



September 11, 2012

Ms. Saara Ali  
Bureau of Landfill and Recycling Management  
**NJDEP – DIVISION OF SOLID AND HAZARDOUS WASTE**  
401 East State Street, P.O. Box 414  
Trenton, New Jersey 08625-0414

Re: Quarterly Landfill Gas Survey –3<sup>rd</sup> Quarter 2012  
**Legler Landfill, Facility No. 1511A**  
Jackson Township, Ocean County, New Jersey  
*FPA No. 08E004A*

Dear Ms. Ali:

## **INTRODUCTION**

This report presents the testing procedures and analytical results of the Quarterly Landfill Gas (LFG) survey conducted by French & Parrello Associates, P.A. (FPA) on September 5, 2012, at Legler Landfill and surrounding properties, Jackson Township, Ocean County, New Jersey. The subject landfill is identified as New Jersey Department of Environmental Protection (NJDEP) Facility No. 1511A.

## **BACKGROUND**

As part of the Closure and Post-Closure Plan Approval dated February 21, 1996, and Corrective Action Plan dated March 2002, methane gas surveys are to be conducted around the landfill perimeter to monitor potential lateral, offsite gas migration. Since 2000, methane gas concentrations have increased in the western portion and southwestern corner of the landfill. As a result, the NJDEP directed Jackson Township to perform quarterly offsite gas surveys to monitor methane gas migration.

Pursuant to the NJDEP letter received April 1, 2009, monitoring is required to be conducted during days of falling barometric pressure in order to accurately monitor gas migration. Barometric pressure data was gathered from the Rutgers Weather and Climate Network station located in Cream Ridge, NJ, approximately 13.5 miles from the Subject Property. Additionally, pursuant to the NJDEP letter dated June 23, 2010, the delineation protocol has been modified. Gas sampling points between each well are no longer required; however, whenever methane gas is detected within one of the onsite gas monitoring wells, three additional sampling points are required.

One point is required 25 feet on either side of the well and the third point is required 25 feet behind (offsite) of the well. In the event methane gas is detected in one of the delineation samples, the same delineation protocol is to be used until methane gas is no longer detected. Delineation samples were collected on the boundary of Block 37, Lot 1, and Block 38, Lot 16.02, and expanded outward from the onsite sampling points.

## **LANDFILL GAS TESTING PROCEDURES**

Gas sampling was performed at 57 gas sampling locations: 23 gas monitoring wells, 32 temporary gas sampling points (GSPs) and two flares. The wells were sampled immediately after removing the locked, metal protective caps by inserting dedicated three-foot, 3/16-inch, white polyethylene tubing through pre-drilled holes in the plastic well caps. The tubing was attached to the LANDTEC GEM-2000 Gas Extraction Monitor (GEM-2000) which instantaneously analyzed the LFG. GSP samples were collected utilizing an AMS Soil Sampling Kit. A slam bar and soil gas probe were utilized to penetrate the soil to an approximate depth of two and one-half feet. Dedicated 3/16-inch inside diameter, polyethylene tubing was pre-fed through the probe, and the GEM-2000 was utilized to instantaneously analyze LFG. GSPs are located primarily along the property boundary 25 feet on each side of the wells containing detectable concentrations of methane gas. On February 4, 2008, four-inch PVC ball valves equipped with fabricated conversion nipples, were installed on the Flares. These valves ensure a sealed connection to the LANDTECH GEM-2000 while sampling.

Offsite gas sampling was conducted on Block 38, Lots 16.02 and 18, as well as Block 37, Lot 1. Samples were collected in 25-foot intervals behind the onsite locations where methane LELs were detected above 0%. Offsite sampling included 12 GSP locations. Each gas sample was analyzed for percent methane, percent oxygen, percent carbon dioxide and methane LEL. Sampling locations are displayed on Drawing No. 1.

## **GAS TESTING RESULTS**

### **Onsite Gas Testing Results**

Methane gas was detected in 16 locations onsite, 12 of which were in excess of the 25 percent LEL: GSP #8a, Well #12, Well #13, Well #15, Well #17, Well #18, GSP #18a, Well #19, GSP #19b, GSP #19bb, Flare One (F-1), and Flare Two (F-2). (Survey results are presented in Table No. 1). A comparison of the most recent monitoring results with the historical results shows no indication of additional methane migration. Changes in onsite methane gas concentrations, since September 2006, are presented in Table No. 2 and graphically on Figure No. 1. Changes in onsite LEL, since September 2006, are presented in Table No. 3, and graphically on Figure No. 2.



## OFFSITE GAS MONITORING RESULTS

During the September 5, 2012 landfill gas monitoring event, methane gas was not detected at offsite locations. Field analysis results of the offsite gas survey are presented in Table No. 4. A comparison of the most recent monitoring results with the historical results indicates an overall decreasing trend of LELs. Changes in offsite methane gas concentrations, since April 2009, are presented in Table No. 5, and graphically on Figure No. 3. Changes in offsite LEL, since April 2009, are presented in Table No. 6 and graphically on Figure No. 4.

## CONCLUSIONS AND RECOMMENDATIONS

Pursuant to the NJDEP letter received April 1, 2009, FPA conducted the first quarter gas monitoring event on a day with falling barometric pressure. Barometric pressure data is presented in Table No. 7. The most current quarterly gas survey indicates a decreasing trend in LELs when compared to historic surveys. LELs were not detected above the acceptable regulatory percentage in offsite sampling locations during the September 5, 2012 monitoring event.

Should you have any questions or comments, please do not hesitate to contact us.

Very truly yours,

**FRENCH & PARRELLO ASSOCIATES, P.A.**

Bryan Heller  
Environmental Scientist

cc: Dan Burke – *Jackson Township Engineer*

**DRAWINGS**

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## ***TABLES***

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**TABLE 1**  
**SEPTEMBER 5, 2012 - ONSITE GAS SURVEY RESULTS**  
 LEGLER LANDFILL (FACILITY No. 1511A)  
 JACKSON TOWNSHIP, OCEAN COUNTY, NEW JERSEY

Well No./ Gas Sampling Point	Percent Methane	Percent Lower Explosive Limit	Percent Carbon Dioxide	Percent Oxygen	Comments
Well # 1	0.0%	0.0%	0.7%	18.7%	
Well # 2	0.0%	0.0%	3.8%	15.4%	
Well # 3	0.0%	0.0%	5.8%	13.8%	
Well # 4	0.0%	0.0%	4.1%	15.4%	
Well # 5	0.0%	0.0%	4.0%	14.1%	
Well # 6	0.0%	0.0%	2.0%	15.7%	
Well # 7	0.0%	0.0%	4.9%	11.2%	
Well # 8	0.7%	14.0%	1.7%	17.5%	
GSP #8a	3.8%	<b>76.0%</b>	15.6%	0.9%	
GSP #8aa	0.0%	0.0%	0.6%	18.6%	
GSP #8ab	0.0%	0.0%	3.7%	16.5%	
Well # 9	0.0%	0.0%	12.0%	3.3%	
Well # 10	0.8%	16.0%	14.5%	3.2%	
Well # 10a	0.0%	0.0%	2.5%	17.9%	
Well # 10b	0.0%	0.0%	1.5%	18.7%	
Well # 11	0.0%	0.0%	5.8%	14.8%	
Well # 12	3.2%	<b>64.0%</b>	16.8%	11.0%	
GSP # 12a	0.0%	0.0%	3.2%	16.8%	
GSP # 12b	0.0%	0.0%	1.8%	18.1%	
Well # 13	3.9%	<b>78.0%</b>	22.8%	0.1%	
GSP # 13a	0.0%	0.0%	4.4%	14.8%	
GSP # 13b	0.0%	0.0%	11.3%	7.3%	
Well # 14	0.3%	6.0%	14.3%	6.2%	
GSP # 14a	0.0%	0.0%	11.5%	18.7%	
GSP # 14b	0.0%	0.0%	2.6%	17.4%	
Well # 15	11.7%	<b>234.0%</b>	21.0%	0.3%	
GSP # 15a	0.0%	0.0%	2.2%	18.3%	
GSP # 15b	0.0%	0.0%	3.4%	16.6%	
Well # 16	0.0%	0.0%	11.5%	7.9%	
Well # 17	13.3%	<b>266.0%</b>	18.9%	0.0%	
GSP # 17a	0.0%	0.0%	14.9%	2.8%	
GSP # 17b	0.0%	0.0%	1.5%	19.0%	
Well # 18	9.7%	<b>194.0%</b>	20.8%	0.1%	
GSP # 18a	25.4%	<b>508.0%</b>	20.5%	0.3%	Delineation connects to GSP # 19bbb.
GSP # 18b	0.0%	0.0%	13.1%	4.6%	
Well # 19	40.1%	<b>802.0%</b>	26.2%	0.1%	
GSP # 19a	0.4%	8.0%	4.3%	15.4%	
GSP # 19aa	0.0%	0.0%	11.8%	5.2%	
GSP # 19b	53.8%	<b>1076.0%</b>	24.6%	0.2%	
GSP # 19bb	14.0%	<b>280.0%</b>	18.2%	0.3%	
GSP # 19bbb	0.0%	0.0%	9.8%	7.8%	
Well # 20	0.0%	0.0%	9.0%	12.0%	
Well # 21	0.0%	0.0%	4.4%	16.3%	
Well # 22	0.0%	0.0%	0.5%	19.9%	
Well # 23	0.0%	0.0%	0.3%	20.3%	
Flare (F-1)	1.9%	<b>38.0%</b>	7.9%	10.6%	
Flare (F-2)	41.5%	<b>830.0%</b>	24.9%	1.4%	

Notes:  
 Background methane levels approximately 0.1% methane  
**Bold values exceed regulatory acceptable levels (25% LEL)**







TABLE 4

SEPTEMBER 5, 2012 - OFFSITE GAS SURVEY RESULTS  
 LEGLER LANDFILL (FACILITY No. 1511A)  
 JACKSON TOWNSHIP, OCEAN COUNTY, NEW JERSEY

Well No./ Gas Sampling Point	Percent Methane	Percent Lower Explosive Limit	Percent Carbon Dioxide	Percent Oxygen	Comments
GSP # 8ac	0.0%	0.0%	5.8%	14.8%	
GSP # 10c	0.0%	0.0%	3.5%	16.5%	
GSP # 12c	0.0%	0.0%	4.6%	11.0%	
GSP # 13c	--	--	5.9%	--	*
GSP # 14c	0.0%	0.0%	2.6%	18.2%	
GSP # 15c	0.0%	0.0%	9.5%	7.6%	
GSP # 17c	0.0%	0.0%	4.8%	15.8%	
GSP # 18c	0.0%	0.0%	6.7%	12.3%	
GSP # 18ac	0.0%	0.0%	8.6%	9.6%	
GSP # 19c	0.0%	0.0%	3.4%	16.9%	
GSP # 19ac	0.0%	0.0%	1.5%	18.7%	
GSP # 19bc	0.0%	0.0%	8.7%	6.9%	
GSP # 19bbc	0.0%	0.0%	5.7%	11.7%	

Notes:

\* - Due to a large berm located offsite behind Well-13, sampling at the GSP # 13c location could not be conducted.

**Bold values exceed regulatory acceptable levels (25% LEL)**

TABLE 5  
 OFFSITE METHANE GAS CONCENTRATIONS FROM APRIL 2009 TO SEPTEMBER 2012  
 LEALER LANDFILL FACILITY No. 1511A)  
 JACKSON TOWNSHIP, OCEAN COUNTY, NEW JERSEY

Gas Monitoring Well	Gas	% CH4 (4-09)	% CH4 (9-09)	% CH4 (12-09)	% CH4 (2-10)	% CH4 (4-10)	% CH4 (7-10)	% CH4 (11-10)	% CH4 (3-11)	% CH4 (7-11)	% CH4 (10-11)	% CH4 (11-11)	% CH4 (3-12)	% CH4 (6-12)	% CH4 (9-12)
GSP-8a (25) (GSP-8ac)	NS	NS	NS	NS	0.0%	0.0%	NS	NS	0.0%	NS	NS	NS	NS	NS	0.0%
Well-10 (25) (GSP-10c)	NS	NS	NS	0.0%	0.0%	0.0%	NS	NS	0.0%	NS	0.0%	NS	NS	NS	0.0%
Well-12 (25) (GSP-12c)	NS	NS	0.0%	0.2%	0.0%	2.0%	NS	0.0%	0.0%	NS	NS	NS	0.0%	NS	0.0%
Well-12 (50)	NS	NS	NS	NS	NS	0.0%	NS	NS	NS	NS	NS	NS	NS	NS	NS
Well-13 (25) (GSP-13c)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GSP-13b (25) (GSP-13bc)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GSP-13bb (25) (GSP-13bbc)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Well-14 (25) (GSP-14c)	NS	NS	NS	NS	0.0%	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Well-15 (25) (GSP-15c)	NS	NS	NS	0.0%	NS	0.0%	NS	NS	0.0%	0.0%	NS	NS	0.0%	NS	0.0%
GSP-16a (25)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Well-16 (25) (GSP-16c)	NS	NS	NS	NS	NS	0.0%	NS	NS	0.0%	NS	NS	NS	0.0%	NS	0.0%
Well-17 (25) (GSP-17c)	NS	NS	NS	0.0%	NS	0.0%	NS	NS	0.0%	NS	NS	NS	0.0%	NS	0.0%
Well-18 (25) (GSP-18c)	NS	NS	NS	0.0%	NS	0.0%	NS	NS	0.0%	NS	NS	NS	0.0%	NS	0.0%
GSP-18a (25)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Well-19 (25) (GSP # 19a)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GSP-19a (25) (GSP # 19ac)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GSP-19aa (25) (GSP # 19aac)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GSP-19b (25) (GSP # 19bc)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GSP-19bb (25) (GSP # 19bbc)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GSP-19bbb (25) (GSP # 19bbbc)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GSP-19bbb (25) (GSP # 19bbbc)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Note:

- Not Sampled
- \* - Due to a large berm located offsite behind Well-13, sampling at the GSP-13 (25) location could not be
- NS - On-site readings were 0.0% during this event; therefore, no offsite readings were required.



TABLE 7  
 SEPTEMBER 2012 - BAROMETRIC PRESSURE DATA  
 LEGLER LANDFILL (FACILITY No. 1511A)  
 JACKSON TOWNSHIP, OCEAN COUNTY, NEW JERSEY

Weather Station Location	State	Date & Time	Time Interval	Temperature	Precipitation	Wind Speed	Wind Direction	Barometric Pressure
Cream Ridge	NJ	9/4/2012 10:00	24 hours prior	75	0	1	S	30.03
Cream Ridge	NJ	9/4/2012 22:00	12 hours prior	75	0.01	6	SSW	29.88
Cream Ridge	NJ	9/5/2012 0:00	10 hours prior	75	0	7	SW	29.88
Cream Ridge	NJ	9/5/2012 2:00	8 hours prior	75	0	5	SSW	29.85
Cream Ridge	NJ	9/5/2012 4:00	6 hours prior	74	0	6	SW	29.83
Cream Ridge	NJ	9/5/2012 6:00	4 hours prior	75	0	1	SSE	29.83
Cream Ridge	NJ	9/5/2012 8:00	2 hours prior	77	0	4	SW	29.83
<b>Cream Ridge</b>	<b>NJ</b>	<b>9/5/2012 10:00</b>	<b>During Monitoring</b>	<b>79</b>	<b>0</b>	<b>9</b>	<b>WSW</b>	<b>29.83</b>
<b>Cream Ridge</b>	<b>NJ</b>	<b>9/5/2012 11:00</b>	<b>During Monitoring</b>	<b>80</b>	<b>0</b>	<b>5</b>	<b>WSW</b>	<b>29.83</b>
<b>Cream Ridge</b>	<b>NJ</b>	<b>9/5/2012 12:00</b>	<b>During Monitoring</b>	<b>82</b>	<b>0</b>	<b>10</b>	<b>WSW</b>	<b>29.8</b>
<b>Cream Ridge</b>	<b>NJ</b>	<b>9/5/2012 13:00</b>	<b>During Monitoring</b>	<b>75</b>	<b>0.17</b>	<b>7</b>	<b>NW</b>	<b>29.8</b>
<b>Cream Ridge</b>	<b>NJ</b>	<b>9/5/2012 14:00</b>	<b>During Monitoring</b>	<b>76</b>	<b>0.39</b>	<b>0</b>	<b>SE</b>	<b>29.8</b>
<b>Cream Ridge</b>	<b>NJ</b>	<b>9/5/2012 15:00</b>	<b>During Monitoring</b>	<b>76</b>	<b>0</b>	<b>0</b>	<b>NW</b>	<b>29.8</b>
<b>Cream Ridge</b>	<b>NJ</b>	<b>9/5/2012 16:00</b>	<b>During Monitoring</b>	<b>77</b>	<b>0</b>	<b>0</b>	<b>NNE</b>	<b>29.8</b>

Notes:

**Bold Cells indicate the times which FPA conducted the gas monitoring event**

***FIGURES***

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Methane Percentages

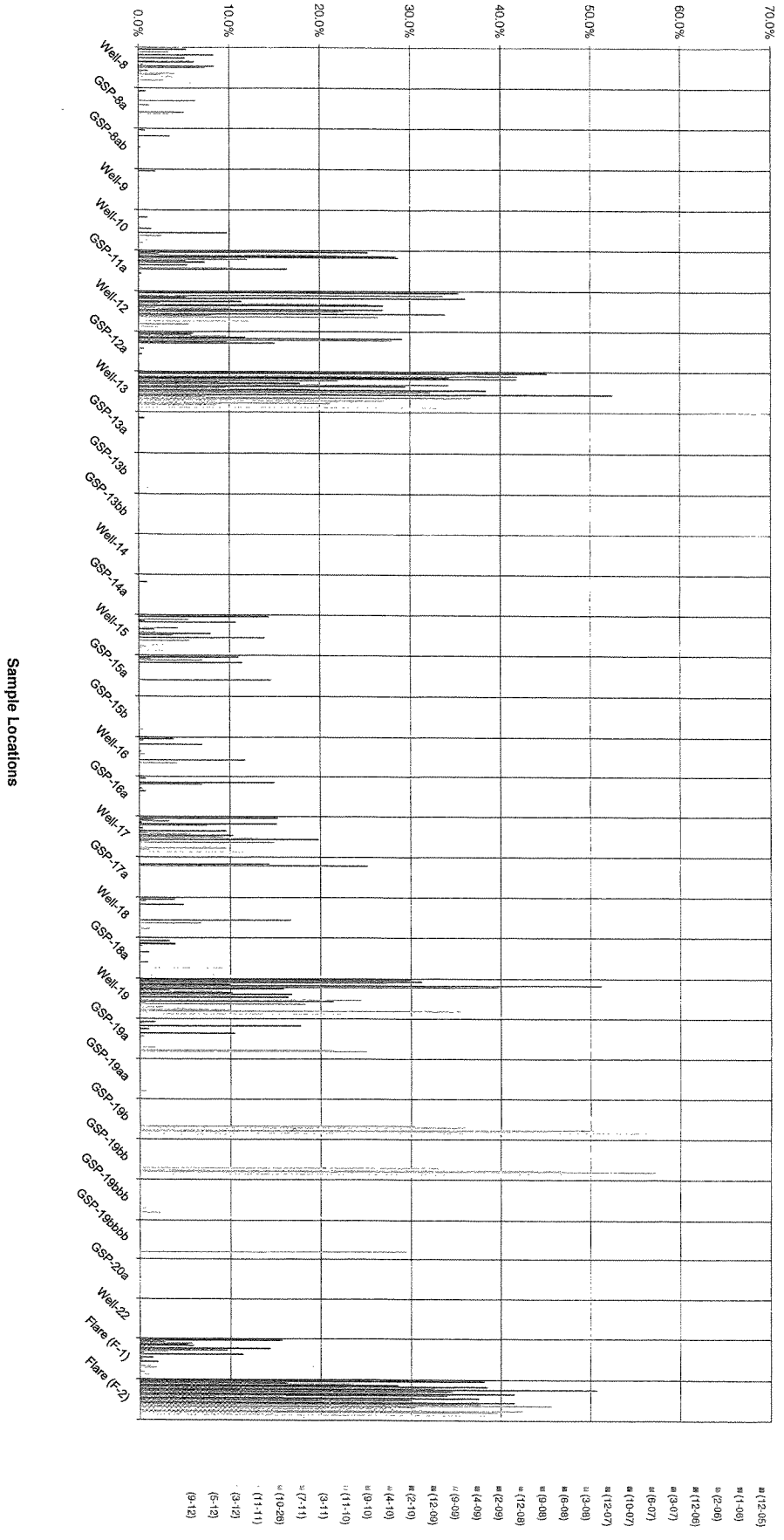


Figure 1  
Changes in Onsite Methane Concentrations

Sample Dates

Percent Lower Explosive Limits

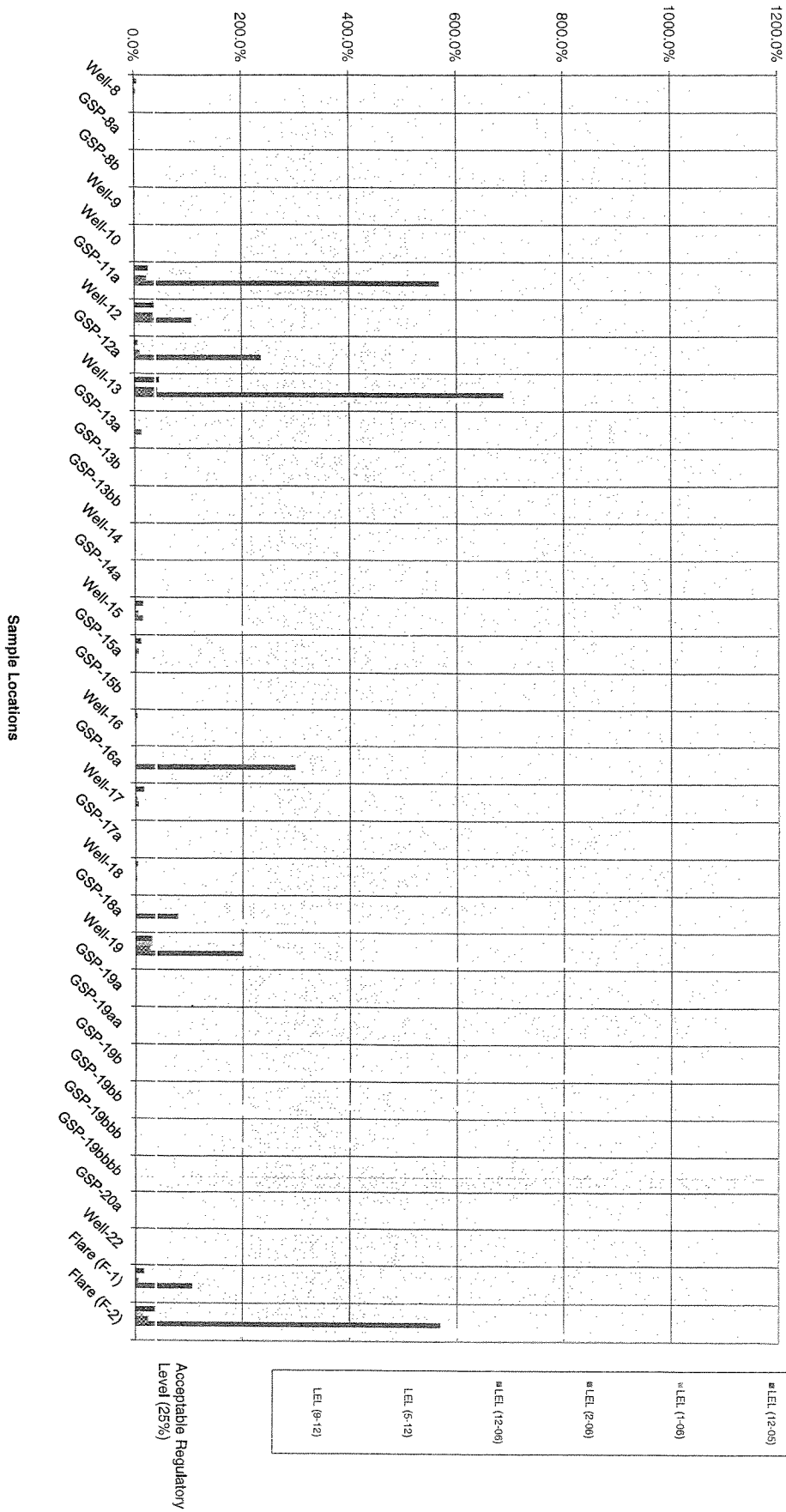
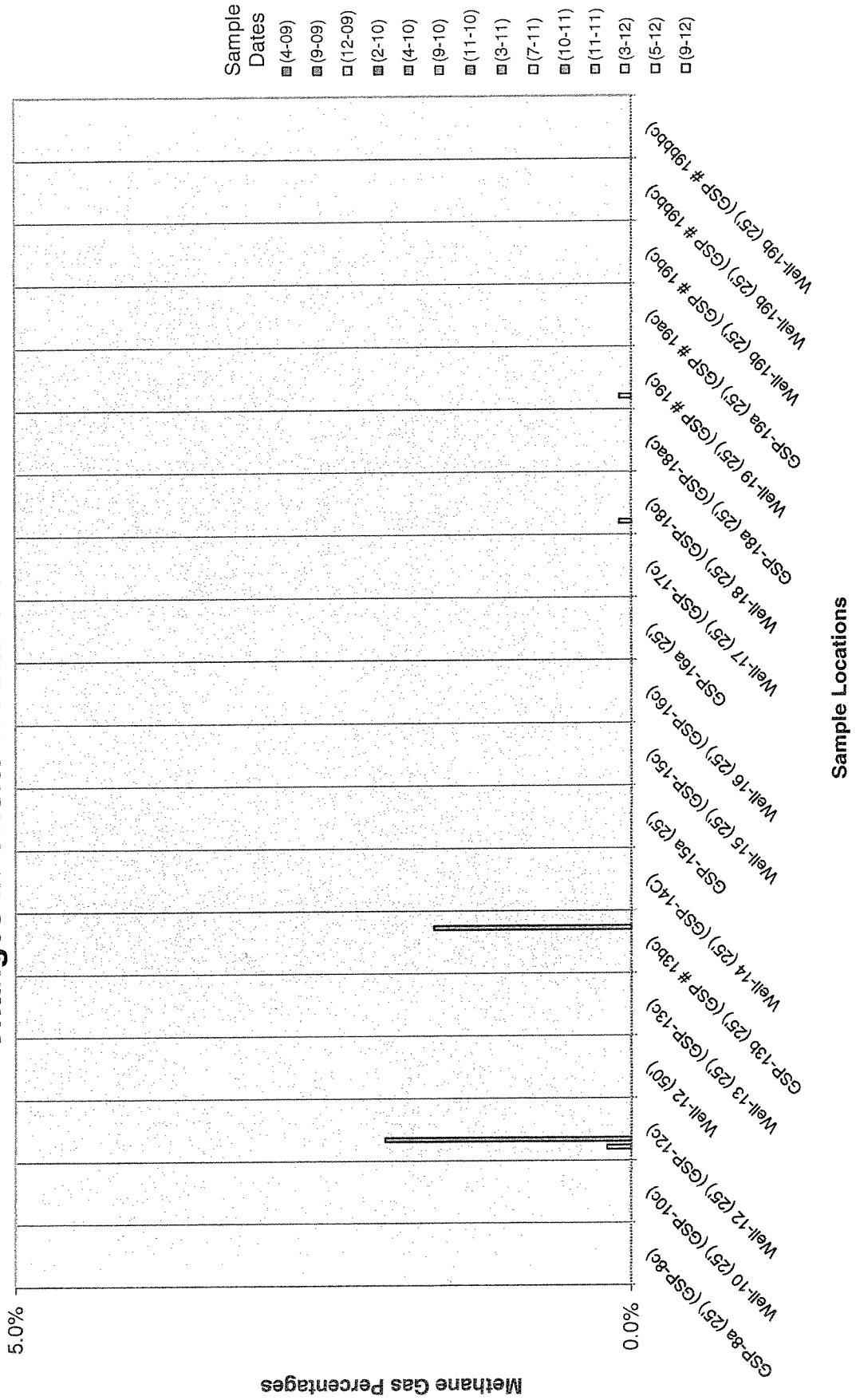


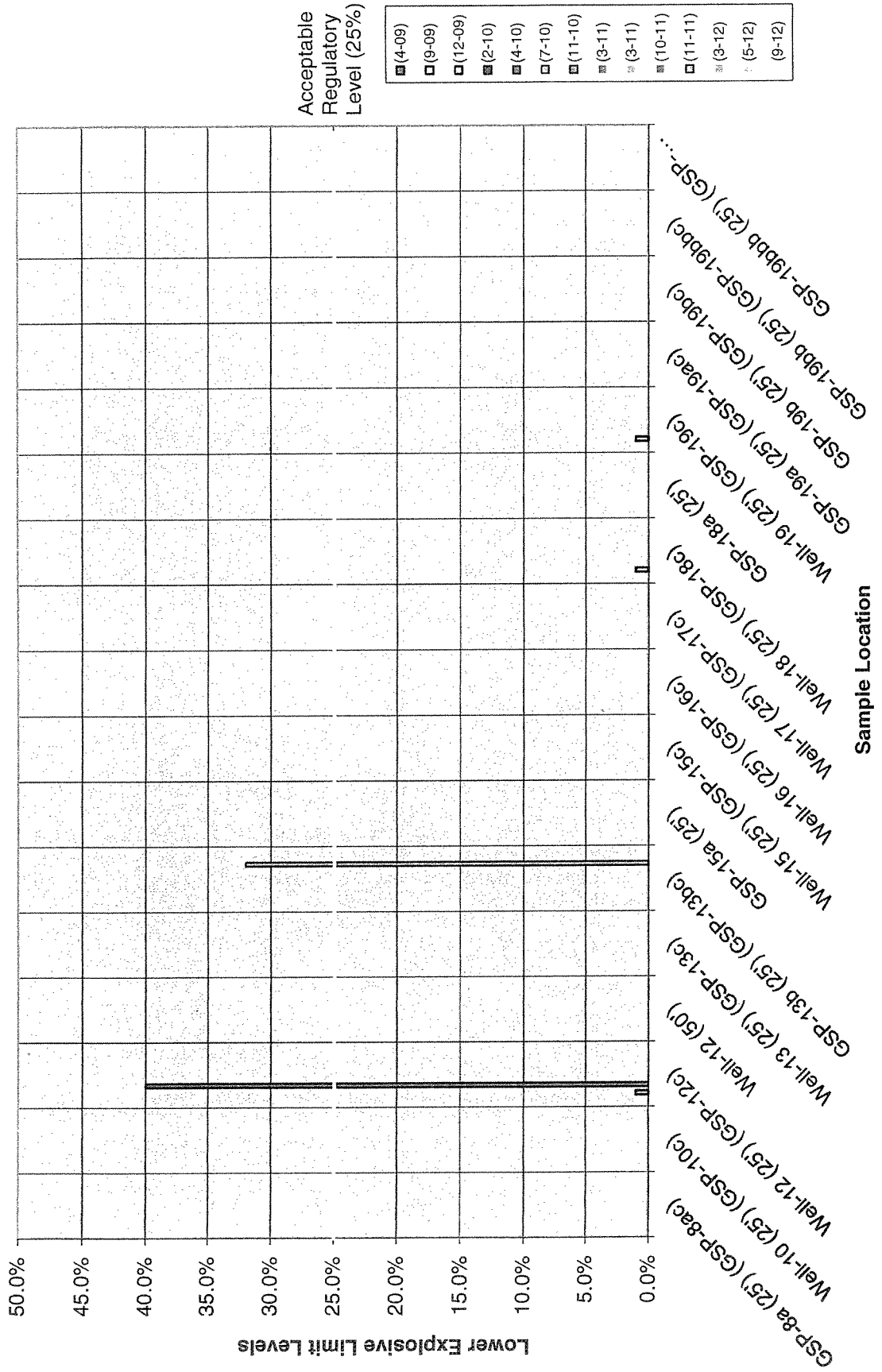
Figure 2  
Changes in Onsite Lower Explosive Limits



**Figure 3**  
**Changes in Offsite Methane Concentrations**



**Figure 4**  
**Changes in Offsite Lower Explosive Limits**



Acceptable  
 Regulatory  
 Level (25%)

- (4-09)
- (9-09)
- (12-09)
- (2-10)
- (4-10)
- (7-10)
- (11-10)
- (3-11)
- (3-11)
- (10-11)
- (11-11)
- (3-12)
- (5-12)
- (9-12)