FACT SHEET

Brookhaven Landfill, Town of Brookhaven, New York

APRIL 2018

INTRODUCTION

The New York State Department of Environmental Conservation (DEC) is publishing a regular factsheet series to share information with the community regarding actions taken by DEC and the town of Brookhaven to improve air quality in the areas surrounding the Brookhaven Landfill. This fact sheet also provides a summary of actions taken by DEC and others in the last several months since the release of the first fact sheet on August 18, 2017.

FACILITY BRIEF

The town of Brookhaven Landfill (the landfill) is a DEC permitted facility located in the hamlet of Yaphank, town of Brookhaven, Suffolk County. The landfill began operating in 1974 and initially accepted household waste, or Municipal Solid Waste (MSW). This MSW was placed in cells (designated areas) 1-4. The disposal of MSW ceased in 1990 in compliance with the Long Island Landfill Law. Construction of cells 5 and 6 took place after 1990. Cell 5, which accepted construction and demolition (C&D) debris and ash from local Resource Recovery Plants, is currently being capped and prepared for closure. Cell 6 is currently active and accepting C&D debris, ash, and other fill material. The landfill has a gas collection system for methane and other gases and a permanent flare to burn the gases to reduce odors and other emissions. The landfill also has a leachate collection system for the liquid that passes or 'leaches' through the waste mass.

ODOR MANAGEMENT AND CORRECTIVE ACTION PLAN (CAP)

In January 2015, DEC started receiving an increasing number of odor complaints about the landfill. Residents of neighboring communities reported rotten egg, sulfur, and sewage-type odors. Most of the complaints came from Frank P. Long Intermediate School, located to the southwest of the landfill; Atlantic Point Residential Complex, located west of the site; and the Brookhaven Fire Department, located to the southeast of the site.

In 2015, the town of Brookhaven retained a consultant (RTP Environmental Associates, Inc.) to develop a plan to monitor onsite sources of odor and dust. The plan included onsite air measurements of hydrogen sulfide (H_2S) (similar to the smell of rotten eggs) to assess sources of odors at the landfill and the establishment of a dust (particle) monitoring network around the perimeter of the landfill. RTP measured and analyzed several parameters, including weather conditions, and concluded that the landfill was the main source of H_2S odors in the community.

In fall 2016, DEC conducted its own investigations and reviewed existing ambient air quality data from several sources. DEC concluded that H_2S emissions from the landfill was causing the odor episodes, and DEC directed the town to better control generation of the gas and its migration offsite. DEC issued a Notice of Violation to the facility in November 2016, and required the town to submit a Corrective Action Plan (CAP) to specifically address DEC's concerns with H_2S emissions.

In December 2016, RTP submitted a CAP addressing DEC's request. The plan listed the following major actions to be undertaken:

- Identify potential odor sources onsite;
- Evaluate existing control systems;
- Redesign the gas collection and control systems (GCCS) and repair the Sulfa Treat System; and
- Evaluate actions to be undertaken at the leachate collection system to reduce odors.

The town has implemented several corrective measures set forth in the CAP to reduce emissions from the onsite odor sources previously identified. Landfill infrastructure upgrades completed to date include:

- Outfitted the newly capped portions of the landfill with a redesigned and more efficient gas collection system to improve gas extraction.
- Upgraded the gas recovery process to reduce condensate accumulation in gas pipes by installing a new condensate line. This moves condensate directly from the gas pipes to the leachate collection system and reduces water from entering the gas collection system.
- Replaced old condensate pumps with new, more efficient models to prevent pump failure. Added a circulator to prevent stagnation in the pipes, thereby resulting in shorter clean-out periods.

The town is now focusing on two main areas of concern: the uncapped sections of landfill and the leachate storage tanks. The sections below discuss this in more detail.

OPERATING LANDFILL AND INACTIVE AREA CLOSURE/CAPPING

At this time, cells 1-5 are capped and closed, and cell 6 is active with landfilling activity occurring in certain sections (see map below for more information),

Summary of Capping to-date

CELLS	CAP PHASE	AREA (acres)	STATUS	YEAR COMPLETED/ PROJECTED COMPLETION YEAR
1 - 4	Phases 1-5b	95.6	Completed	1996
5 - 6	Phases A-F	77.8	Completed	2002 – 2017
5 - 6	Phase G	30.8	Being capped	2018
6	Remaining area to be capped	77.8	Active or partly filled	Upon achieving final elevation

The purpose of placing a final cover on a landfill is to provide containment, a barrier to avoid contact with the disposed waste, and to prevent rainwater infiltration through the waste. The final slope design ensures that proper channeling of rainwater will effectively prevent damage to the cap components.

Once placed in a landfill, waste will settle due to natural consolidation and biodegradation. The primary components of decomposition gases generated in C&D landfills are methane and H_2S. To minimize odorous gas emission to the atmosphere, the Brookhaven Landfill is equipped with a GCCS that collects, treats, and burns the gas in a flare.

In February 2016, the town installed 10 new vertical gas extraction wells at the top plateau of the landfill to mitigate the odors by capturing the gas emanating from an uncapped portion of cell 5. The town also accelerated implementation of its capping plan for the top of the landfill; it completed capping of 13 acres during the 2015-2016 fiscal year, and 15.8 acres during the 2016-2017 fiscal year. This capping closes out the area, which was identified by the odor monitoring plan as most active uncontrolled gas generating area for the entire landfill site. The capping and installation of the gas extraction wells will mitigate uncontrolled landfill gas emissions and direct the gas to the flare to reduce odors.

ANTICIPATED CAPPING ACTIVITIES in 2018

The town of Brookhaven is currently in the process of designing and securing a contractor for a 31-acre capping project. Once completed, 75 percent of the landfill will have been capped. Construction activities should end in the winter of 2018, leaving minor storm-water drainage system work for the spring of 2019. The attached site plan shows the proposed capping area.

POTENTIAL VISUAL IMPACT FROM LANDFILL CAPPING ACTIVITY

In preparation for the proposed landfill capping activity, the town will be regrading at the top and side slope areas of the landfill, which may result in temporary visual impacts at portions of the site including equipment and trucks moving around the landfill.

POTENTIAL ODOR NOTICE FROM LANDFILL CAPPING ACTIVITY

Settlement of the landfill mass is random, thus requiring cutting and filling of the waste mass to achieve proper slopes and contours before placement of the final cap. Potential for increased odor during capping is likely, and the town has proposed the following measures to mitigate offsite odor impacts:

- Undertake all cut and fill operations in smaller, more manageable sections;
- Pre-plan all cuts to be filled in the same day and covered with clean soil;
- Plan work to avoid weekends and holidays.

DEC will monitor all activities and conditions, including odor, during the cut and fill operations.

Leachate Collection System Improvement

Over the past year, the town has taken various steps to improve the leachate collection system to help minimize odor issues, including the following:

- Set up a storage trailer to keep an inventory of numerous replacement pumps, motors, and electrical components. This inventory should help minimize the down time of any single leachate system; less downtime will result in less leachate buildup and less odor potential.
- Created an extensive monthly leachate maintenance schedule to prevent malfunction of any of the leachate system components.
- Performed the following repair work to minimize odors from the side-riser chambers[1]: re-grouting concrete joints, re-grouting the side-riser pipe penetrations, inspection and replacement of pipe gaskets, and installation of additional bolts/nuts to better seal the side-riser tubes.
- Installed a side-riser chamber misting unit for each side-riser chamber on the west side of cell 5 (10 in total). This system is designed to inject a 30 second mist of an odor neutralizing fog into the sealed side-riser chamber every 15 minutes, 365 days a year, thereby reducing the potential of odors emanating from the leachate collection chambers.
- Redesigned the three existing condensate traps located around cell 5 and cell 6. This modification allowed for the installation of a standard submersible pump. The added reliability of the trap will help keep a more efficient vacuum on the landfill backside.
- Installed a high-density polyethylene lining cover of the cell 5/6 and cell 5 manhole system to help minimize the release of any potential odors.
- Created a checklist for the reassembly of any leachate system component that is disassembled for repairs and/or scheduled maintenance. Upon work completion, this list is signed by the contractor and L. K. McLean Associates personnel to ensure the system is reassembled properly.

Treatment of Landfill Leachate for Hydrogen Sulfide

In March 2017, the town retained Dvirka & Bartilucci Engineers & Architects (D&B) to help address odor issues at the landfill, with an emphasis on the leachate collection system. D&B recommended the process of oxidizing the leachate to mitigate odors around the leachate storage tanks, which are located near the intersection of Woodside Avenue and Horseblock Road. The process precipitates the odor causing sulfur compounds, thereby reducing the primary source of odors.

In July and August 2017, D&B conducted a bench study to evaluate the efficacy of treating the leachate with hydrogen peroxide (H_2O_2). Preliminary results of pilot testing were promising - adding H_2O_2 to the leachate tanks had reduced air concentration of H_2S. D&B is currently trying to optimize the frequency, dosage, and method of introducing H_2O_2 to the leachate tanks.

[1] Side riser is collection of leachate collection pipes that pumps the leachate from the landfill liner system for treatment and disposal at the waste water treatment plant

A Picture of newly installed H_2O_2 dosing station located adjacent to the leachate holding tanks. A graphic representation of the dosing results is presented in Figure II

Continuous Monitoring of Off-Site H_2S

In June 2017, DEC installed two hydrogen sulfide (H_2S) air monitors, one north of the landfill along East Woodside Ave. and one south at the Frank P. Long School. The monitors are Apptek Low Range OdaLogs, which measure H_2S in the range of 10 to 2,000 parts per billion (ppb). The measurements are collected at 10-minute intervals, making the instrument an effective screening tool as it operates on a continuous basis. Because the instruments cannot operate below freezing temperatures, they were removed in November 2017. DEC will reinstall the two monitors and continue to monitor offsite concentrations of H_2S in the spring.

DEC has an ambient air quality standard for H_2S of 10 ppb for a one-hour period. Because of limitations with the instrument, measurements were compared with the standard to determine follow-up activities.

At the Frank P. Long School location, the OdaLogs collected samples at 10-minute average and recorded 17,465 observations at the school between 6/22/2017 and 11/16/2017. Only 0.3 percent of the readings potentially detected H_2S, and no one-hour average exceeded the 10 ppb New York State standard at Frank P. Long School.

At the north location, 19,027 measurements were collected from June to November. H_2S was detected in 3 percent of the readings. The one-hour average was at or exceeded the DEC standard for H_2S for 82 hours - 2.6 percent of the total hours of measurements recorded. This monitor is closest to the leachate tank area at the landfill which is known to be a source for air releases of H_2S.

It is important to note that other gases such as diesel exhaust can interfere with readings, and some individuals may smell hydrogen sulfide below the instrument's detection limit, as studies have shown that the hydrogen sulfide odor threshold for approximately 14 percent of the population is 2 ppb.

Summary of upcoming events

- The town initiated an additional capping project at the top of cells 5 and 6 to cap about 31 acres, which is expected to be completed during calendar year 2018.
- DEC plans to continue the community H_2S monitoring in the spring of 2018.

- The town will revise and finalize the Corrective Action Plan to address DEC comments.
- The town will finalize the design for the permanent H_2O_2 treatment system in spring/summer 2018.
- The town will continue their evaluation of the effectiveness of the H_2O_2 treatment system on reducing odors at the leachate tank area.
- The town will continue to monitor potential onsite sources of uncontrolled landfill gas emissions to identify and mitigate emissions and odors.
- DEC will continue to monitor offsite odor migration and effectiveness of corrective measures being implemented.
- The town will continue to monitor onsite fine particulate matter ($PM_{2.5}$).

List of Consultants and Functions

• RTP Environmental Associates	*Air monitoring*	Additional scope of preparing the Odor and Dust Monitoring Plan and the Corrective Action Plan
• D&B	*Groundwater monitoring consultant*	Additional scope of the leachate treatment study
• L. K. McLean Associates	*Landfill operations and maintenance consultant*	Additional scope for updating and improving the leachate collection and pumping infrastructure at the landfill
• SCS Engineers	*Landfill gas collection and management consultant*	Newly hired consultant (replaced Wehran Engineering) for landfill gas management, evaluating the existing system and recommend changes

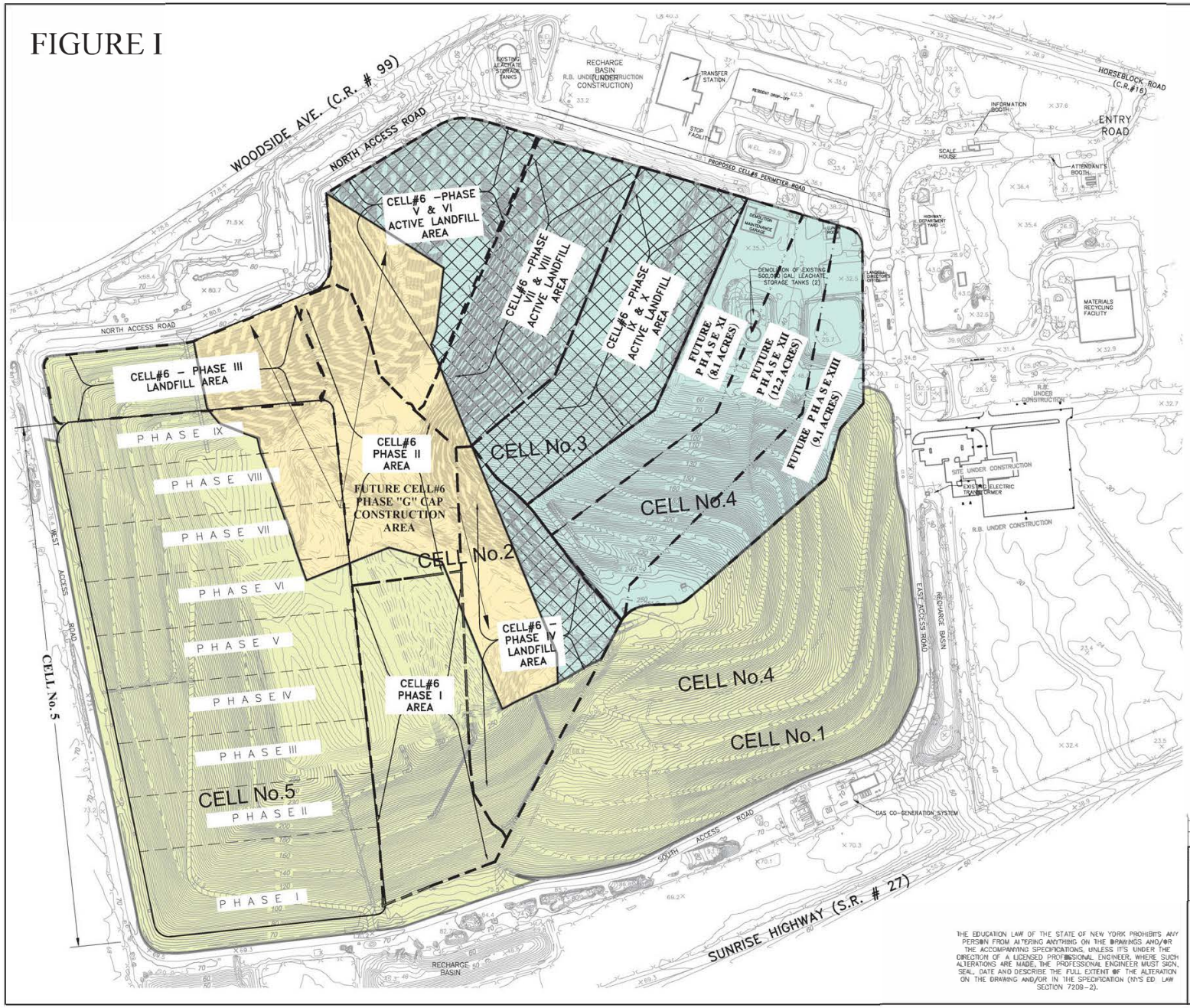
For More Information

Please contact Aphrodite Montalvo, Public Participation Specialist
Phone: (631) 444-0249
Email: R1info@dec.ny.gov

To Report an Odor Complaint

DEC Odor Hotline: (631) 444-0380
Please leave your name, phone number, date of call, location and description of odor.

FIGURE I



GENERAL NOTES:

1. BASE MAPPING AND TOPOGRAPHY FROM AERIAL MAPPING BY GEOMAPS, INTERNATIONAL, INC. FLOWN APRIL 2011 AND MARCH 11, 2003.
2. TOPOGRAPHY OF CELL#5 & #6 IS FROM JUNE 2012 THROUGH JANUARY 2017 FIELD SURVEYS BY L.K. McLEAN ASSOC., P.C.
3. ALL PLAN COORDINATES ARE BASED ON THE LONG ISLAND ZONE OF THE NEW YORK STATE PLANE COORDINATE SYSTEM (N.A.D. 27).
4. UNAUTHORIZED ALTERATION OR ADDITION TO THESE DRAWINGS IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.
5. MEASUREMENTS ARE IN ACCORDANCE WITH U.S. STANDARDS.
6. VERTICAL DATUM IS BASED ON NGVD 29.
7. COPIES FROM THE "ORIGINAL" OF THIS SURVEY PLAN, NOT BEARING AN "ORIGINAL" OF THE LAND SURVEYOR'S "INKED SIGNATURE" OR "EMBOSSED SEAL" SHALL NOT BE A TRUE AND VALID COPY.
6. FUTURE AND PAST CELL#6 PHASES LOCATIONS AS DETERMINED BY CORNERSTONE ENVIRONMENTAL, LLC FILE MIBHXK06.dwg OF JULY 19, 2011.

0 400 800 Feet

SCALE: 1" = 200'

CAPPING SCHEDULE

CELL V & VI

PHASE G	2018	(30.8 ACRES)
EXISTING PHASES	2002–2017	(117.1 ACRES)
EXISTING ACTIVE UNDERLINER PHASES	2002–2017	(39.2 ACRES)
FUTURE UNDERLINER PHASES	2018+	(29.3 ACRES)

THE EDUCATION LAW OF THE STATE OF NEW YORK PROHIBITS ANY PERSON FROM ALTERING ANYTHING ON THE DRAWINGS AND/OR THE ACCOMPANYING SPECIFICATIONS, UNLESS IT'S UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, WHERE SUCH ALTERATIONS ARE MADE, THE PROFESSIONAL ENGINEER MUST SIGN, SEAL, DATE AND DESCRIBE THE FULL EXTENT OF THE ALTERATION ON THE DRAWING AND/OR IN THE SPECIFICATION (NYS ED. LAW SECTION 7209-2).

DATE	BY	DESCRIPTION	APPROV. BY
REVISIONS			

LKMA

TOWN OF BROOKHAVEN
SUFFOLK COUNTY, NY

BROOKHAVEN LANDFILL

PROPOSED PHASE G CAPPING PLAN

L. K. McLEAN ASSOCIATES, P.C.
CONSULTING ENGINEERS 437 SOUTH COUNTRY RD., BROOKHAVEN, NEW YORK 11719

Designed By:	DCJ/CFD	Scale: AS NOTED	Sheet No. 9
Drawn By:	LMY	Date: DEC. 2017	
Approved By:	RGD	File No. 17001.000	

Dec. 15, 2017 - 02:03pm
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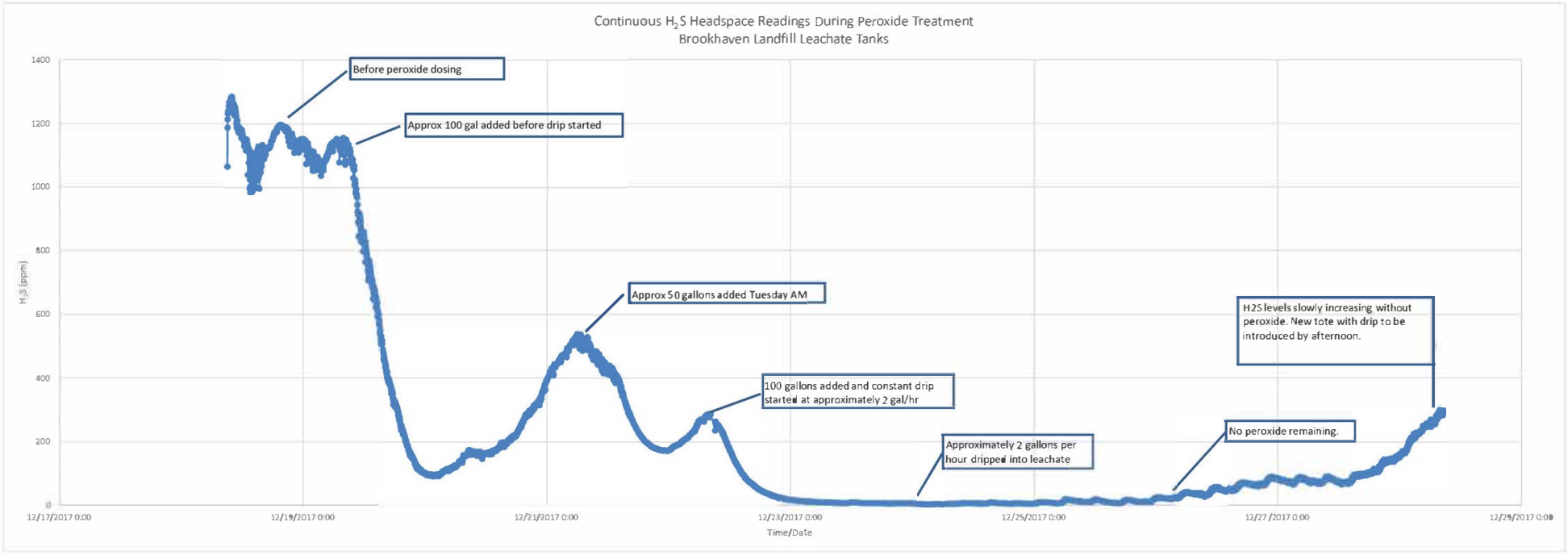
FIGURE- II

FIGURE 1



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