



**TLN705894: Contaminant / Odor  
Survey**

**Owl's Head Wastewater Treatment Plant  
And Surrounding Community  
*Bay Ridge, Brooklyn, NY***

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**Prepared for:  
Councilman Vincent Gentile**

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# Contaminant / Odor Survey

## *Owl's Head WWTP and Surrounding Community*

### 1.0 Introduction

RJ Lee Group, Inc. (RJLG) conducted a survey at the New York City Department of Environmental Protection's (NYC DEP) Owl's Head Wastewater Treatment Plant and surrounding community in Bay Ridge, Brooklyn, New York. The survey was intended to supplement ongoing odor surveys conducted by Malcolm Pirnie, Inc. (Malcolm Pirnie) as detailed in their December 2006 report, and to identify and quantify any possible contaminants in the air.

An initial site visit was conducted on July 16, 2007 to gather background information into the nature and extent of the perceived problem. Air monitoring was conducted on August 8, 2007.

### 2.0 Background

The RJ Lee Group was contacted by the office of Councilman Vincent Gentile regarding odor complaints made by residents in the vicinity of the Owls Head wastewater plant in Bay Ridge. Complaints were logged in at the Councilman's office and were reported in the local news media.

#### 2.1 Review of Previous Studies

A previous odor study had been conducted by Malcolm Pirnie regarding the Owls Head plant with a report issued in December, 2006. The report summarized the results of four odor surveys performed by Pirnie, conducted between July 12 and September 26, 2006. Odor perceptions were documented for intensity, field dilution to threshold, intensity, hedonic tone and hydrogen sulfide. The report concluded that the worst sources of odors were the primary settling tank weirs, followed by the primary settling tanks, and then the grit and scum building, bar screens, gravity thickeners and digesters. Other portions of the plant were not deemed to significantly contribute to the odors. In addition, the report stated that the measured hydrogen sulfide concentrations were well below the "OSHA health risk values."

The report also contained the following observations:

- Primary Settling Tank Weirs – one of the 'most significant odor sources', due to 'open, area-wide source' and their location, 'nearest to the community';
- Primary Settling Tanks – 'significant source of odors', tanks contain hydrogen sources with a large odor emitting surface area;
- Residuals building – low odor from the carbon absorber exhaust;
- Bar Screens – modifications underway to restore 'effective odor control';

- Gravity Thickeners – possibility of odor release by a north or northwest wind pushing odors toward the nearby community;
- Digesters – digester gas release from pressure valves is an ‘intermittent event’; while the gas received the same intensity and hedonic tone ratings as the primary settling weirs, it received an ‘overall lower odor source rating’ due to the intermittent nature of its release;
- Aeration tanks – the large turbulent surface area can contribute to odor emissions;
- Final Settling Tanks – almost no perceptible odor;
- Chlorine contact tanks – no perceptible odor.

In addition to the plant odor study, two community surveys were performed in September of 2006. During the September 17, 2006 survey, no odors were detected due ‘likely to the wind direction being from the south.’ During the September 26, 2006 survey, the wind was from the west and odors were detected. The report for the September 26 survey delineates the extent of the wastewater treatment plant odors and states that the highest odor intensity perceived during the survey was a 2 (out of a possible 5).

## 2.2 Summary of Initial Meeting and Walk-through

An initial meeting and walk-through were held on July 16, 2007 at the Owls Head Plant in Bay Ridge, Brooklyn. The following were in attendance: Dr. Farrell Melnick and Dr. Bobby Gunter of RJLG; DEP Compliance Officer Diane Hammerman; Councilman Vincent Gentile and his assistants Rob Alarcon, Eric Kuo and Stephanie Giovinco; Richard Pope, Vice President of Malcolm Pirnie; and Plant Superintendent William (Bill) Grandner.

Discussions focused on the nature and volume of complaints and any potential health effects, both in the plant and in the community. Following discussions, a walkthrough of the plant was conducted. During the walkthrough, Mr. Pope informed us of the actions that had been taken to assist in mitigation of odors. Monitoring locations were identified at selected points throughout the plant and in the community. Following the site visit, a sampling protocol was developed.

## 3.0 Methods

Six (6) locations around the perimeter of the plant were selected for air monitoring. In addition, two (2) locations in the community were provided by the councilman’s office. At each location, air samples were collected for volatile organic compounds (VOCs) and viable bacteria. In addition, real-time hydrogen sulfide monitoring was conducted. Each location is listed in Table 1 below. Figure 1 and Figure 2 illustrate the sampling locations in relation to community locale and plant features, respectively.

**Table 1. Air Monitoring Locations.**

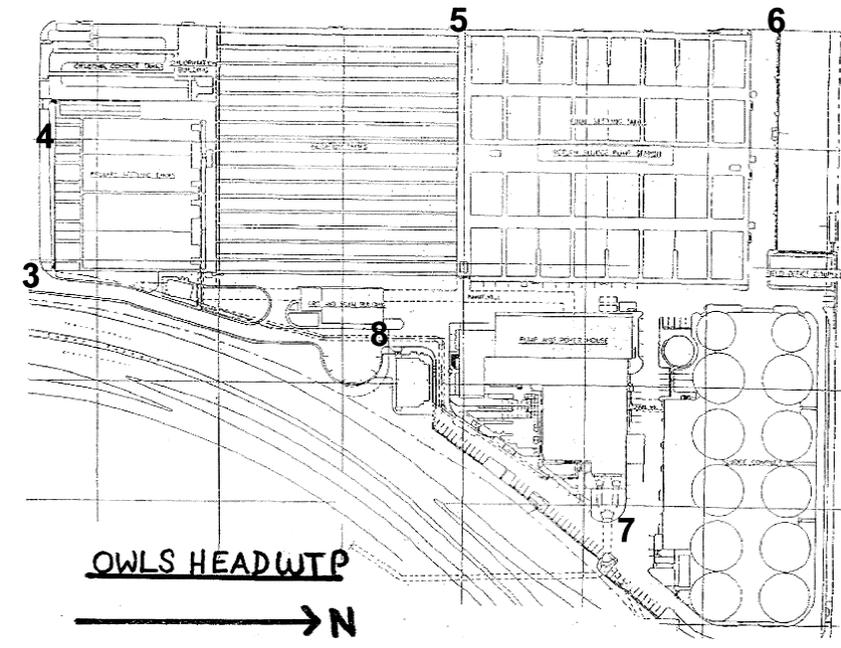
<b>Location No.</b>	<b>Community / Plant Perimeter</b>	<b>Description</b>	<b>VOC Client Sample ID*</b>	<b>Bacteria Client Sample ID</b>
1	Community, Indoors	6801 Shore Road, Apartment 6S	5265125	Sample 1 5265104, 5265105
2	Community, Outdoors	7100 Shore Road, Xaverian School, Near Front Steps	5265126	Sample 2 5265106, 5265107
3	Plant Perimeter	Southeast, Near Primary Settling Tanks	5265127	Sample 3 5265108, 5265109
4	Plant Perimeter	Southwest, Between Primary Settling Tanks and Chlorine Contact Tanks	5265128	Sample 4 5265110, 5265111
5	Plant Perimeter	West, Between Aeration Tanks and Final Settling Tanks	5265129	Sample 5 5265112, 5265113
6	Plant Perimeter	Northwest, Near Final Settling Tanks	5265130	Sample 6 5265114, 5265115
7	Plant Perimeter	Northeast, Near Sludge Complex	5265131	Sample 7 5265116, 5265117
8	Plant Perimeter	East, Near Grit and Scum Building	5265132	Sample 8 5265118, 5265119

\*VOC Client Sample IDs for field blank samples were 5265124 and 5265135

Figure 1. All Air Monitoring Locations<sup>1</sup>.



Figure 2. Detail of Plant Perimeter Air Monitoring Locations.



<sup>1</sup> Google Earth, Version 3.0. November 2005. Accessed 29 August 2007.

### 3.1 VOC Sampling and Analysis

Air samples were collected by using SKC Universal XR personal air-sampling pumps connected with Tygon tubing to the sampling media, charcoal sorbent tubes. The pumps with sampling media were allowed to operate for several hours. A Gilibrator primary flow meter was used to calibrate the volumetric airflow rates of the air sampling pumps with sampling media in-line before and after each sampling period.

As a quality control measure, field blanks were also submitted to the laboratory for analysis.

VOC samples and field blanks were processed and analyzed per NIOSH 1501 (modified) by RJLG Center for Laboratory Sciences (CLS), an American Industrial Hygiene Association (AIHA) Accredited Laboratory located in Pasco, WA. To supplement the analysis, a scan for VOCs not contained on the method's target analyte list was conducted by a Tentatively Identified Compound (TIC) search.

### 3.2 Viable Bacteria Sampling and Analysis

Air samples were collected by using a Zefon rotary vane high volume sampling pump connected with Tygon tubing to an Andersen N6 single stage impaction sampler loaded with standard Petri plates containing R2Ac agar. Two (2) agar plates comprised each sample: one collected for 1 minute and one collected for 2 minutes for a total sampling time of 3 minutes. Prior to sampling, a DryCal DC-Lite primary flow meter was used to calibrate the volumetric airflow rate (28.3 liters per minute) of the air sampling pump in accordance with standard techniques for using the Andersen N6 impaction sampler.

Viable bacteria samples were processed and analyzed by Pathcon Laboratories per Pathcon's internal 2-plate protocol for Bacteria. Pathcon is an AIHA Environmental Microbiology Accredited Laboratory located in Norcross, GA.

### 3.3 Real-time Hydrogen Sulfide Monitoring

Real-time hydrogen sulfide monitoring using an MSA Passport FiveStar Alarm was conducted at each Plant Perimeter location and at two intervals between Plant Perimeter locations. The instrument was also utilized at both Community locations.

### 3.4 Meteorological Data Collection

Historical weather data for the area on the date of monitoring including wind speed and direction, temperature, barometric pressure, and relative humidity was obtained from Weather Underground<sup>2</sup>, an internet database.

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<sup>2</sup> The Weather Underground, Inc. Ann Arbor, MI. History for KNYBKLN1, Data Summary for August 9, 2007. Accessed 12 September 2007. Available from: <http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KNYBKLYN1&month=8&day=9&year=2007>

## 4.0 Results

### 4.1 VOC Results

As a result of the NIOSH 1501 (modified) analysis and the TIC search, no significant VOCs were detected in the samples. The complete laboratory report submitted by RJLG CLS can be found in Appendix A.

### 4.2 Viable Bacteria Results

Viable bacteria were detected on all samples in low concentrations. Concentrations ranged from 24 Colony Forming Units Per Cubic Meter of Air (CFU/m<sup>3</sup>) to 695 CFU/m<sup>3</sup>. No pathogenic genera of bacteria were detected in any samples. The complete laboratory report submitted by Pathcon can be found in Appendix B.

### 4.3 Real-time Hydrogen Sulfide Results

No hydrogen sulfide was detected at any Plant Perimeter or Community locations.

### 4.4 Meteorological Data

Meteorological data was provided approximately every five (5) minutes during the period of monitoring. Generally, winds were calm, ranging from 0 to 6 miles per hour (mph) out of the south and southeast. Temperatures in the area ranged from approximately 79 to 82 degrees Fahrenheit, barometric pressure ranged from 29.86 to 29.89 inches Hg, and relative humidity ranged from 53 to 64 percent. There was no precipitation on the day of the monitoring.

## 5.0 Discussion

The weather on the day of monitoring was ideal for air sampling, with warm temperatures, a lack of precipitation, and very light or no wind speeds. Under these conditions, we would expect contaminant emissions in the air to accumulate and be detected by the perimeter monitoring locations. However, the results showed that no significant VOCs or hydrogen sulfide were detected, and viable bacteria concentrations were low.

Although winds were very light, the general wind direction was from the south-southeast, moving from the community across the plant toward the Upper New York Bay. Therefore, it is assumed that any odors or contaminant emissions generated at the plant would not be detected in the community.

The highest viable bacteria concentration, which was observed indoors at Location 1 in the community, is likely a result of normal indoor conditions and human habitation. Typically, as in the case of the apartment unit tested, air is re-circulated by window air conditioning units. A lack of make-up air in apartment units may allow for the build-up of human commensal bacteria and environmental bacteria in indoor air.

A number of the remediation items were suggested by Malcolm Pirnie in their December 2006 report. These items are listed below:

- Primary settling tank weirs – these have been covered and the exhaust ventilation is currently passed through activated carbon which mitigates odors;
- Primary settling tanks – no changes suggested;
- Residuals building – the outside door is kept closed in order to reduce release points for odors, and activated carbon is used for odor control;
- Residuals containers – these are now stored in a new building in order to reduce the odor points of emissions;
- Bar screens – activated carbon is now used for odor control;
- Gravity thickeners – windows are now locked in the sludge complex building located at the northeast corner of the plant;
- Digester gas flare – at the time of the odor study, the flare was not working; it has since been repaired; the gas holder tank was also out of service, but has since been repaired;
- Aeration tanks – no changes were suggested.

The two major sources of odors, primary settling tanks and weirs, have been covered as a result of previous odor studies. The carbon absorber containers should have a maintenance schedule, and should be regularly serviced to achieve maximum odor control.

The purpose of this study was to monitor chemical and biological agents that may have harmful health effects. The presence of hydrogen sulfide and other air contaminants and odors at wastewater plants is commonly manifested as a nuisance odor problem, with an absence of documented physiological effects, other than those relating to the odors such as nausea and dizziness<sup>3</sup>. The odor threshold of sulfur-containing compounds commonly found at wastewater plants is very low. For example, hydrogen sulfide has an odor detection threshold of less than 0.00021 parts hydrogen sulfide per million parts air (ppm), a concentration well below that known to cause harmful health effects.

## 6.0 Conclusions

The lack of detection of significant VOCs and hydrogen sulfide at the Owl's Head Wastewater Treatment Plant monitoring locations has shown that the plant, on the day of the monitoring, was not a significant source of emissions. In addition, the low

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<sup>3</sup> Metcalf and Eddy: Wastewater Engineering, Treatment, Disposal and Reuse, 3rd Edition, 1991

concentrations yielded by the viable bacteria sampling indicate that the plant was not a significant source of microbes. Results are subject, in part, to meteorological conditions which were favorable for air sampling that day.

Resulting from previous odor studies by Malcolm Pirnie, odor control methods have been implemented. The two major sources of odors, primary settling tanks and weirs, have been covered and carbon absorbers have been put into place. A maintenance schedule for the carbon absorbers should be developed for maximum odor control.

In conclusion, it should be noted that the levels of organics and microbes did not present a health hazard in this study. However, in any study of this kind, there will be a 'scale of sensitivities' of individuals, such that some people may experience discomfort and effects such as nausea and dizziness associated with prolonged exposure to odors. A study conducted by the New York City Department of Environmental Protection (DEP) and its contractors should definitively determine any other areas of the plant where odor control measures should be implemented and periodic checks of those areas for efficiency of odor reduction should be performed.