

November 17, 2000
File No. 32219.14-C

Ms. Rebecca Fishman
U.S. Environmental Protection Agency
One Congress Street, Suite 1100
Boston, Massachusetts 02114-2023
(mail code SEA)

Re: Surface Emission Monitoring Report - Third Quarter 2000
Central Landfill
Johnston, Rhode Island

Dear Ms. Fishman:

GZA GeoEnvironmental, Inc. (GZA) is pleased to provide you with the attached surface emission monitoring report. The purpose of this report is to provide you with the results of the third quarter of surface emission monitoring at the Central Landfill in Johnston, Rhode Island. GZA completed monitoring of all areas of the landfill with the exception of areas of active landfilling and/or construction. Our work was conducted on behalf of the Rhode Island Resource Recovery Corporation (RIRRC).

We trust this report fulfills your current needs. If you have any questions or comments regarding this information please feel free to call either of the undersigned at (401) 421-4140 or contact us via email at junsworth@gza.com or esummerly@gza.com.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

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1.0 INTRODUCTION

Subpart WWW of 40 CFR Part 60.750 requires that surface emission monitoring (SEM) be completed quarterly at certain solid waste management facilities. The third quarter of monitoring at the Central Landfill commenced on September 27, 2000 and was completed by GZA on September 29, 2000. The SEM program was conducted in general accordance with a work plan dated March 2000 entitled *Revised Surface Emission Monitoring Plan, Central Landfill, Johnston, Rhode Island*. Please note that a revised work plan was requested by the USEPA on August 18, 2000 and submitted by GZA on September 8, 2000. The revised work plan has not yet been approved for implementation. 40 CFR Part 60.750 stipulates that monitoring may be reduced to an annual frequency on closed cells when three consecutive quarters with no monitored exceedances are obtained.

2.0 EQUIPMENT PERFORMANCE AND CALIBRATION

As required in Section 3 of Method 21, the performance of the instrument used to complete the surface emission monitoring must be evaluated "...prior to being placed in service, and at subsequent 3-month intervals or at the next use whichever is later." We have interpreted this requirement as requiring a performance evaluation prior to beginning of each quarter of monitoring.

Section 3 requires that the calibration precision, the equipment response time, and the equipment's response factor be evaluated. A response factor is calculated by comparing the concentration recorded by the instrument to the known concentration of the target gas being measured. This program is measuring the concentration of fugitive landfill gas emissions. A response factor can not be calculated since the concentration of methane in the landfill gas is not known and is not consistent. A response factor was therefore not calculated. The following sections discuss the equipment performance and calibration procedures completed.

2.10 Calibration Precision

The calibration precision was calculated on September 26, 2000. The instrument was calibrated with a gas containing 492 parts per million (ppm) of methane in air. After completing the initial calibration, the precision was calculated by running a zero air gas (i.e., < 1 ppm volatile organics) through the instrument and then switching to the calibration gas and recording the reading. The procedure was completed three times. The three readings recorded were 490 ppm, 490 ppm, and 491 ppm. The differences between these readings and the concentration of the calibration gas (492 ppm) are 2 ppm, 2 ppm, and 1 ppm with the average algebraic difference being 1.67 ppm. Dividing the average of

1.67 ppm by the concentration of the calibration gas (492 ppm) and multiplying by 100 results in a calibration precision of 0.33%. Therefore, the instrument complies with the requirement that the calibration precision be less than 10%.

2.20 Response Time

The response time was calculated by placing the instrument on the zero air and quickly switching to the calibration gas and recording the time from switching gases until the instrument reached 90% of the calibration gas concentration (492 ppm x 0.9= 443 ppm). The three recorded response times were 4.3, 4.5, and 3.8 seconds with an average of 4.2 seconds. Therefore the instrument complies with the requirement that the response time be less than 30 seconds.

2.30 Daily Calibration

Prior to commencement of surface emission monitoring, the equipment was calibrated with zero air and the calibration gas containing 492 ppm of methane in air. After each calibration of the instrument, the calibration gas was applied and the reading recorded. As indicated on the Field Summaries in Appendix A, all the readings were within approximately 2% of the calibration gas concentration.

3.0 MONITORING AND RE-MONITORING RESULTS

The attached Figure 1 shows the surface monitoring routes completed by GZA and the locations at which levels of methane exceeded 500 ppm. The third quarter of monitoring was completed over portions of 3 consecutive days. Surface methane emissions were initially detected above 500 ppm at 9 locations as shown on Figure 1. All nine exceedances were recorded on September 28, 2000 and occurred in areas where there is no final cap. Elevated surface methane emission concentrations ranged from 800 ppm to 3,000 ppm. Due to the replacing of the generator, Remote Flare 3 was not operating several days prior to September 28, 2000 and had started operating September 27, 2000. Table 1 summarizes the results of the surface emission monitoring.

The initial third quarter exceedances were similar in number (i.e., 8 exceedances in second quarter and 9 exceedances in third quarter), concentration, and location to the second quarter readings. These locations were re-monitored on October 12, 2000 and October 26, 2000. The results of the re-monitoring, as summarized on Table 1, indicate continued marginal exceedances at two of the nine locations.

It appears that the remedial actions completed in response to the first quarter exceedances have resulted in a significant improvement in landfill gas control at the landfill. Completion of the proposed remedial actions discussed in the first and second quarter reports should result in additional improvements in landfill gas collection.

Remote Flare 3 was operating during the re-monitoring of the nine exceedances on October 12, 2000 which is most likely the reason the number of exceedances decreased. It should be noted that Subpart WWW requires that some remedial action be taken (e.g., cover material maintenance or well field adjustment) prior to re-monitoring. Repair of Remote Flare 3 addresses this requirement.

In addition, as discussed in the second quarter SEM report, standing water exists in several wells in the northwest portion of the landfill. The removal of water in certain wells (e.g., wells 46 and 66) near the location of the two remaining exceedances is ongoing and should result in improved landfill gas collection in that area. Refer to Figure WF1 for the current landfill gas collection system configuration.

4.0 STATUS OF RESPONSE ACTIONS

The following sections discuss the status of the remedial actions proposed in first quarter surface emission monitoring report.

4.10 Upgrading of Piping

Two portions of the landfill gas collection system piping were proposed to be upgraded to increase the vacuum in a number of landfill gas extraction wells. The proposed changes included increasing the pipe diameter of certain sections and elimination of two four-inch restrictions. Both four-inch restrictions have been removed and the piping for the southern upgrade was completed. The piping upgrade proposed between wells 47 and 59 was not completed as result of a measured increase in vacuum in this area of the system following removal of the four-inch restriction.

4.20 Additional Landfill Gas Extraction Wells

Four of the six extraction wells proposed were installed and are currently in operation. The locations of the four new wells, designated wells 65, 66, 67, and 68, are shown on Figure 2. Two of the proposed wells in the southwestern portion were not installed due to the shallow depth of the waste. These wells were replaced with a gas collection trench, shown on Figure WF1, which was installed and is operating in this area.

4.30 Perched Water Removal

Several extraction wells were discovered to be inundated with what is believed to be perched water in the landfill. The water removal is currently ongoing. The perched water removed from the wells is being discharged to the leachate collection system. The perched water continues to be removed from the wells. Additional pumps are being used to increase the water removal rate.

5.0 CONCLUSIONS

Based on our evaluation of the third quarter surface emission monitoring results and our understanding of the requirements of Subpart WWW, GZA has developed the following conclusions and recommendations.

- The remedial actions proposed in the first quarter monitoring report appear to be reducing surface emissions. The number of locations with recorded exceedances and the concentration of the exceedances have decreased as compared to the first quarter of surface emission monitoring.
- Surface emissions were monitored in accordance with the Surface Emission Monitoring plan, as revised, between September 27, 2000 and September 29, 2000.
- Nine locations had surface emissions above the 500 ppm limit. The concentrations of the exceedances ranged from 800 to 3,000 ppm. Remote Flare 3 was not operating for several days prior to September 28, 2000 and was placed back in operation on September 27, 2000. The concentrations at three of the nine locations were above the 500 ppm limit when re-monitored on October 12, 2000. Two of the nine locations were above the 500 ppm limit when monitored for the third time on October 26, 2000.
- Completing the removal of standing water in landfill gas extraction wells in the areas of the two remaining exceedances should improve the landfill gas collection efficiency in those two areas.

TABLE 1

**SUMMARY OF SURFACE EMISSION
MONITORING
THIRD QUARTER 2000**

Central Landfill - Johnston, Rhode Island

Location I.D.	Methane Concentration Detected (ppm)		
	Sept. 28, 2000	October 12, 2000	October 26, 2000
Q300-1	1,200	364	--
Q300-2	1,000	97	--
Q300-3	1,800	480	--
Q300-4	800	190	--
Q300-5	3,000	704	444
Q300-6	900	551	680
Q300-7	1,000	91	--
Q300-8	1,500	211	--
Q300-9	900	1,050	870

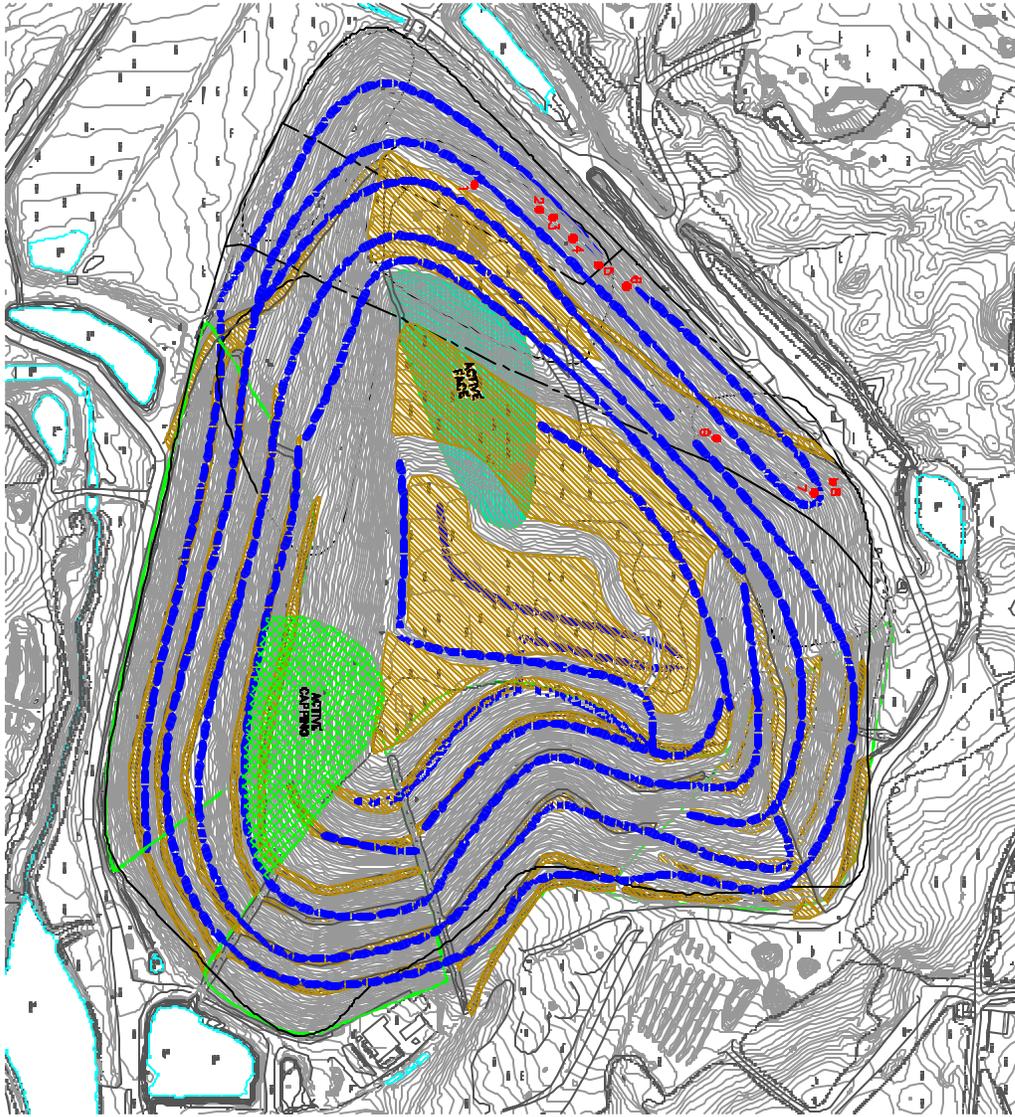
TABLE 2

**SUMMARY OF DEPTH TO WATER
IN LANDFILL GAS EXTRACTION WELLS**

Central Landfill - Johnston, Rhode Island

Well ID	Depth to Water (feet)	Depth of Well (feet)	Standing Water (feet)
18	3	62	59
19	23	55	32
21	6	60	54
42	17	40	23
43	44	39	-5
44	26	40	14
45	9	38	29
46	5	45	40
47	27	48	21
48	33	75	42
52	26	81	55
53	12	75	63
54	28	86	58
56	42	81	39
57	23	65	42
58	20	55	35
17	50	59	9
59	7	52	45
38	21	60	39
39	15	55	40
40	17	45	28
41	44	42	-2
60	25	95	70
61	28	97	69

Note: Water depths referenced from top of well casing which may be 2 feet to 10 feet above the ground elevation. Negative values indicate well is dry and negative amount is equal to height of well casing above grade.



- LEGEND**
-  LOCATION OF EXCEEDANCE
 -  CAPTED AREA
 -  MONITORING ROUTE
 -  LANDFILL AREA WITH SLOPE LESS THAN 4% (4%)



PROJECT NO.
32218.1.4
1

**SURFACE EMISSIONS MONITORING
THIRD QUARTER
CENTRAL LANDFILL
CHICAGO, ILLINOIS**

**MONITORING ROUTES AND
EXCEEDANCE LOCATIONS**

PROJ. MGR. JIU
CHK'D BY JIU
REV'D BY EAB
DRAWN BY BAW
SCALE: 1"=200'
DATE: NOV., 2008

SCALE IN FEET



GZA
GeoEnvironmental, Inc.

REV#	DESCRIPTION	BY	DATE

