

August 2, 2000
File No. 32219.14-C

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

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

Dear Ms. Fishman:

GZA GeoEnvironmental, Inc. is pleased to provide you with the attached second quarter surface emission monitoring report. The purpose of this report is to provide you with the results of the second quarter of surface emission monitoring at the Central Landfill in Johnston, Rhode Island. GZA GeoEnvironmental, Inc. (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 letter 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 be completed quarterly. The second quarter of monitoring commenced on June 27, 2000 and was completed by GZA on July 6, 2000. 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. The monitoring was completed within three non-consecutive days. The second quarter of surface emission monitoring was characterized by a reduction in the number of locations with detected exceedances and a decrease in the concentration of the exceedances as compared to the first quarterly results.

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 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 June 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 491 ppm, 492 ppm, and 493 ppm. The differences between these readings and the concentration of the calibration gas (492 ppm) are 1 ppm, 0 ppm, and 1 ppm with the average algebraic difference being 1 ppm. Dividing the average of 1 ppm by the concentration of the calibration gas (492 ppm) and multiplying by 100 results in a calibration precision of 0.2%. 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 7, 4, and 5 seconds with an average of 5.3 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 second quarter of monitoring was completed over portions of 3 non-consecutive days. Surface methane emissions were detected above 500 ppm at 8 locations as shown on Figure 1. The exceedances all occurred in areas where there is no final cap. Elevated surface methane emission concentrations ranged from 610 ppm to 3,000 ppm. Table 1 summarizes the results of the surface emission monitoring.

The number of locations at which exceedances were recorded decreased from 33 during the first quarter of monitoring to 8 during the second quarter. The concentrations of the recorded exceedances also decreased. 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. The improvements are likely also due in part to seasonal fluctuations in rainfall and gas production rates.

All eight exceedances were recorded on June 29, 2000. These locations were re-monitored on July 20 and 28, 2000. The results of the re-monitoring, as summarized on Table 1, indicate continued exceedances at these eight locations. 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; however, several remedial actions presented in the first quarter surface emission monitoring report are currently being implemented and others will commence in the near future. As such, no additional remedial actions were taken and no new actions are being proposed as part of this quarterly monitoring report. The ongoing actions continue and are believed to be adequate. The remedial actions proposed in the first quarterly report included the installation of additional landfill gas extraction wells in the areas in which the second quarter exceedances were recorded. These wells will be installed and operational by August 25, 2000.

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 and elimination of two four-inch restrictions. The four-inch restriction in the northern portion of the landfill has been removed and the piping for the southern upgrade is currently being fused and should be completed by August 11, 2000. The remaining piping upgrades will be completed by August 25, 2000

4.20 Low Permeability Soil

Low permeability soil was proposed to be placed in the northern portion of the landfill to increase the collection efficiency of extraction wells in that area. Approximately 5 acres of area was covered with low permeability soil to the east of the northern access road. The covered area is indicated on Figure 1. Additionally, approximately 14 acres of area were covered with gravel, bringing the cover thickness in this area to two feet, due to capping activities. The area covered with gravel is indicated on Figure 1.

4.30 Additional Landfill Gas Extraction Wells

Six extraction wells were proposed to be installed. The drilling contractor is scheduled to mobilize to the landfill the week of July 31, 2000. All six wells should be completed and operational by August 25, 2000. An additional six wells were proposed if the removal of the perched water discussed in Section 4.40 does not adequately improve landfill gas control in those areas.

4.40 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 results from the first well pumped were favorable, showing an increased gas recovery rate once the water level dropped below the top of the well screen.

4.50 Collection Trench in RecoverMat Area

As discussed in the first quarter report, a series of five collection trenches were installed in the area of the Recovermat operations. There were no exceedances recorded in this area during the second quarter monitoring. Therefore, no additional remedial actions are proposed for this area.

5.0 CONCLUSIONS

Based on our evaluation of the second 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 and should be completed by August 25, 2000.
- Surface emissions were monitored in accordance with the Surface Emission Monitoring plan, as revised, between June 27, 2000 and July 6, 2000.
- Eight locations had surface emissions above the 500 ppm limit. The concentrations of the

exceedances ranged from 610 to 3,000 ppm. The concentrations at the eight locations were generally above the 500 ppm limit when re-monitored on July 20 and 28, 2000.

- 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.

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TABLE 1

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

Central Landfill - Johnston, Rhode Island

Location I.D.	Methane Concentration Detected (ppm)		
	June 29, 2000	July 20, 2000	July 28, 2000
Q200-1	850	517	1,132
Q200-2	990	660	1,376
Q200-3	610	1,189	1,600
Q200-4	1,200	22,000	2,500
Q200-5	3,000	949	1,320
Q200-6	1,300	770	600
Q200-7	900	787	250
Q200-8	1,000	583	1,008

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.

