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SCS ENGINEERS

November 10, 2016
File No. 23212007.04

Ms. Tracy Buchanan
Ohio EPA Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911

Subject: Village of St. Bernard Landfill
MP-10 Contingency Monitoring 2nd 30-day Report

Dear Ms. Buchanan:

Per the approved EGMP for the above referenced site, every 30 days from the date of initial detection above threshold limits, until contingency monitoring plan discontinuation criteria are met, the owner/operator will submit a report to the Ohio EPA and Hamilton County Public Health containing:

a. Analysis and summary of the results from the contingency monitoring including the lateral extent of explosive gas concentrations above the threshold limit and a characterization of explosive gas pathways. Characterization, based on visual inspection, of the pathways will include the degree of saturation and porosity (textural classification or fracturing) within the pathways and the possible causes of the increase in gas concentrations such as landfill operational procedures, gas control system failure or upset, climatic conditions, or other activities being conducted on or near the site.

b. A summary of the steps taken to ensure protection of human health and the environment and an analysis of their effectiveness.

This letter serves as the second 30-day report. A site map is presented as Figure 1 in Attachment A.

Analysis and Summary

The results of the contingency monitoring performed to date are summarized in the table included in Attachment B. Following the initial and verification sampling for the last three events, MP-10 has been pumped for 30 minutes, at a rate of approximately 550 cc/min., using the GEM 5000. Approximately 25 casing volumes are being removed from MP-10 each time. The falling methane concentration during the 30 minute purge indicates that the elevated concentration of methane is present in a small area, i.e. only a small volume of soil gas with an elevated concentration of methane is present.

The monitoring results for the last four to five weekly contingency monitoring events show the concentration of methane at MP-10 generally decreasing. The concentration is below the peak reading observed on September 21, 2016. The absence of pressure at MP-10 indicated that there

is no driving force that could cause gas migration to the nearby residents, which are also monitoring with indoor combustible gas indicators. The methane detected at MP-10 is likely a localized concentration or is present due to migration driven by a concentration gradient/diffusion. At this time, no further remedial actions are proposed.

Pathway Characterization

The description of the site setting and site geology has been summarized from the EGMP. With respect to regional geology, the site is situated on the southeast edge of the Mill Creek Valley. The regional geology reflects multiple glacial advances and is consistent with a glacial outwash valley. Generally, regional geologic sequences consist of glacial valleys incised within Ordovician bedrock formations. These valley fills consist of highly variable interbedded sands, gravels, clays, silts, boulders, and cobbles.

With respect to site specific geology, the most significant feature includes a glacial till/outwash sequence which appears to form the base of the site. This unit is predominated by low permeability clays and or silts interbedded with silty sands within the areas investigated. Both oxidized and non-oxidized native materials have been found at depth, suggesting deposition in multiple sequences.

Although interbedded sands represent a potential zone of migration, those materials examined via borings were saturated and included a high percentage of silt (estimated at 40 percent or higher). As such, although classified as granular material, the potential for large scale gas transmission is seen as limited.

Along the northern perimeter of the site, the former landfill property is contiguous with several residential properties along Bank Avenue. Essentially, this area consists of a flat terrace, projecting out from the toe of the landfill slope and transitioning into the back yards of the Bank Avenue residences. This terrace was raised to its current elevation by the placement of two generations of fill. A cross section along this northern perimeter is presented as Figure 2 in Attachment A. The boring logs used to prepare the cross section are presented in the EGMP. The log for MP-10F is included in this report in Appendix C. The fill soils, in particular the lower fill, contain hard fill and miscellaneous debris. As a result, the near surface geologic profile of this terrace is varied. The fill soil matrix in the vicinity of MP-10 is a sandy silt or sandy clay. The presence of the hard fill and debris likely increases the porosity and results in a porosity that approaches that typically assumed for granular soils, i.e. 25 percent. Recent water level measurements show that the fill soil in the vicinity of MP-10 is saturated at approximately 4 feet below the ground surface. MP-10 is screened from approximately 2 to 12 feet below the ground surface.

As part of the delineation investigation conducted in 2013, a test pit, TP-7, was excavated in the vicinity of MP-10. The log for TP-7 is included in Appendix C. The unsaturated portion of the fill layer is the primary pathway. Geotechnical testing of this material as part of the delineation investigation showed that it can be classified as silty sand with gravel. Porosity of the soil matrix of the fill is considered to be moderate. The presence of large pieces of concrete debris within the fill results in the potential for isolated, unconnected open void space, depending on the location and orientation of the concrete debris.

Possible Causes of Exceedance

Just prior to the detection of the initial exceedance at MP-10 on September 7, 2016, the St. Bernard area experienced an extreme storm event, ranging in intensity from a 100 to a 500 year rain event. The infiltration into the landfill of significant quantities of water could have displaced methane in the landfill into the pathway monitored by MP-10. Alternatively, the additional water that infiltrated into the landfill could have resulted in an increase in the generation of methane, some of which reached MP-10.

Summary of the Steps Taken to Protect Human Health and the Environment

The collection and control system was adjusted to apply additional vacuum to the segments in the vicinity of MP-10, specifically those monitored by EW-3S and EW-4S. This was done by reducing vacuum on the other segments in the system. MP-10 will continue to be pumped for 30 minutes, at a rate of approximately 550 cc/min., using the GEM 5000 after the initial and verification monitoring. Approximately 25 casing volumes will be removed from MP-10 each time. This appears to have a beneficial effect in reducing the concentration of the landfill gas present in the vicinity of MP-10.

Should you have any questions or comments, please contact the undersigned.

Sincerely,

Randall C. Mills, P.G.
Senior Project Professional
SCS ENGINEERS

James J. Walsh, P.E.
Principal
SCS ENGINEERS

cc: Chuck DeJonckheere, Hamilton County Public Health
Nick Schapman, GHD
John Estep, Mayor, Village of St. Bernard

Enclosures

ATTACHMENT A

FIGURES

SAN MH
RIM=509.33
INV=489.23-8" E/NW
501.93-8" SW

INV 6"CPP=506.79

448 Bank Ave.
Thomas, Kathy
Parcel ID 582-0007-0261-00
Gas Monitoring Alarm Installed

426 Bank Ave.
Craddock, Robert L.
Parcel ID 582-0007-0271-00
Gas Monitoring Alarm Installed

City of St. Bernard
Parcel ID 582-0007-0262-00

EX. SAN C.O.
RIM=504.78
INV=497.25
N: 431802.5182
E: 1400321.6611

SUPPLEMENTAL VACUUM LATERAL FOR FUTURE USE IF NEEDED (BURIED AND SEALED).

1,500 GALLON CONDENSATE COLLECTION TANK (BURIED). CONDENSATE IS REMOVED VIA VACUUM TANKER.

MP-1

2" PVC

4" PVC

24"

EX. SAN C.O.
RIM=507.94
INV=497.39
N: 431781.5612
E: 1400293.2903

MP-16

441 Bank Ave.
Ziegler, Gregg M. & Molly E.
Parcel ID 582-0007-0263-00
Gas Monitoring Alarm Installed

437 Bank Ave.
Kistner, Marian L.
Parcel ID 582-0007-0264-00
Gas Monitoring Alarm Installed

433 Bank Ave.
Shrader, Jan
Parcel ID 582-0007-0265-00
Gas Monitoring Alarm Installed

429 Bank Ave.
Schrenk, Robert W. & Sandra
Parcel ID 582-0007-0266-00
Gas Monitoring Alarm Installed

425 Bank Ave.
Hackney, Tim
Parcel ID 582-0007-0267-00
Gas Monitoring Alarm Installed

421 Bank Ave.
Ramsey, Michael
Parcel ID 582-0007-0268-00
Gas Monitoring Alarm Installed

EW-14S

PARK RESTROOM FACILITY

EX. SAN C.O.
RIM=508.38
INV=497.87
N: 431713.1779
E: 1400288.4885

CONDENSATE FLOW TO COLLECTION TANK

EW-2S

2" SCH. 40 PVC SLOTTED VACUUM EXTRACTION LATERAL. EACH LATERAL MAY BE ISOLATED AND OPERATED INDEPENDENTLY VIA VALVE ADJUSTMENTS.

TP-7

EX. CONDENSATE VACUUM BREAK
RIM=502.48
INV=498.84
N: 431649.6338
E: 1400506.0296

ISOLATES VACUUM FROM CONDENSATE GRAVITY DRAIN. MAINTAIN CHAMBER IN FLOODED CONDITION AT ALL TIMES

EX. SAN C.O.
RIM=504.34
INV=499.42
N: 431652.5277
E: 1400611.8807

MP-17

MP-9

MP-10

MP-8F

MP-7E

CONDENSATE FLOW TO VACUUM BREAK

SS-8 STORM MH
RIM=517.27
INV=492.69

2" SCH. 40 PVC CONDENSATE GRAVITY DRAIN FLOWS WEST TO EAST, DISCHARGING TO THE CONDENSATE TANK. CLEANOUTS LOCATED AS SHOWN. CLEANOUTS ARE BURIED APPROXIMATELY 12" BELOW GRADE AND ARE MARKED WITH A STEEL/CAST IRON CAP FOR LOCATING PURPOSES.

EX. SAN C.O.
RIM=508.63
INV=497.95
N: 431669.2468
E: 1400330.0247

EW-3S &
SP-3R (FORMER EW-3R)

2" SCH. 40 PVC LATERAL (SOLID) FROM VALVE VAULT TO PERFORATED VACUUM LATERAL. (TYPICAL OF SIX).

VACUUM HEADER VALVE VAULT (FLUSH MOUNT). INCLUDES VACUUM VALVING AS WELL AS SAMPLING PORTS (TYPICAL OF SIX).

EX. SAN C.O.
RIM=505.67
INV=498.12
N: 431656.2388
E: 1400356.4814

3" SCH. 80 PVC VACUUM HEADER SLOPED TO VACUUM BREAK. HEADER PIPING IS CENTERED UNDER VALVE VAULTS FOR LOCATION AND ACCESS.

CUT OFF TRENCH

EXISTING SOIL/BENTONITE CUT-OFF WALL (APPROXIMATE LIMITS SHOWN)

MP-7H

EX. 12" CMP
INV=502.89

EX. 12" CMP
INV=503.34

EW-4S

EW-5S

EW-6S &
SP-6R (FORMER EW-6R)

COLLECTED CONDENSATE FLOWS THROUGH TO VACUUM BREAK TO SANITARY SEWER.

6" CPE DRAIN TILE (APPROXIMATE LOCATION)

ABANDONED CONDENSATE TANK

VACUUM BREAK ISOLATION VALVE

COLLECTED GAS FLOWS TO VACUUM BLOWER

SS-6
STORM MH RIM=518.19
INV=509.21 - 12"
514.19 - 6"

PLAY SET

3" HDPE GAS EXTRACTION VACUUM HEADER

MATCH LINE

12" EXTENSION TO SPRING HEADWALL (ASSUMED - DIRECT CONNECTION COULD NOT BE CONFIRMED IN FIELD)

SPRING (APPROXIMATE LOCATION)

VACUUM EXTRACTION BLOWER ASSEMBLY AND DISCHARGE (FENCE-LOCKED NO. 204-REQUEST ACCESS VIA VILLAGE OF ST. BERNARD). SHUTOFF VALVES, POWER DISCONNECT AND PRESSURE GAUGES LOCATED IN ENCLOSURE.

MATCH LINE

LEGEND

- 500 — EXISTING CONTOUR
- PROPERTY/LOT LINES
- EXISTING SANITARY SEWER
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY CLEANOUT
- 24" — EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING STORM CATCH BASIN
- EXISTING DRAINAGE TILE
- MP-11 — EXISTING MONITORING PROBE
- EW-4S — EXISTING EXTRACTION WELL
- EXISTING FENCE
- 4" PVC — EXISTING 4" SANITARY SEWER
- 2" PVC — EXISTING 2" SLOTTED EXTRACTION PIPING
- VACUUM HEADER
- MP-11 — MONITORING PROBE ABANDONED DURING REMEDIATION AT 441 BANK AVENUE

NOTES:
1. BASE MAP SOURCE CEC DRAWING 2B, DATED MARCH 31, 2011

NORTH
SCALE IN FEET
0 20 40

REV.	DATE	DESCRIPTION	CK. BY

SHEET TITLE: MONITORING NETWORK

PROJECT TITLE: ST. BERNARD LANDFILL
VILLAGE OF ST. BERNARD, OHIO

CLIENT: VILLAGE OF ST. BERNARD
110 WASHINGTON AVENUE
ST. BERNARD, OHIO 45217

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
246 BEE CANYON ROAD, CINCINNATI, OHIO 45202
PH: (513) 421-4353 FAX: (513) 421-2847

PROJ. NO. 23212007.02
DSN. BY: CES
DWN. BY: FDB
CHK. BY: RCM
QA/A RVW BY: JJW
APP. BY:

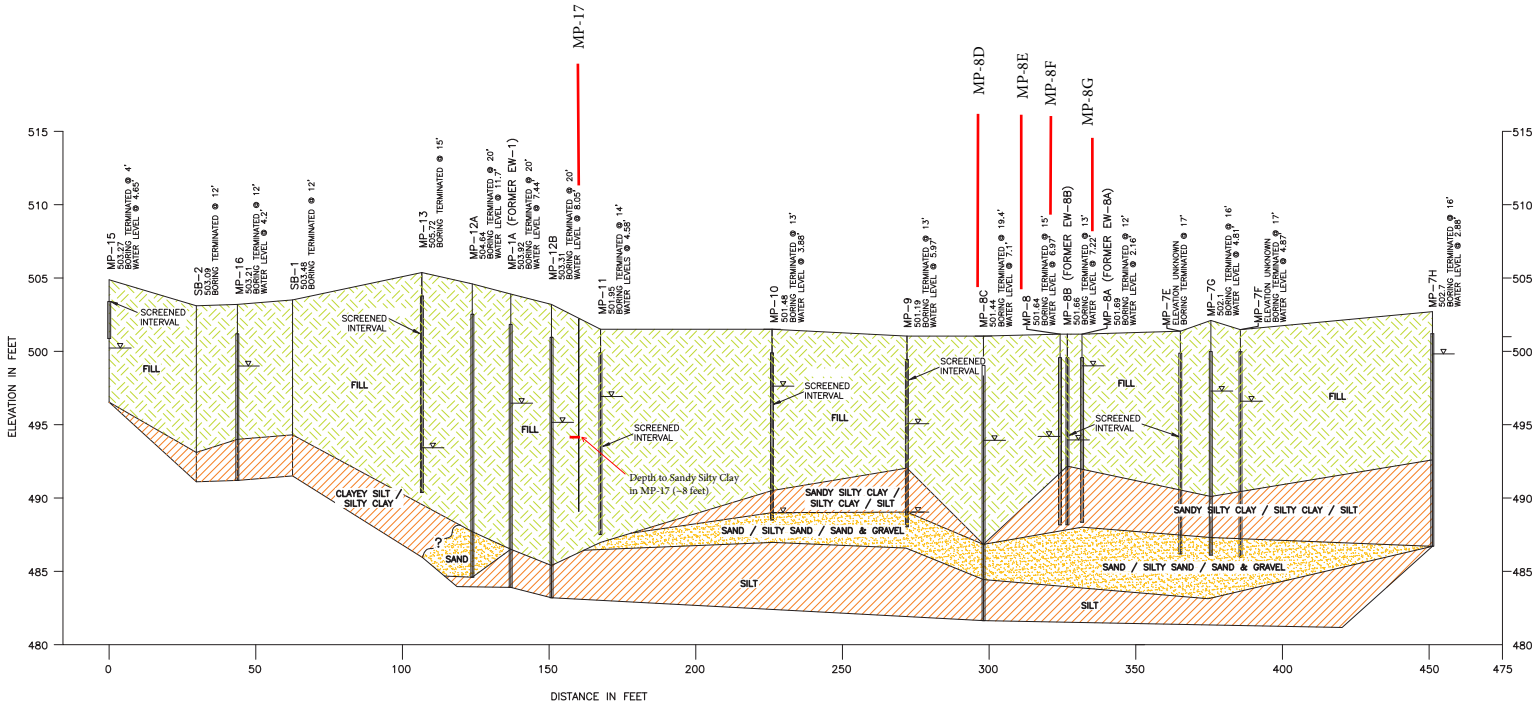
CADD FILE: FIG 5

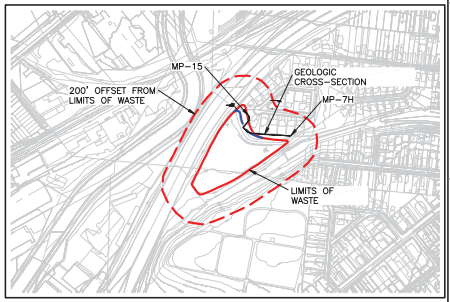
DATE: SEPTEMBER 2014

SCALE: AS SHOWN

DRAWING NO.

FIG 1





LOCATION MAP
NOT TO SCALE

THE WATER LEVELS PRESENTED HEREIN ARE APPLICABLE TO THE LOCATION AND TIME OF MEASUREMENT. WATER LEVELS MAY FLUCTUATE THROUGH TIME

LEGEND

- FILL (GAS MIGRATION ZONE)
- CLAY / SILTY CLAY / SANDY SILTY CLAY / SILT
- SAND / SILTY SAND / SAND & GRAVEL
- INITIAL WATER LEVEL RECORDED DURING PROBE INSTALLATION

NOTES:

1. WATER LEVELS MEASURED ON 03/04/2011.
2. SEE DRAWING NO. 2 FOR PROBE LOCATIONS. CROSS-SECTION TRACE INTERCEPTS PROBE LOCATIONS SHOWN.
3. FILL OR DEBRIS INDICATED IS OUTSIDE OF LIMITS OF WASTE PLACEMENT. FILL SHOWN WAS OBSERVED TO CONSIST PRIMARILY OF INERT FILL WITH INCIDENTAL QUANTITIES OF ORGANIC DEBRIS.

Scale: 1"=4'
Scale: 1"=20'

REVISION RECORD

NO	DATE	DESCRIPTION
1		
2		
3		
4		

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4274 Glendale-Milford Road · Cincinnati, OH 45242
Ph: 513.985.0226 · 800.759.5614 · Fax: 513.985.0228
www.cecinc.com

BANK AVENUE LANDFILL
ST. BERNARD, OHIO
HAMILTON COUNTY

DRAWN BY:	MLB	CHECKED BY:	RJS	APPROVED BY:	RH
DATE:	03/31/2011	DWG SCALE:	AS SHOWN	PROJECT NO:	100-194

GEOLOGIC CROSS-SECTION

DRAWING NO.: 4B

P:\2010\100-194\-CADD\ISSUED\2010100-LDF-4-20110328.DWG,4/1/2011 - 11:01:14

FIGURE 2. CEC 2011 Northern Geologic Cross Section

ATTACHMENT B

CONTINGENCY MONITORING RESULTS

TABLE 1. SUMMARY OF CONTINGENCY MONITORING RESULTS AT MP-10
METHANE CONCENTRATION (PERCENT BY VOLUME)

	Initial Reading		Verification Reading		30-minute Evacuation Readings	
Date	Initial	Sustained	Initial	Sustained	Initial	Sustained
09/07/16	46.6	46.8	36.3	41.8		
09/14/16	48.2	48.4	37.3	43.0		
09/21/16	55.8	56.3	45.9	49.3		
09/29/16	10.8	23.3	6.5	15.9		
10/04/16	48.1	49.5	38.8	43.0		
10/13/16	44.3	46.8	41.4	39.2		
10/19/16	44.3	42.0	35.0	46.6	19.5	22.0
10/27/16	39.2	39.9	39.2	38.6	28.5	5.8
11/02/16	28.3	28.7	20.7	27.1	27.0	3.8

ATTACHMENT C

BORING & TEST PIT LOGS

Civil & Environmental Consultants, Inc.
Cincinnati, OH (513) 985-0226 • (800) 759-5814
Pittsburgh, PA (412) 921-3402 • (800) 365-2324

CITY OF ST. BERNARD

St. Bernard, Ohio

JOB NO.: 200610

LOG OF MP-10

Sheet 1 of 1

LOGGED BY: PCS

DRILLER: Jersey West Drilling

DATE DRILLED: 08/14/00

DRILL METHOD: 4 1/4 IN. HSA

GROUND SURFACE ELEVATION:

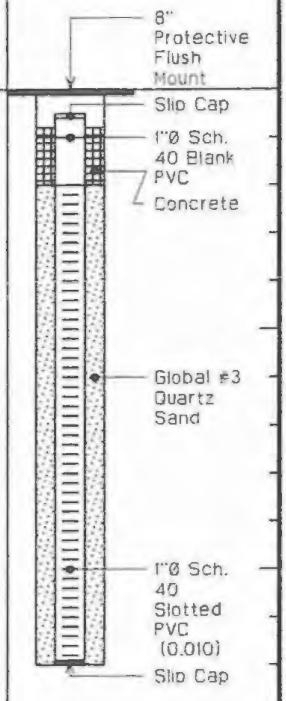
TOP OF CASING ELEVATION:

INITIAL WATER LEVEL: 12.5 ft. BGS DATE: 08/14/00

STATIC WATER LEVEL: DATE:

HNu (ppm)	Recovery (in.)	Blow Counts	Elevation, MSL	Depth (ft.)	Graphic Log	Materials Description
1.8						No sample, Vapor reading from soil cuttings
1.2	17	5-18 5-5		5		Gray silty CLAY w/ fine to medium sand, glass, concrete, metal, rubber, and fine gravel, wet in conrete fragments at 6.7 to 7 feet, very stiff (FILL)
0	18	1-3 4-4				Gray silty CLAY w/ roots and black organic stains, moist, medium stiff (FILL)
1.0	22	1-1 2-1		10		Soft
1.9	16	1-1 1-2				Gray fine sandy silty CLAY w/ medium sand, moist, very soft Gray fine SAND, wet, very loose
				15		Boring terminated at 13 feet
				20		
				25		

Well Completion



Project Name: St. Bernard Landfill	SCS Project Number: 23212007.01	**Test Pit No.: 7 & "L"**	
Project Location: St. Bernard, Ohio	Date Started: 4/16/2013	Page 1 of _1__	
Logged By: R. Mills	Date Completed: 4/16/2013	GW Depth (ft) / Date / Time	
Excavated By: Petro	Sampling Method:		
Excavation Method: Cat 308E	Weather:		
Backfill: excavated and off-site soil			
Total Test Pit Depth: 8 feet			

Depth (ft.)	Sample No.	Methane Reading (%vol)	PID Scan (ppm)	PID Headspace (ppm)*	Description
0--					Approximately 0.5 feet topsoil.
--					Tan soil fill: CLAY & SILT, little Sand, little Gravel, moist, with occasional brick
1--				1.5	fragments and small pieces of metal. Less than 5% non-soil debris.
--					
2--					
--		0	0.4		At approximately 2.5 feet, grey soil fill: SILT & CLAY, some to little Sand, little Gravel,
3--					moist, with glass fragments, brick fragments, slight petroleum odor.
--					Tire encountered at 3 feet. 5 to 10% non-soil debris.
4--					
--					
5--				8	Fill includes slabs of concrete, small pieces of rusted metal, metal tubing, road sign,
--				0.4	car mirror.
6--					2nd tire and inner tube in initial test pit.
--					
7--					Approximately 6 foot square slab of concrete in west end of "L" at 7.5 feet.
--					
8--					At 8 feet, native soil: olive grey Clayey SILT, some fine Sand, some organic matter.
--					
9--					Bottom of test pit at 8.5 feet.
--					
10--					
--					
11--					

* Unless otherwise indicated, headspace samples were collected from excavated soil fill stockpile prior to backfilling.