Wellfield

The wellfield was maintained in good operational condition throughout 2002. No major problems were noted with the wells or the wellheads. A low spot between GW-4 and GW-5 previously repaired by SCS-FS in July 2000, re-established itself; however this has not completely blocked LFG collection from GW-5. No other operational issues related to the physical condition of the wellfield required attention in 2002.

Monthly wellfield readings were conducted throughout the year, with flow adjustments made to the wells, as needed. Graphical summaries of each well's monthly readings are shown below, in Figures 3-5 through 3-17.

Figure 3-5
GW-1 Gas Quality

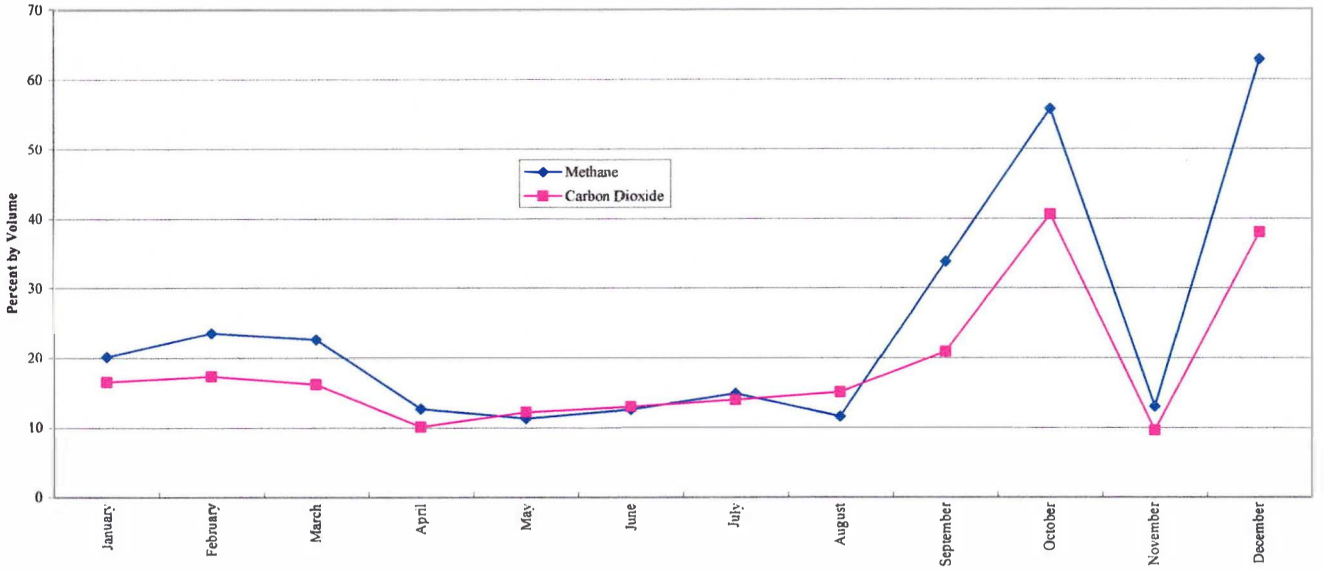


Figure 3-6
GW-2 Gas Quality

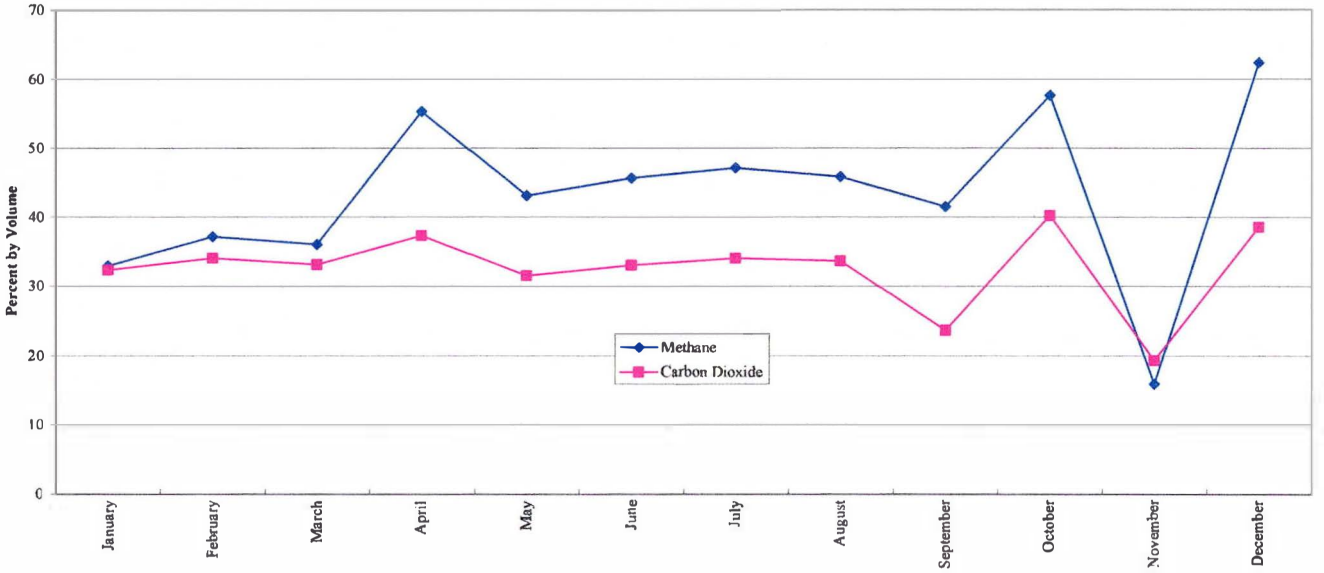


Figure 3-7
GW-3 Gas Quality

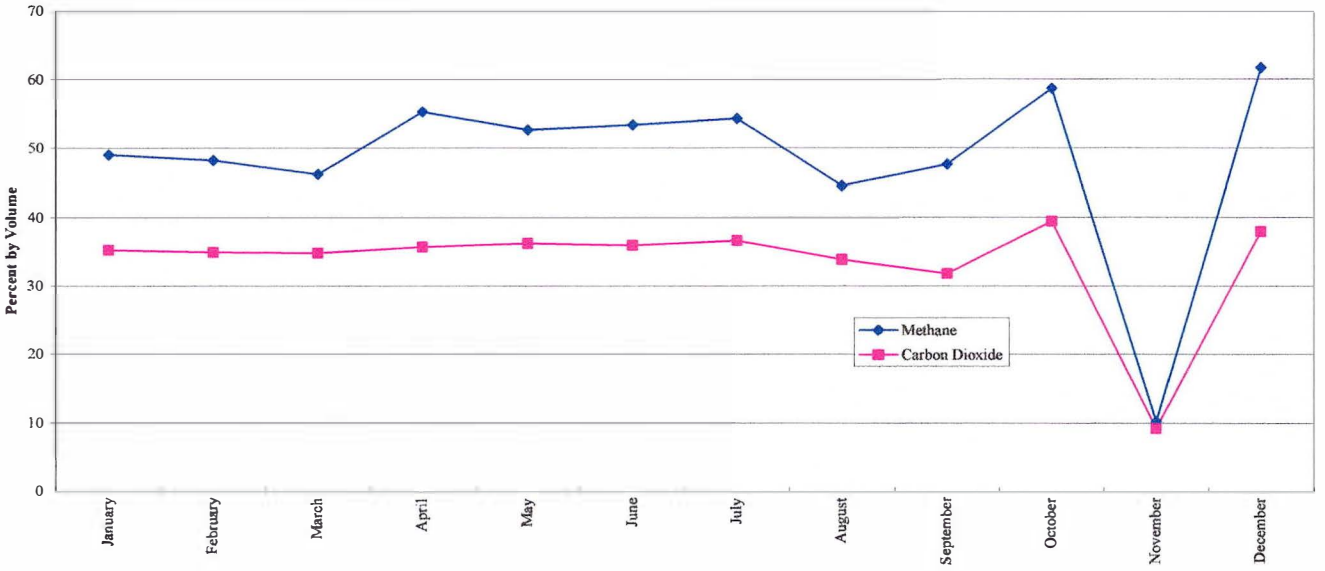


Figure 3-8
GW-4 Gas Quality

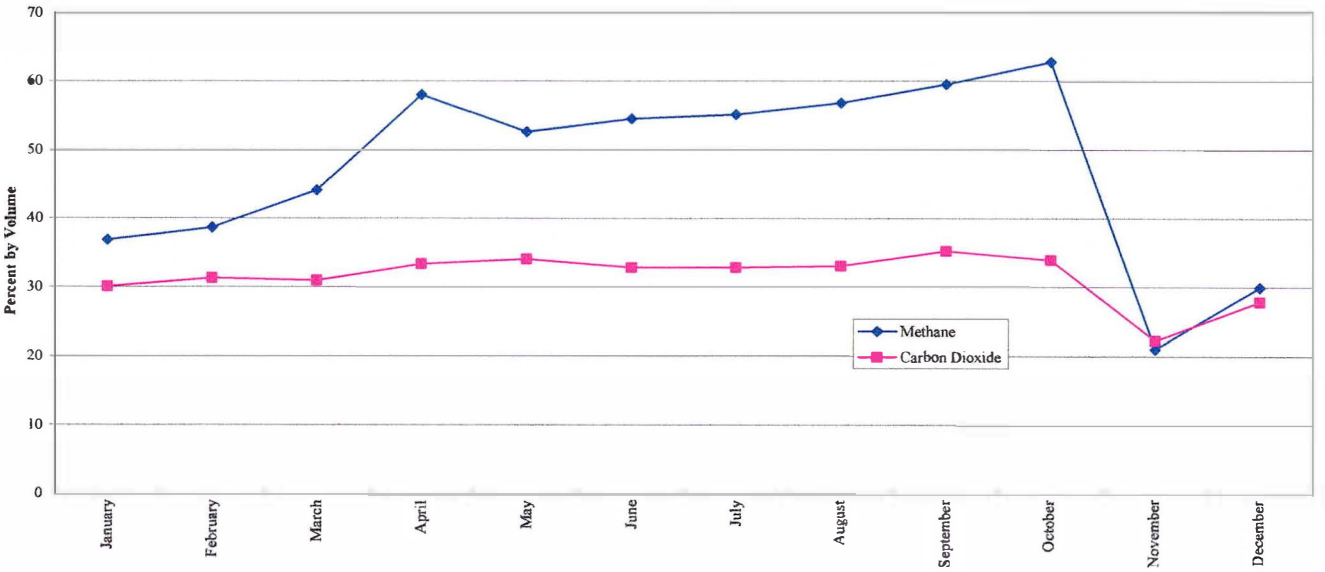


Figure 3-9
GW-5 Gas Quality

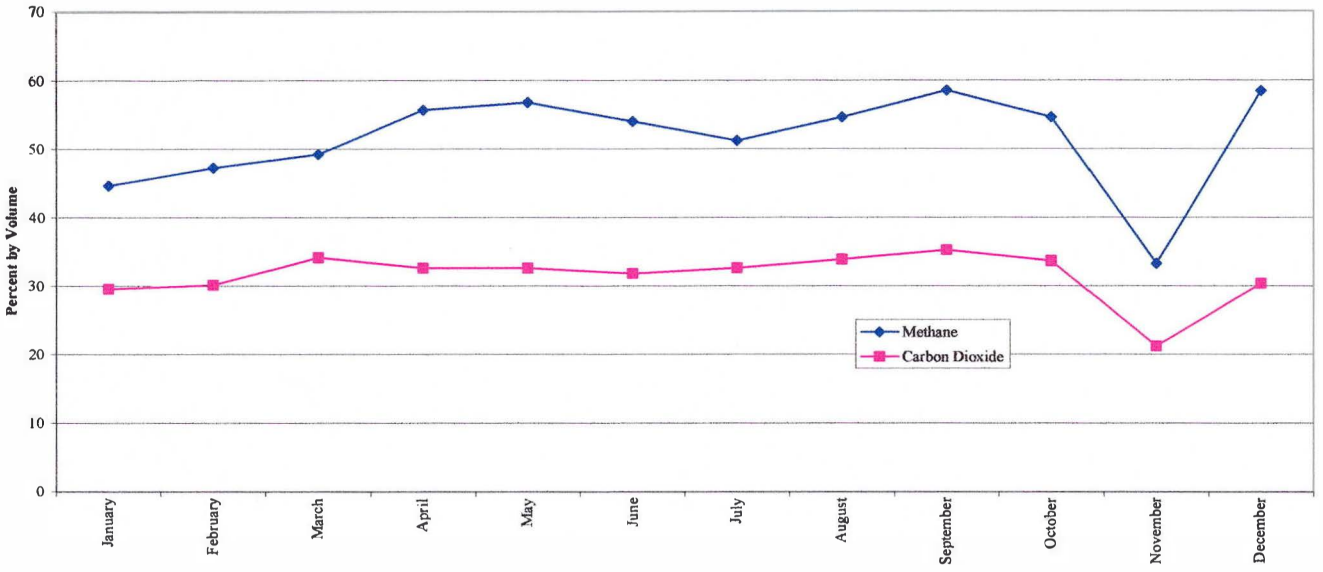


Figure 3-10
GW-6 Gas Quality

Figure 3-11
GW-7 Gas Quality

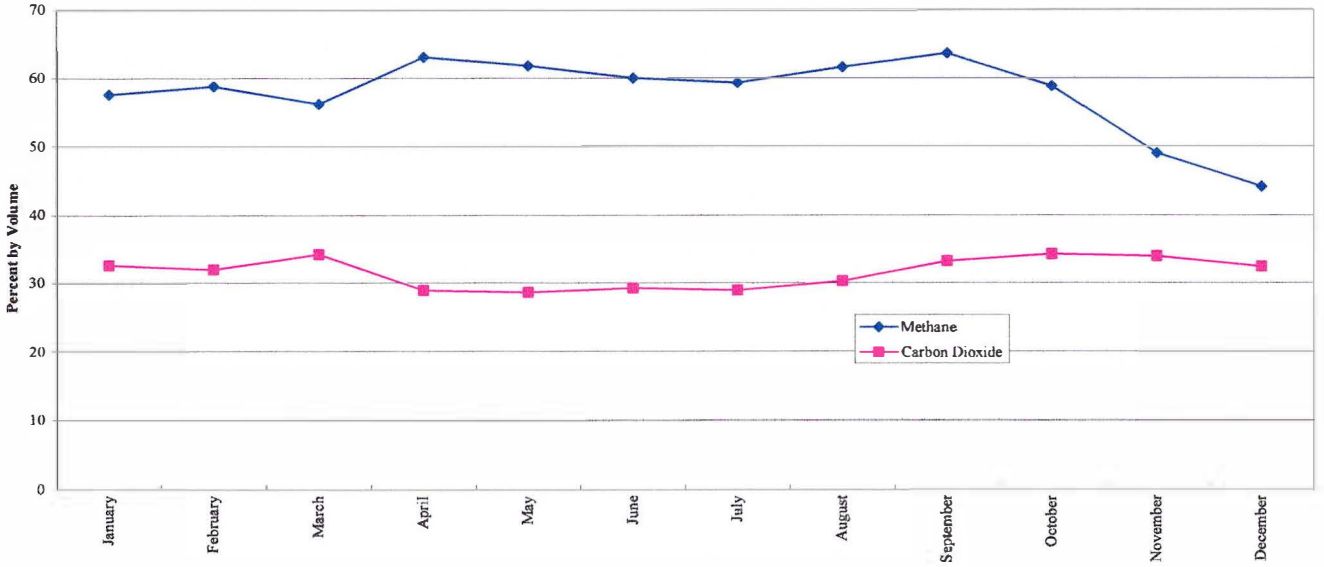


Figure 3-12
GW-8 Gas Quality

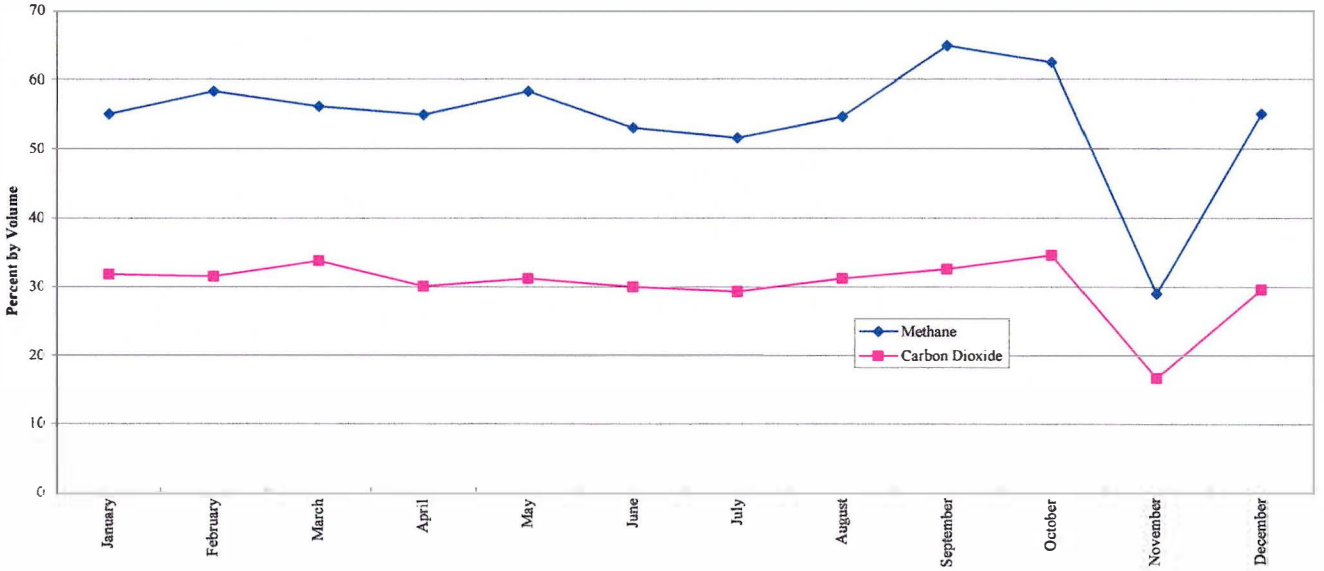


Figure 3-13
GW-9 Gas Quality

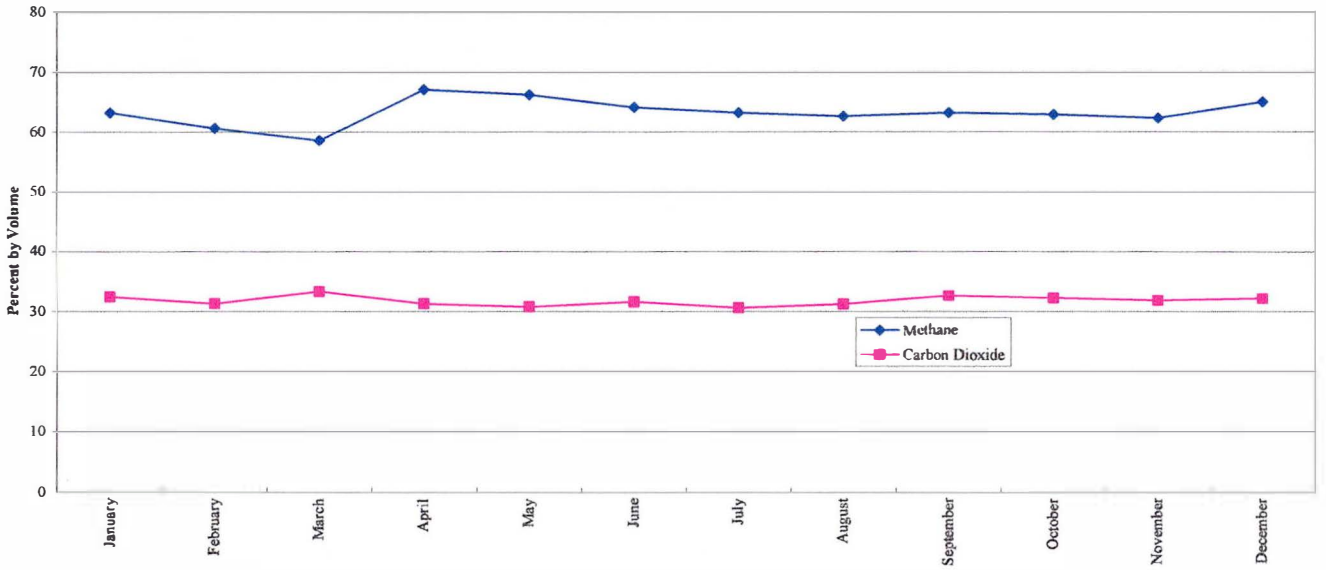


Figure 3-14
GW-10 Gas Quality

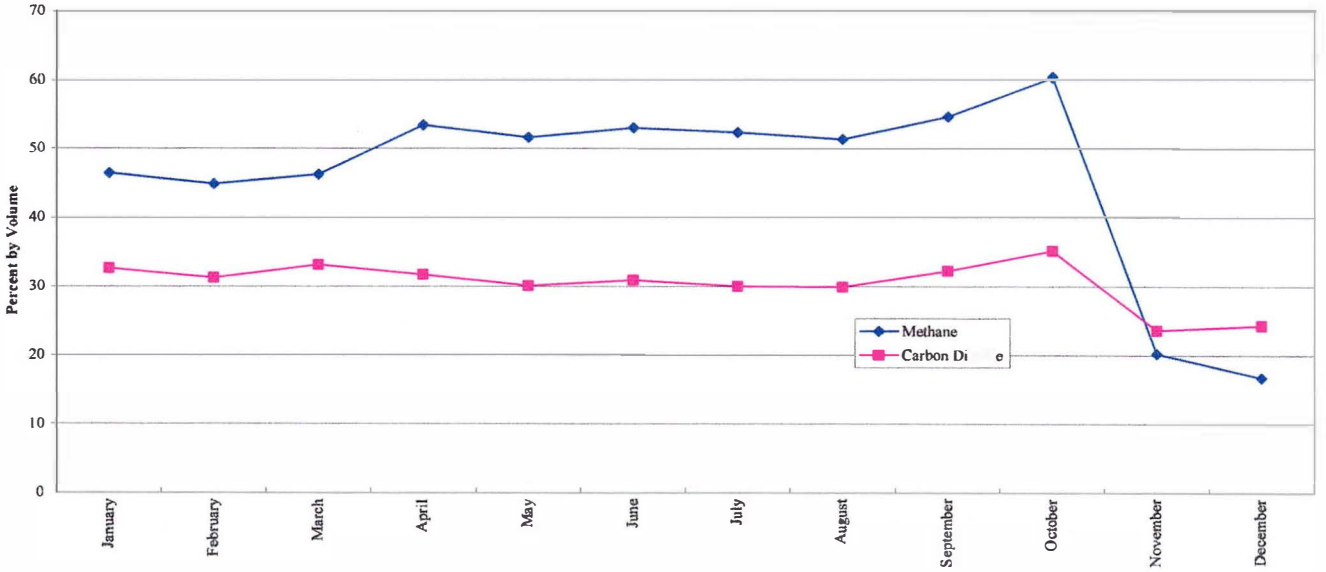


Figure 3-15
GW-11 Gas Quality

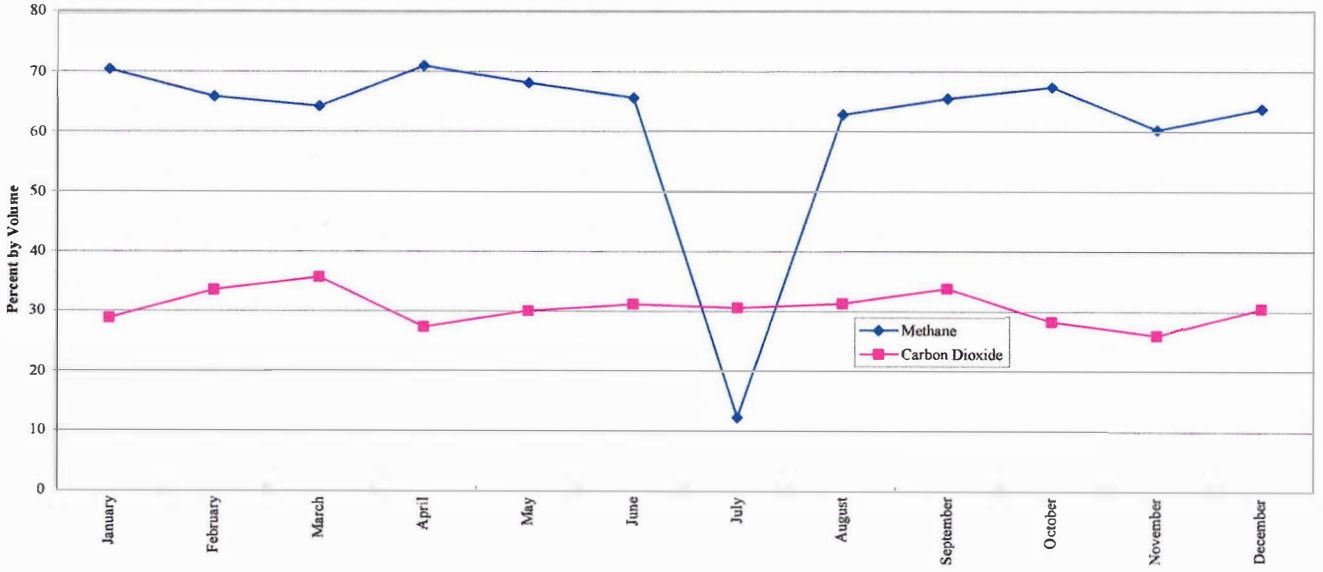


Figure 3-16
GW-12 Gas Quality

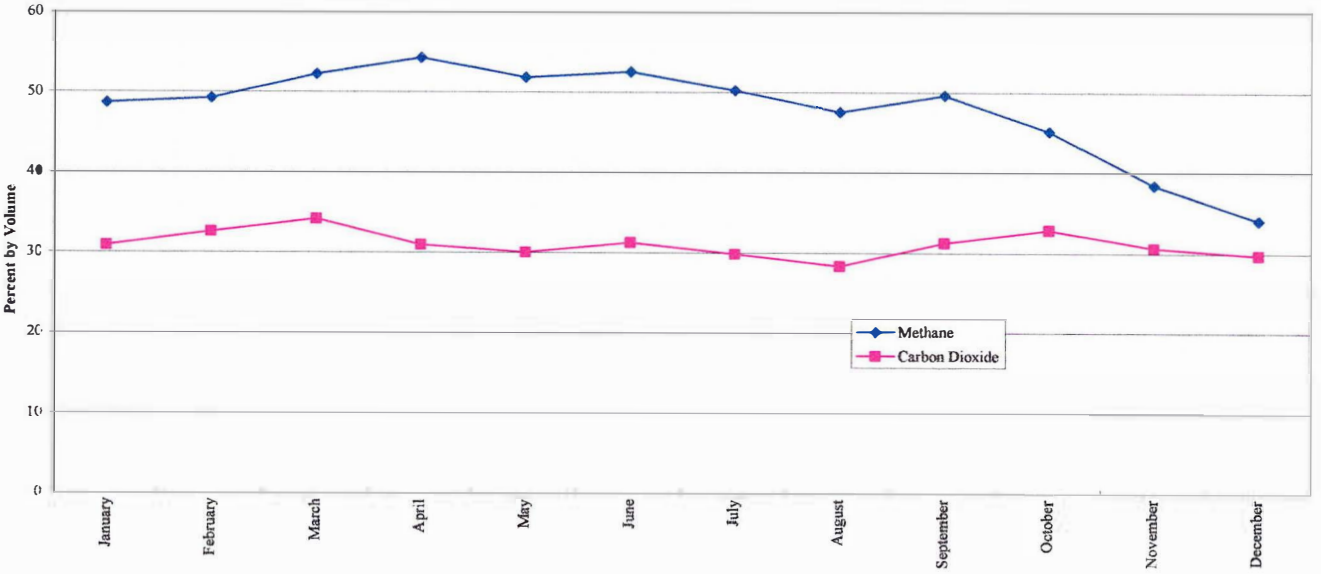
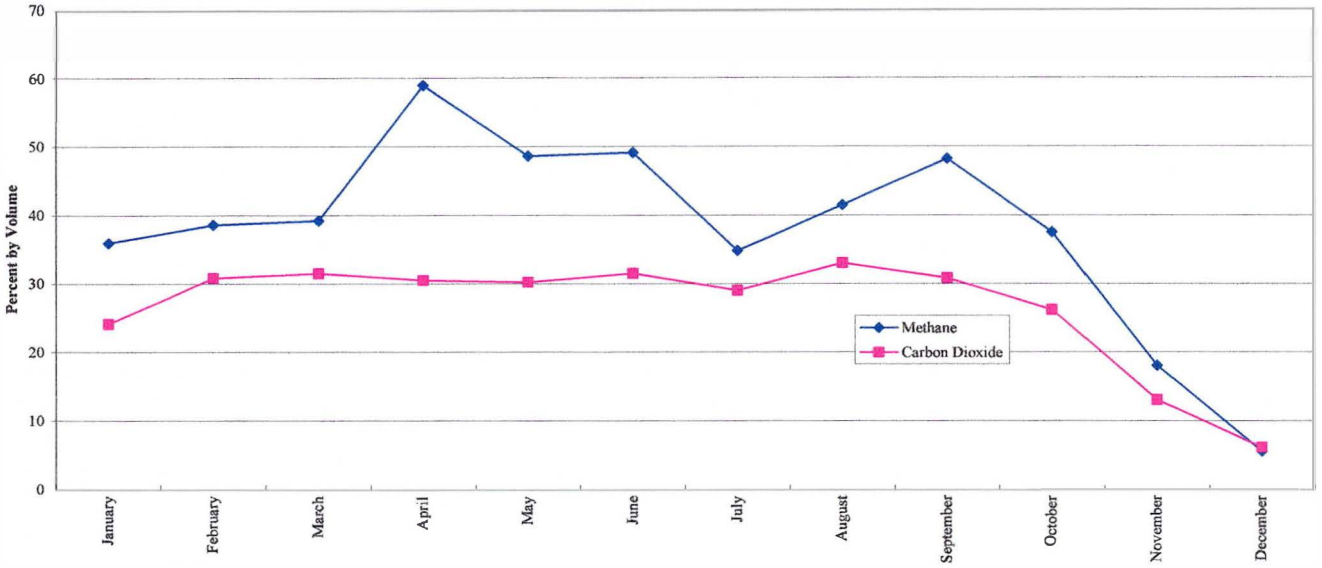


Figure 3-17
GW-13 Gas Quality



As the above figures indicate, the LFG quality remained relatively constant throughout the year, with only GW-13 (Figure 3-17) showing a consistent decrease in methane quality throughout the last quarter of the year. As with each well, adjustments are made on a monthly basis, and are based on LFG quality readings taken that month. Conditions in the field can, and do vary from month to month; and our figures only represent once per month LFG quality readings.

C. Methane Monitoring Probe Results

As stated earlier in this report, there are a total of 11 methane monitoring probes located surrounding the Site. Each of these probes is monitored on a monthly basis. Methane in excess of the lower explosive level (5 percent, or LEL) was detected in one of the probes during the monthly events performed in 2002. This well, GP-11D has had "seasonal" exceedances throughout the five years that SCS has been providing O&M services at the Site. The one exceedance, in October 2002, is the lowest number of exceedances for any year since SCS began working at the Site. The exceedance and the associated methane level is summarized below:

Probe	Date	Methane Level (%,v/v)
GP-11D	10/11/2002	7.3

Monthly methane monitoring is also performed within the Speedway Sand and Gravel buildings adjacent to the Site. No methane was detected in any of the buildings during 2002.

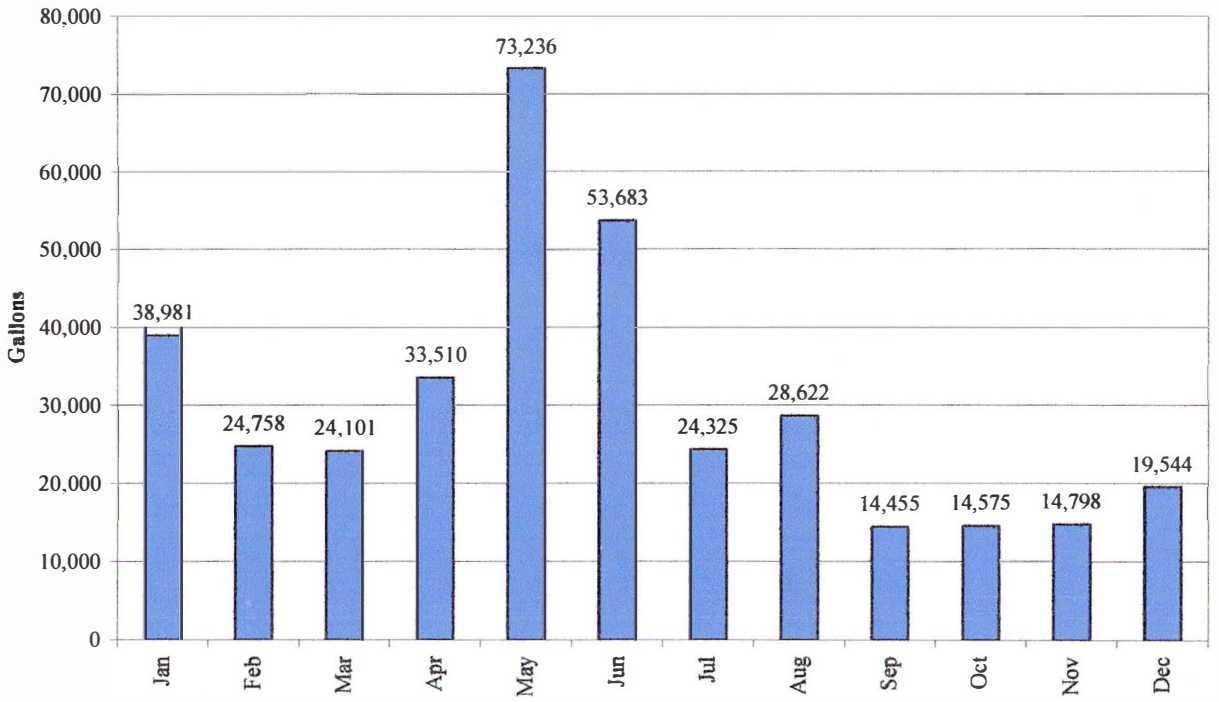
IV. LEACHATE COLLECTION SYSTEM

A. Summary of 2002 Operation

The leachate collected within the landfill is held in a 25,000-gallon below-grade storage tank. A-1 Sanitary Sewer Service (Madison, Wisconsin) pumps the tank on a regular basis, with the leachate being trucked to a Madison Metropolitan Sewerage District POTW (MMSD) for treatment and discharge.

In 2002, 75 loads of leachate totaling approximately 365,000 gallons were collected and transported to MMSD for treatment. Figure 4-1 shows the monthly volumes transported.

Figure 4-1
Leachate Volumes Hauled



The number of loads, and total gallonage removed from the Site in 2002 is approximately 25 percent less than in 2001. Part of this was due to operational problems associated with the air compressor which operates the pneumatic leachate well pumps. These problems continued until the compressor was rebuilt in November 2002.

B. Collection Wells

The leachate level in each collection well is measured once per month. Collection wells GW-4, GW-5, GW-7, GW-8, GW-9, GW-11, GW-12, and GW-13 have dedicated Solo pneumatic pumps in them. The wells with pumps also have "cycle counters" which are recorded on a monthly basis, and compared to the previous months reading to confirm pump operation. Each well's monthly leachate level, and pump activity (if applicable) are indicated below in Figures 4-2 through 4-14.

Figure 4-2
GW-1 Monthly Leachate Levels

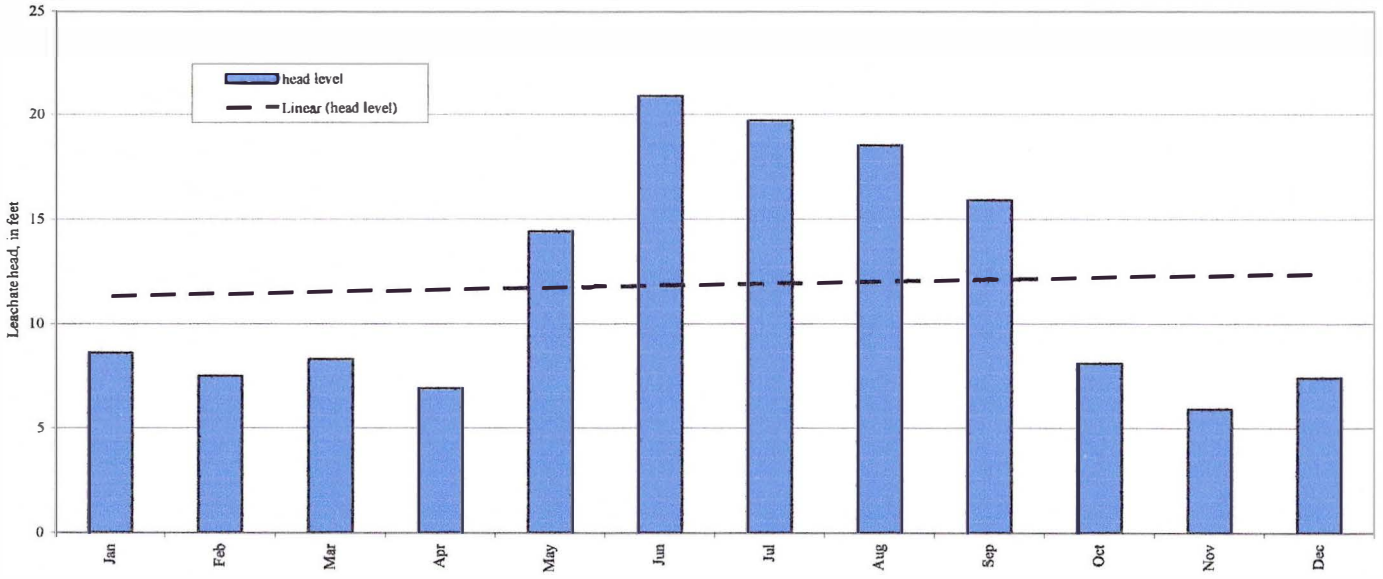


Figure 4-3
GW-2 Monthly Leachate Levels

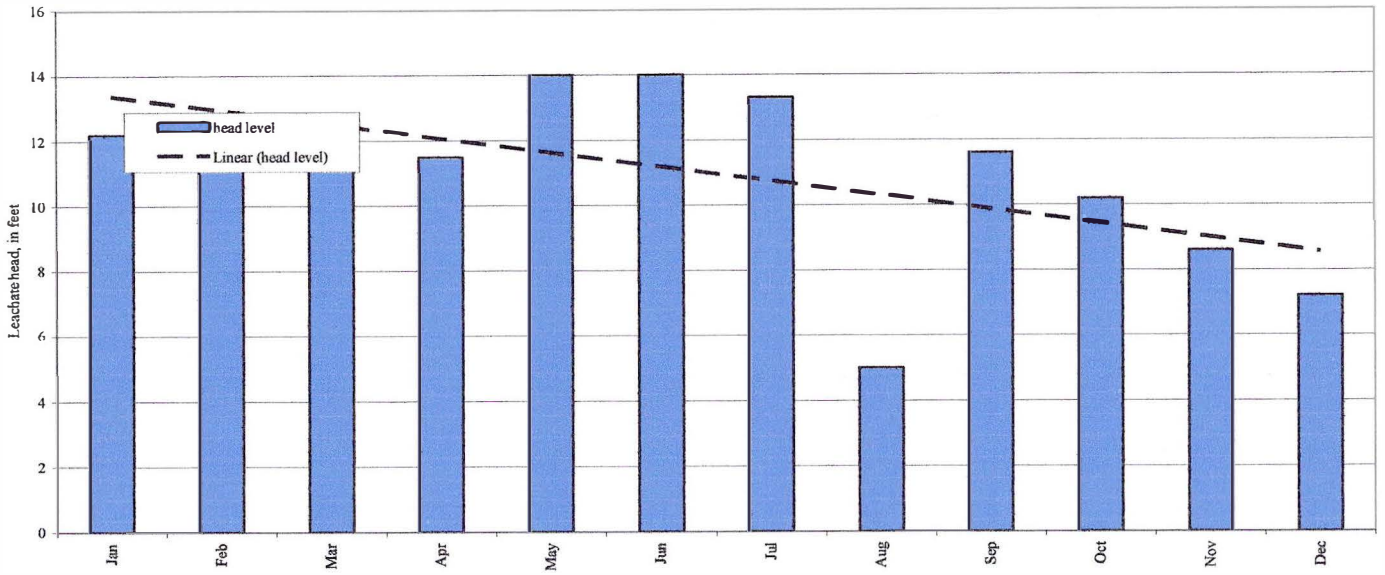


Figure 4-4
GW-3 Monthly Leachate Levels

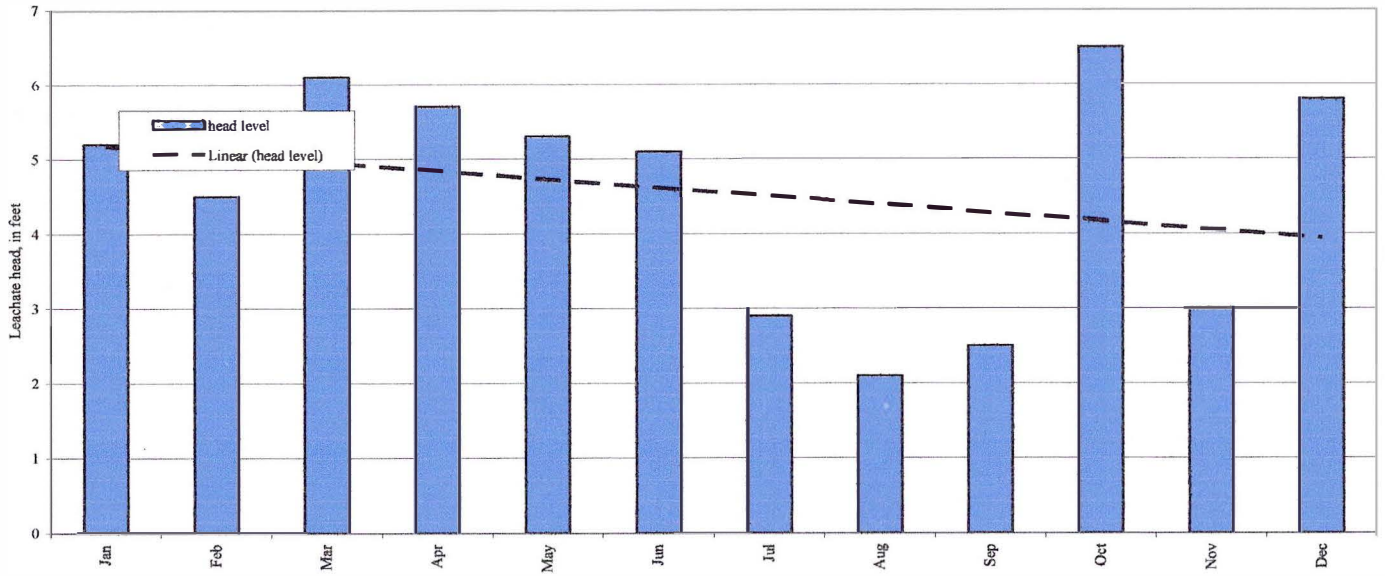


Figure 4-5
GW-4 Monthly Leachate Levels and Pumping

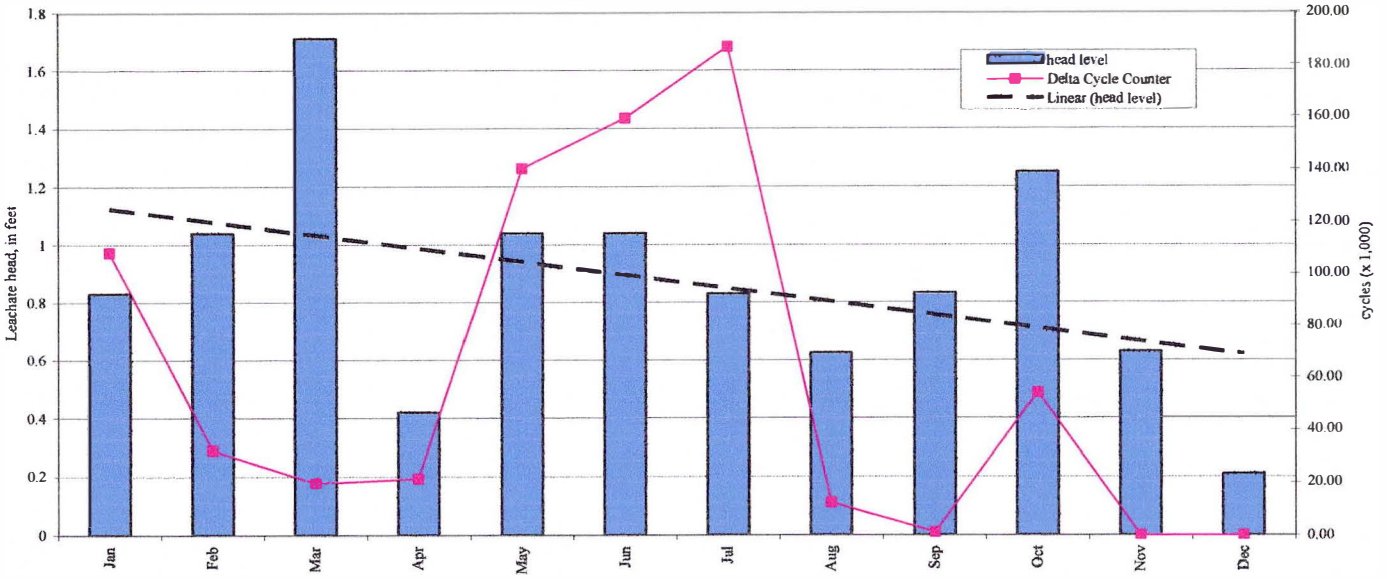


Figure 4-6
GW-5 Monthly Leachate Levels and Pumping

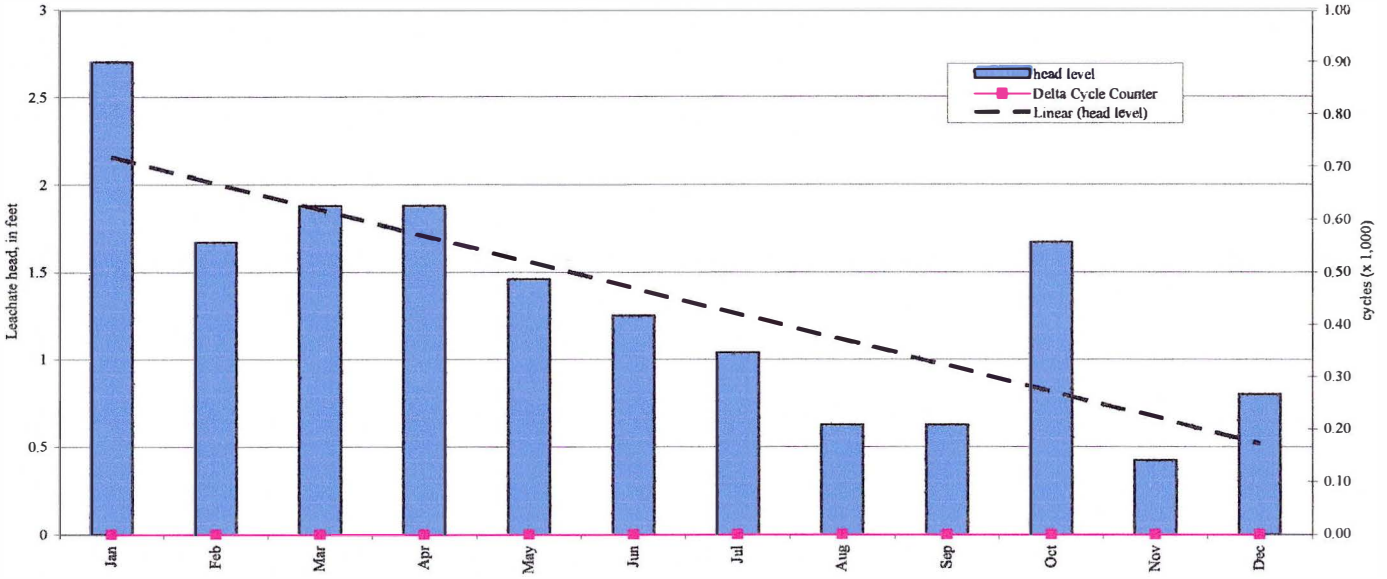


Figure 4-7
GW-6 Monthly Leachate Levels

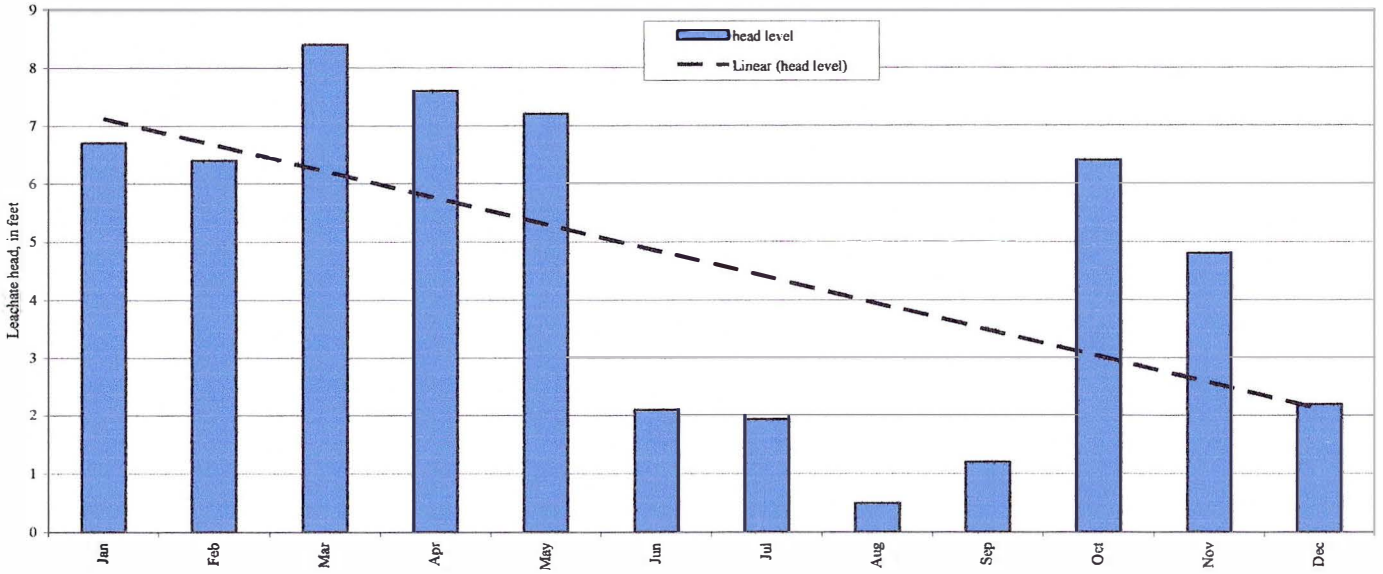


Figure 4-8
GW-7 Monthly Leachate Levels and Pumping

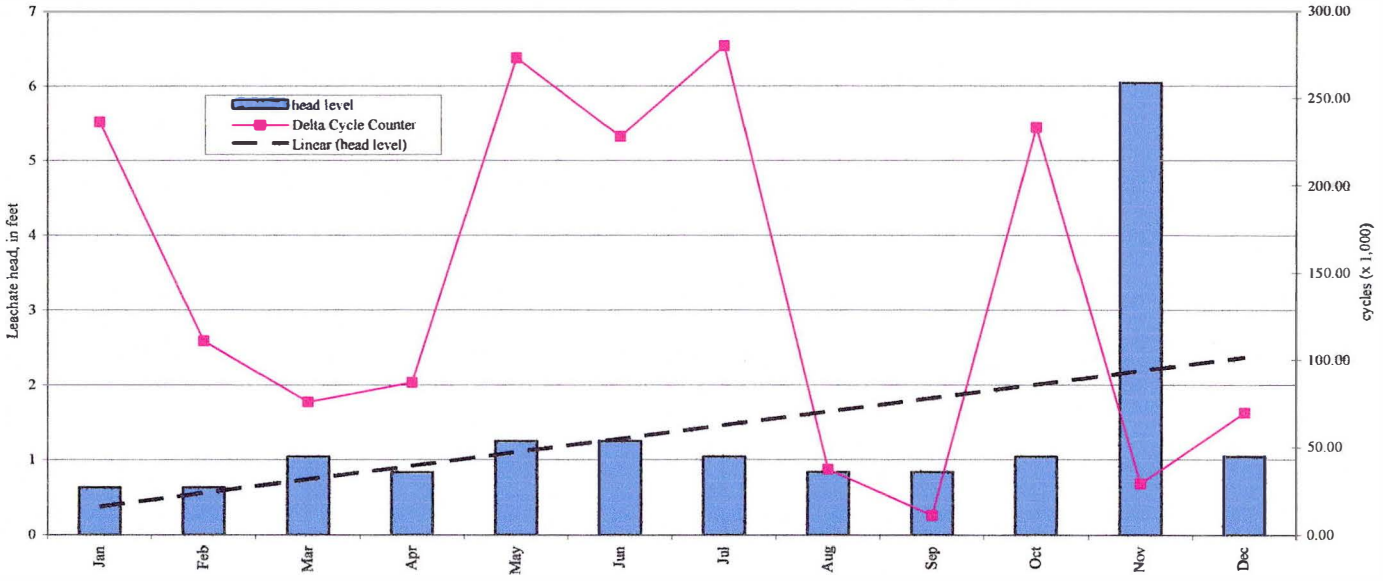


Figure 4-9
GW-8 Monthly Leachate Levels and Pumping

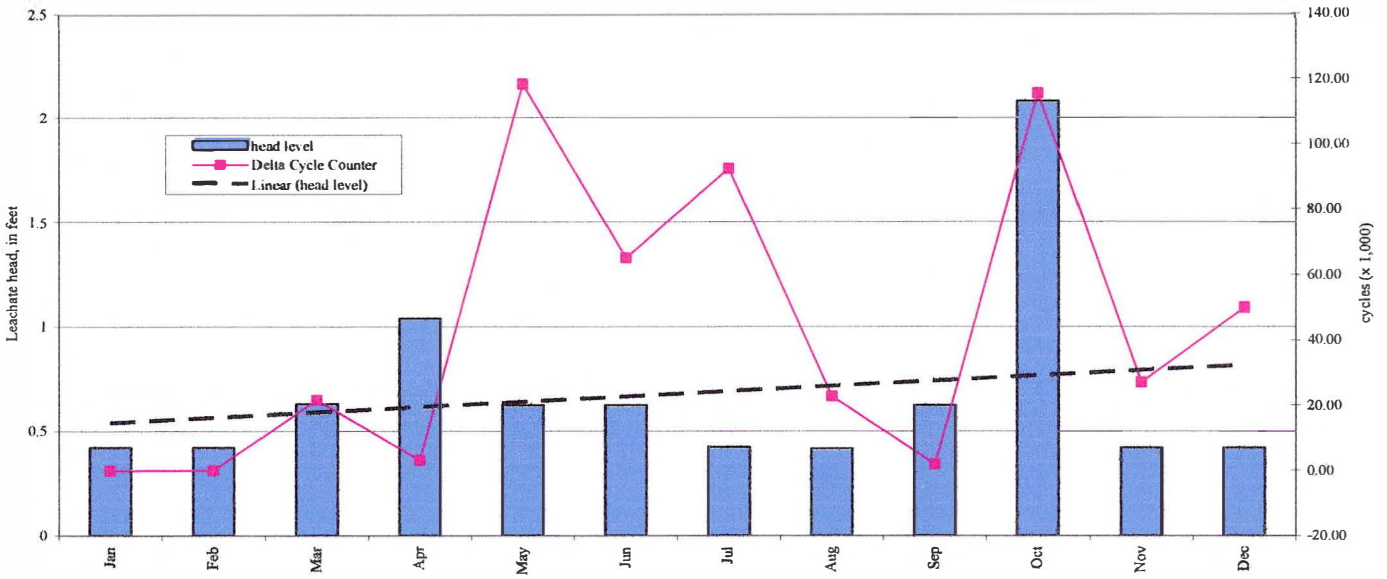


Figure 4-10
GW-9 Monthly Leachate Levels and Pumping

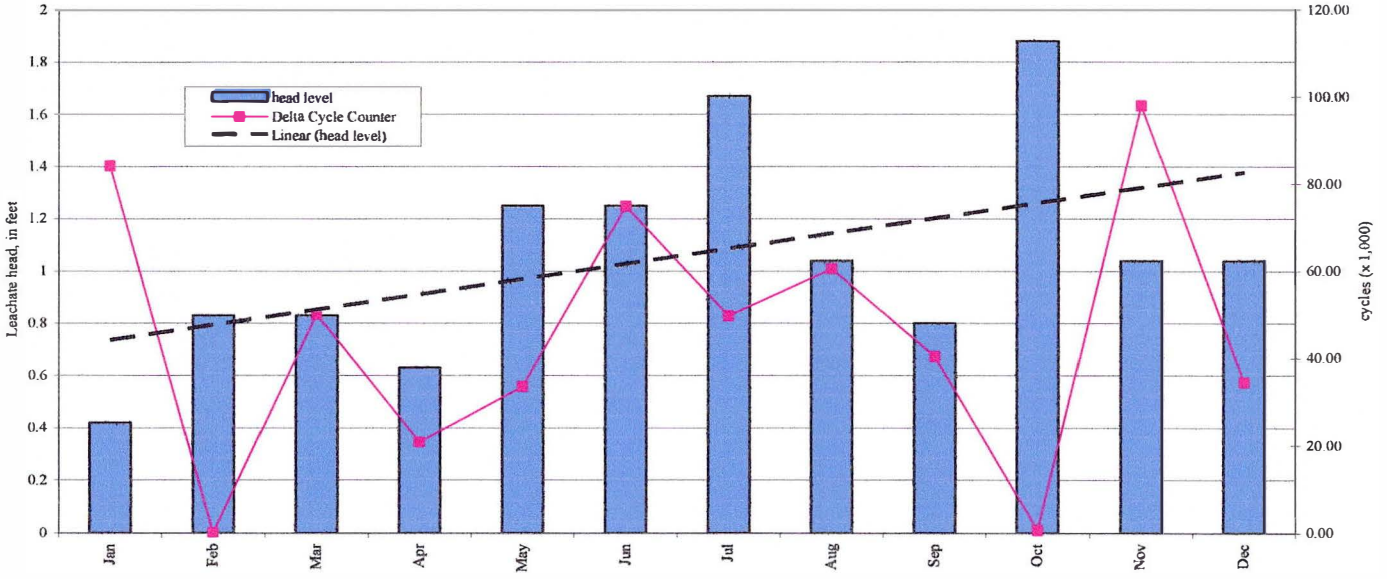


Figure 4-11
GW-10 Monthly Leachate Levels

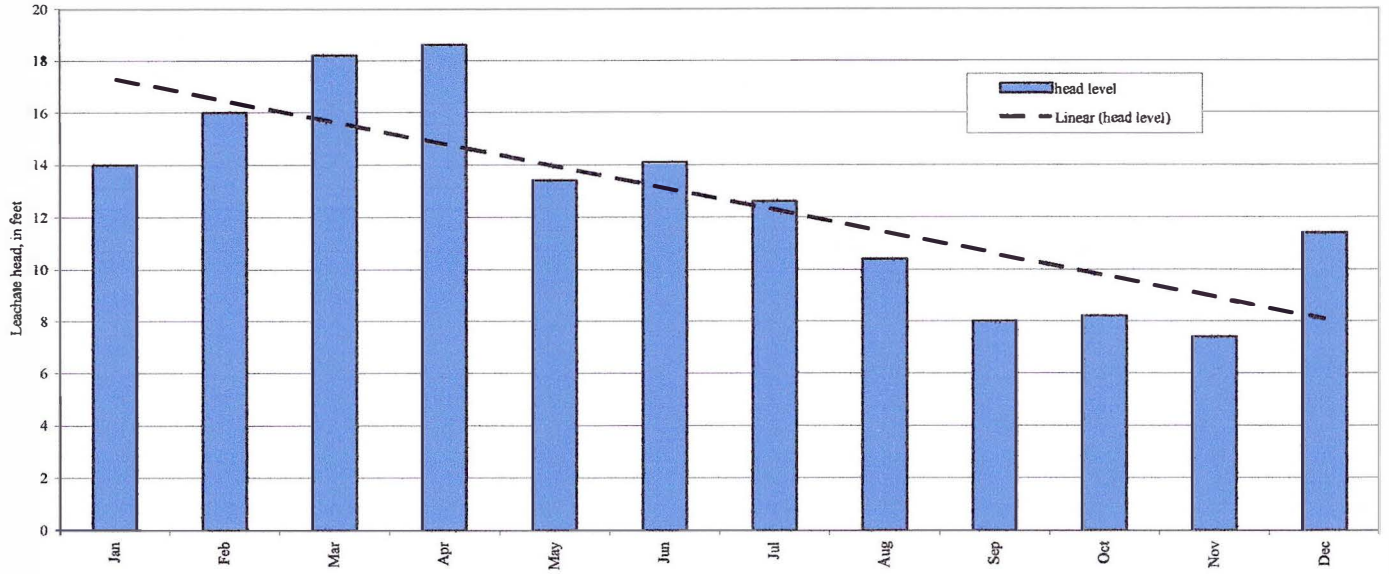


Figure 4-12
GW-11 Monthly Leachate Levels and Pumping

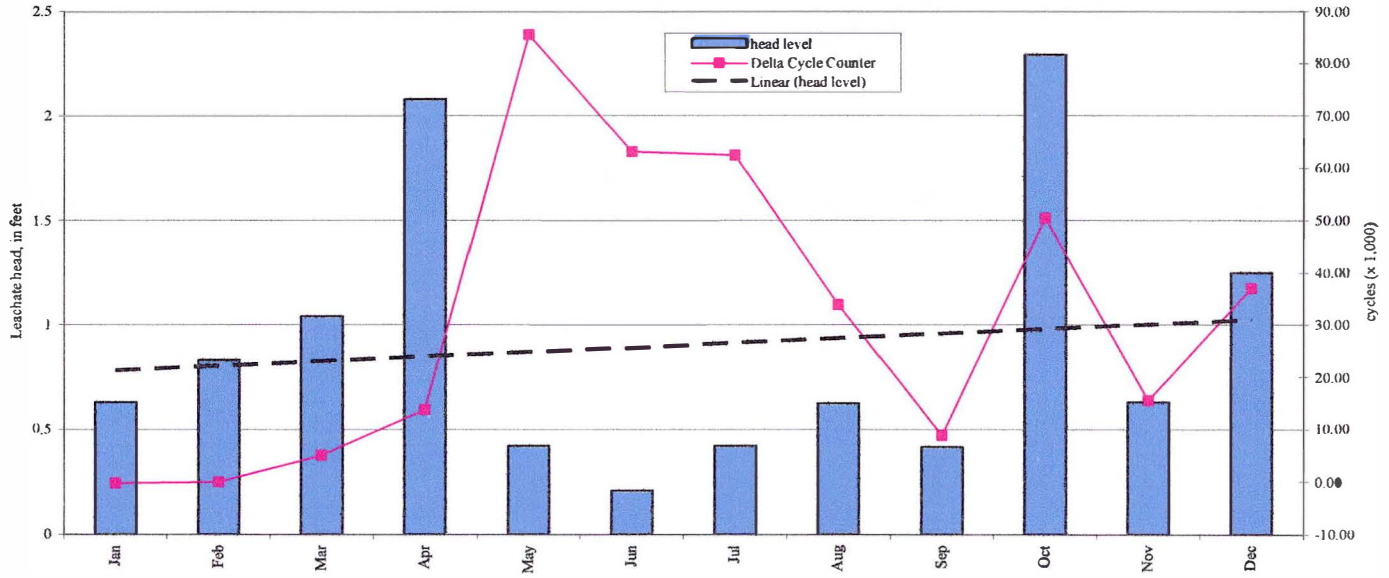


Figure 4-13
GW-12 Monthly Leachate Levels and Pumping

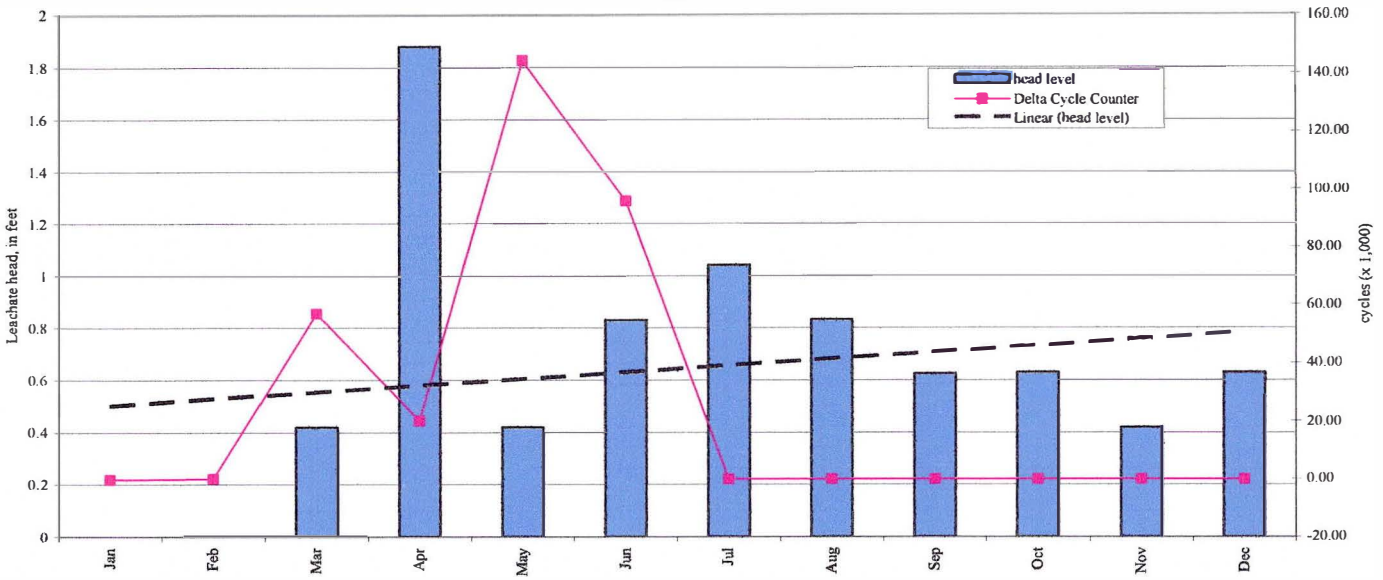
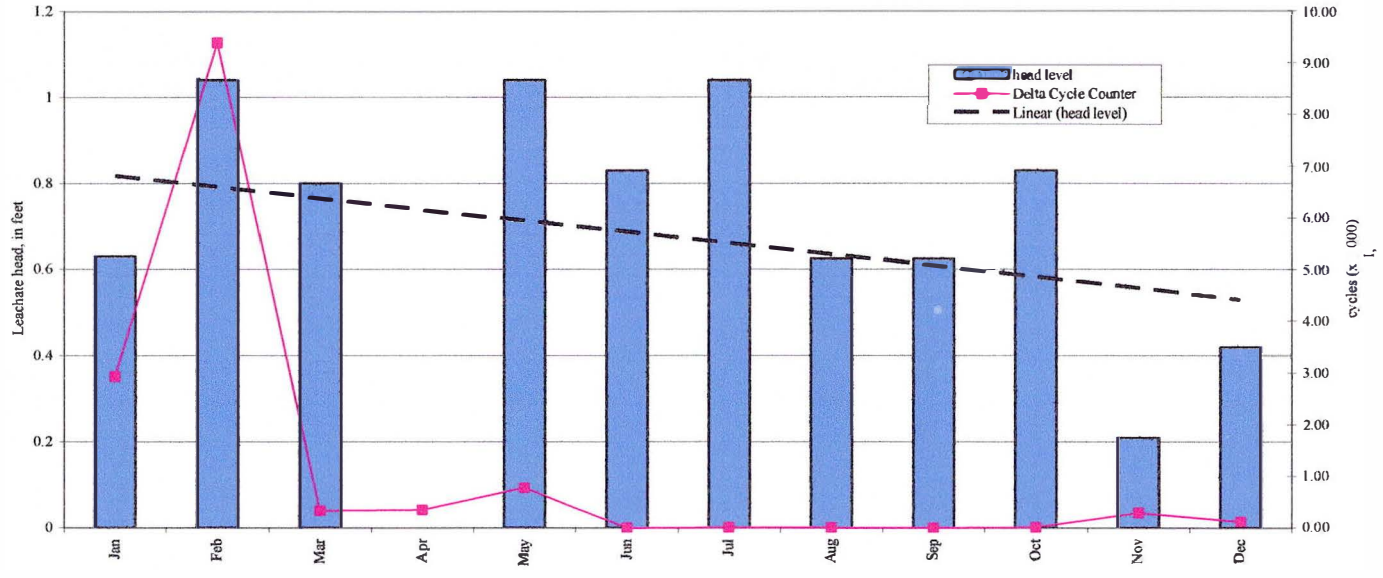


Figure 4-14
GW-13 Monthly Leachate Levels and Pumping



Based on our review of the monthly data, it does appear that leachate levels are being maintained in all of the extraction wells. This includes wells without pumps in them. That

being said, the leachate level is generally continuously higher in those wells without permanent pumps installed in them.

Trending data indicates increasing levels in wells GW-7, GW-8, GW-9, GW-11, and GW-12; all wells with pumps installed. The leachate levels within these wells are relatively low (generally less than 1 foot), and therefore this is not considered an operational concern at this time. Monthly level monitoring will be continued.

V. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

The LFG and leachate collection systems at the Refuse Hideaway Landfill were operated continuously throughout calendar year 2002. Aside from routine services performed throughout the year, the major non-routine service performed at the site included the following:

- A rebuild of the air compressor was performed in October/November 2002. This rebuild was necessitated following a complete failure of the air compressor.

The leachate collection system had no major operational concerns throughout 2002. Previous annual reports prepared by SCS-FS had discussed the need for pneumatic pumps in some of the wells that did not contain them; however this is not necessarily borne out by data collected throughout 2002.

B. Recommendations for 2003

Given the age of the landfill and collection systems, continuing routine monitoring and maintenance will likely highlight additional non-routine repair items; these cannot be accurately predicted, and will need to be dealt with on a case-by-case basis.

SCS-FS recommends that the routine operation and maintenance schedule be continued throughout 2003. Even though the BFS was modified in 2001 to allow running on a timer, that does not yet appear to be necessary at this time. Consistent combustion, and more importantly, little subsurface gas migration was noted throughout 2002.

The Department may wish to consider reducing the frequency of site visits from weekly to bi-monthly (2 times per month). This is suggested considering not only budgetary concerns, but also because the Site is currently operating with minimal adjustments. This does not necessarily need to be determined for this year, but is suggested for future contract cycles.