New Jersey Department of Environmental Protection
Division of Air Quality

FENCELINE AIR MONITORING PLAN FOR HYDROGEN SULFIDE

The following guidance must be followed in order to comply with the requirement for monitoring hydrogen sulfide (H_2S) in the air around the perimeter of a facility, in accordance with the facility's New Jersey Air Pollution Control Permit.

It is recommended that you make a copy of the following guidance, and fill in your information where specified in underlined italics.

Prior to doing any H_2S sampling, the facility's monitoring plan must be approved by NJDEP. Sign and submit the monitoring plan to:

Luis Lim, Chief
Bureau of Air Monitoring
NJDEP Division of Air Quality
Mail Code 401-02E
P.O. Box 420
Trenton, NJ 08625-0420

If you have any questions about fenceline monitoring, call 609-633-1151, or send an email to Luis.Lim@dep.nj.gov.

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AT *(FACILITY NAME)*

FACILITY INFORMATION

Facility/Company (Operator of Facility)	
Facility/Company Address	
Name of Responsible Facility Representative	
Title	
Signature	
Date	

CONSULTANT INFORMATION

Air Monitoring Plan Preparer (Consulting Firm)	
Consulting Firm Address	
Name of Responsible Consultant	
Title	
Signature	
Date	

FENCELINE AIR MONITORING PLAN FOR HYDROGEN SULFIDE

1. Project Organization

(Consulting firm) will operate the monitoring program for *(Company)*. *(Responsible consultant)* is the project manager for *(consulting firm)* and will report to *(responsible person)* at *(facility/company)*. *(Consulting firm)* will employ *(subcontractor)* for laboratory analysis, data analysis, etc. *(please specify)*. This is illustrated in the flow chart below.

Figure 1: Organization Chart for Fenceline Monitoring Project

(Insert figure showing flow of monitoring data associated with names of responsible parties.)

2. Project Description

(Company) operates *(facility)* that *(describe production at facility)*. Due to *(insert appropriate: condition of permit, Legacy Landfill Regulation)*, *(company)* will operate a fenceline air monitoring program that will measure hydrogen sulfide (H_2S). The purpose of the monitoring program is to compare periodic H_2S measurements to an action level, and to submit and implement an odor minimization plan if specific criteria are met. The sampling frequency, action level and the actions triggered by exceeding this level (or by maintaining measurements below this level) are summarized in Table 1. Data collection is expected to begin on *(start date)* and will continue until *(end date)*. A map of the facility is shown in Figure 2.

Table 1: Example Sampling Frequency and Action Levels for Fenceline Monitoring of Hydrogen Sulfide

30-MINUTE AVERAGE H_2S CONCENTRATION, PPBV	ACTION
≤30 ppbv	1. No action, continue current sampling frequency. 2. After completing 1 calendar week in which all H_2S measurements were ≤30 ppbv, sampling frequency may be reduced to once per week. 3. After completing 2 calendar months in which all weekly H_2S measurements were ≤30 ppbv, sampling frequency may be reduced to once per calendar quarter.
>30 ppbv	1. If sampling frequency was reduced to weekly or quarterly, revert to daily sampling. 2. If 3 consecutive H_2S measurements were >30 ppbv, an Odor Minimization Plan shall be submitted to NJDEP for review and approval.

Figure 2: Map of Facility and Surroundings

(Add figure containing map of facility and bordering properties, including major roads.)

3. Quality Objectives for Measurement Data

In addition to H_2S, the project will also measure wind speed and wind direction. The measurement quality objectives for these parameters are summarized in Table 2.

Table 2: Measurement Quality Objectives

OBJECTIVE	H2S	WIND DIRECTION	WIND SPEED
Data Completeness (% Valid Data)	100%	100%	100%
Range	0-50 ppb	0-360 degrees	0-50 mph
Minimum Detection Limit	3 ppb	2 degrees	1 mph
Accuracy	±10%	±5%	±5%
Frequency of Zero Checks	Each sample	--	--
Frequency of Sensor Regeneration	Each sample	--	--
Frequency of Factory Calibration	Annual	--	--

4. Special Training or Requirements

Any technician identified to collect samples will receive appropriate training to operate the H_2S analyzer and the wind sensor. In addition, the technician will be trained in performing basic data validation.

5. Sampling Design

Only one monitoring site is required, but it must be downwind from the facility at the fenceline. In order to meet this requirement, eight (8) monitoring sites are to be identified in the cardinal directions where monitoring may be performed depending on the wind direction of the time of monitoring. These sites are listed in Table 3 *(fill in)*, and their locations on a map of the facility are shown in Figure 3 *(insert map)*. Specifications on the monitors are listed in Table 4 *(fill in)*.

Table 3: Identified Downwind Monitoring Sites

(Fill in address/coordinates)

MONITORING SITE	WIND DIRECTION	ADDRESS/COORDINATES
1	North	
2	Northeast	
3	East	
4	Southeast	
5	South	
6	Southwest	
7	West	
8	Northwest	
9 - Meteorological Station		

Figure 3: Map of Downwind Monitoring Sites

(Insert map showing locations of monitoring sites.)

Table 4: Specifications for Hydrogen Sulfide and Wind Speed/Wind Direction Monitors

(Fill in)

	H_2S	Wind Speed	Wind Direction
Manufacturer			
Model #			
Measurement Range			
Units			
Resolution/Detection Limit			
Accuracy			
Average/Response Time			
Power Requirement			
Operating Environment			

6. Sample Handling Requirements

The air sample is automatically drawn into the H_2S analyzer's inlet by an internal sample pump. After the air sample is analyzed for H_2S, the sample air is exhausted. The initial sampling frequency is daily, and this schedule may be changed according to Table 1.

7. Analytical Method

The method for analyzing H_2S is electrochemical. In the analyzer, the air sample passes over a gold film for a precise time period. The gold film adsorbs the H_2S from the sample air, which causes an increase in electrical resistance in the gold film proportional to the mass of H_2S in the sample. The analyzer's internal electronics determine the concentration of H_2S, and the value is displayed in parts per million (ppm) or parts per billion (ppb).

8. Quality Control

To ensure the quality of the data, the following quality control activities will be conducted.

Table 5: Quality Control Activities

ACTIVITY	FREQUENCY	ACTION
Data Completeness	100% valid data for each sample	Repeat sampling
Zero Check	Before each sample	Perform warm-up
Regeneration	Before each sample	Perform regeneration
Factory Calibration	Annual	Return to factory
Analyzer Audit	Annual	By independent party

9. Instrument Maintenance

The following maintenance schedule will be implemented. A record of maintenance activity must be kept and must be made available to the NJDEP when requested.

Table 6: Maintenance Schedule

PART/COMPONENT	MAINTENANCE CYCLE
Charge battery	Depends on usage
Change 0.25 inch fritware	Weekly or as needed
Change internal filters and tubing	Every 6 months or as needed
Replace zero air filter	Annually
Functional check	Monthly or as needed
Replace battery	Annually or as needed

10. Performance Assessment

A performance audit on the H_2S analyzer will be conducted annually by an independent party. The goal of the audit is to meet $\pm$10% difference at the concentration of the action level, 30 ppb. The result of the audit will be submitted to NJDEP. NJDEP may also request that an audit be conducted at any time.

11. Data Management

A blank "HYDROGEN SULFIDE MONITORING DATA FORM" is attached to the end of this document.

The technician taking the measurement must record the H_2S reading on the form, along with the location, date, time, wind speed, wind direction, quality control checks, and signature. The technician hands the completed data form to the data manager who must also sign the monitoring form.

Upon receipt of the monitoring form, the data manager confirms that the data is valid and determines if the current sampling schedule should continue as is, or if it should change according to Table 1. The data manager keeps a file of the monitoring forms in a secure location, and records the data in electronic format (Excel). Depending on the sampling frequency, the data manager may submit periodic summary reports to NJDEP, including the results of quality control activities. The data manager will notify the project manager if the data triggers the need to submit an odor minimization plan according to Table 1.

12. Data Validation

Every sampling event is important since it can trigger a change in the sampling frequency or trigger the need to submit an odor minimization plan. Therefore, every sampling event must produce a valid H_2S concentration. The technician taking the sample will be trained to perform basic data validation tests. If the technician determines that the data is not valid, they may retake a sample or notify the supervisor or project manager regarding the condition of the analyzer. Upon receipt of the monitoring form, the data manager must confirm that the data is valid, or must perform additional tests or investigations to determine the validity of a questionable concentration. The data manager will certify that the data is valid.

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HYDROGEN SULFIDE MONITORING DATA FORM

Facility Name	
Sample Date	
Sampling Technician	
Zero Check	
Sensor Regeneration	
Location	
Begin Time	
End Time	
Wind Speed	
Wind Direction	
H_2S Concentration (ppbv)	
Data Manager/Reviewer	

Sampling Technician
Signature & Date _____

Sample data is: Valid ☐ Invalid ☐

Data Manager/Reviewer
Signature & Date _____