WehranEnviroTech

Site# 704010

DRAFT
BROOME COUNTY
COLESVILLE LANDFILL
ENVIRONMENTAL MONITORING PLAN

Prepared For

BROOME COUNTY

DIVISION OF SOLID WASTE MANAGEMENT

Broome County, New York

and

GAF CORPORATION

Wayne, New Jersey

February 1993

Wehran-New York, Inc.
Middletown, New York

Environmental Engineers • Scientists • Constructors

WehranEnviroTech

Wehran-New York, Inc.
666 East Main Street
P.O. Box 2006
Middletown, New York 10940
Tel: 914-343-0660
Fax: 914-343-1946

February 18, 1993

Mr. Brian Davidson
Project Manager
Bureau of Central Remedial Action
Division of Hazardous Waste Remediation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233-7010

RECEIVED
FEB 23 1993
BUREAU OF CENTRAL REMEDIAL ACTION

Re: Colesville Landfill Remedial Design
Draft Environmental Monitoring Plan
Wehran Project No. 02260.EC

Dear Mr. Davidson:

Please find enclosed three (3) copies of the referenced report. This plan is part of the pre-final design submission. Please let me know if you have any comments.

Very truly yours,

WEHRAN-NEW YORK, INC.

Michael W. O'Hara

Michael W. O'Hara, P.E.
Project Manager

MWO/amw

cc: Neil Kaye - GAF (2)
Ray Standish - Broome County (1)
Eduardo Gonzalez - USEPA (9)
Claudine Jones - NYSDOH (1)

Site # 704010.

DRAFT
BROOME COUNTY
COLESVILLE LANDFILL
ENVIRONMENTAL MONITORING PLAN

Prepared for

BROOME COUNTY DIVISION OF SOLID WASTE MANAGEMENT
Broome County, New York
and
GAF CORPORATION
Wayne, New Jersey

Prepared by

WEHRAN-NEW YORK, INC.
666 East Main Street
Middletown, New York 10940

WE Project No. 02260 EC

February 1993

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

This Environmental Monitoring Plan was prepared by Wehran-New York, Inc. for the Broome County Division of Solid Waste Management (Broome County, New York) and GAF Chemicals, Inc. (Wayne, New Jersey). It was prepared as part of the closure engineering design for the Colesville Landfill Remedial Design/Remedial Action (RD/RA) project.

The Colesville Landfill is located in Broome County, New York.It is a Superfund site that has been the subject of a Remedial Investigation/Feasibility Study (RI/FS) performed by Wehran. The March 1991 Record of Decision called for groundwater containment and extraction by a series of wells in the contaminant plume of volatile organic compounds (VOCs) in the glacial outwash aquifer adjacent to the northwest/west/southwest portion of the landfill, and wells to be screened in the glacial outwash aquifer beneath the landfill.

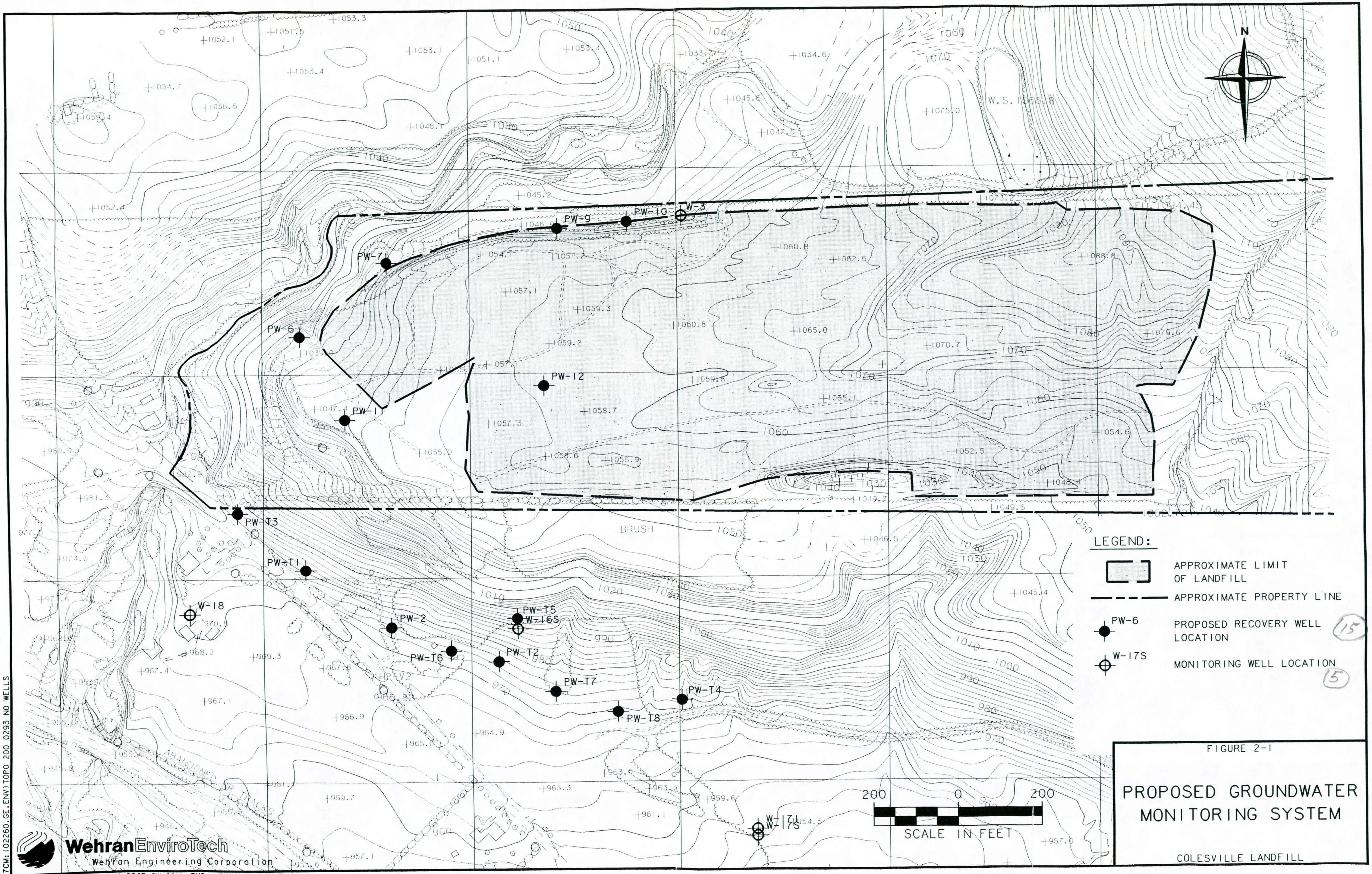
Analysis of groundwater samples from the monitoring wells installed outside of the landfill as part of this pre-design effort showed VOC and iron concentrations above surface water discharge standards. Treatment for iron removal and VOCs will therefore be provided.

This plan has been prepared based on fact that the groundwater at the site was fully characterized during the RI/FS and that active remediation of the groundwater will be instituted along with this monitoring program. These considerations will allow for the monitoring of the contaminant plume in the glacial outwash and the effectiveness of the remedial design.

2.0 WATER QUALITY MONITORING PROGRAM

2.1 GROUNDWATER MONITORING

The results of the RI has shown that groundwater contamination from the site is limited to the glacial outwash aquifer. As such, the groundwater monitoring program has been developed to monitor the water quality in this aquifer within the contaminant plume, and the effectiveness of the remedial design. Because the RI has shown that the bedrock aquifer has not been affected, no monitoring of it is included in this Plan.



LEGEND:

▨	APPROXIMATE LIMIT OF LANDFILL
— —	APPROXIMATE PROPERTY LINE
● PW-6	PROPOSED RECOVERY WELL LOCATION (15)
⊕ W-17S	MONITORING WELL LOCATION (5)

FIGURE 2-1

PROPOSED GROUNDWATER MONITORING SYSTEM

COLESVILLE LANDFILL

WehranEnviroTech
Wehran Engineering Corporation

7CM:(02260.GE.ENV)TOPO 200 0293 NO WELLS

7CM:(02260.GE.ENV)FIG PROP GW COLL SYS DWG: DT129219

The groundwater monitoring well network for the Monitoring Plan consists of five existing monitoring wells (W-16S, W-17S, W-17I, W-18, and W-3) within the contaminant plume in the vicinity of the proposed groundwater collection wells. Figure 2-1 shows the locations of the monitoring wells along with the locations of the proposed groundwater collection wells. The monitoring wells will be sampled on a quarterly basis for VOCs. The data obtained from these wells will allow the contaminant plume to be monitored and assist in the evaluation of the effectiveness of the groundwater collection system as the remedial program progresses over time.

All other monitoring wells installed for previous investigations, which will not be included in either the monitoring well network for the closed landfill or in evaluating the remedial program, will be abandoned in accordance with 6 NYCRR Part 360-2.11(a)(8)(vi). A total of 32 wells will be abandoned.

2.2 EFFLUENT MONITORING

The collected groundwater will be treated using metals precipitation and air stripping. The effluent from the treatment plant will be monitored in accordance with the New York State Department of Environmental Conservation (NYSDEC) Effluent Limitations and Monitoring Requirements (Permit Equivalency No. 704010b) provided in Appendix A. Samples for flow and pH will be obtained daily. Samples for all other required parameters will be collected at a frequency of twice per month.

?

2.3 AQUATIC TOXICITY MONITORING

An effluent toxicity monitoring program based on the Permit Equivalency requirements (No. 7040106, Appendix A). The toxicity monitoring program will be instituted upon completion of the RD construction and the commencement of effluent discharge to the unnamed stream north of the site, and will be performed monthly for three months and quarterly thereafter, for a period of one year.

Toxicity monitoring will include Tier 1, acute testing. Tier 1 testing will be performed for both a vertebrate and invertebrate species in accordance with the "New York State Manual for Toxicity Testing of Industrial and Municipal Effluents" (NYSDEC, February 1985). Following completion of the toxicity testing, the results will be evaluated to determine if Tier 2 chronic testing or a Toxicity Reduction Evaluation (TRE), is needed.

2.4 LEACHATE MONITORING

The engineering design shows seep collectors; however, it is proposed that these not be constructed until it is shown that capping and groundwater collection will not eliminate the seeps (in approximately one year). If a seep collection system is installed, monitoring locations will be sampled on a quarterly basis for the list of VOCs. Seep sampling will coincide with the quarterly groundwater monitoring. The number of sampling locations associated with the seep collection system would be dependent on the reduction of active seeps following capping and the startup of the groundwater collection system; although, a maximum of two samples would be collected, one from leachate collected from both the north and south sides of the landfill.

2.5 SAMPLING PROCEDURES

All sampling procedures and protocols to be followed are included in the Sampling Analysis Plan (Appendix B). The Health and Safety Plan (Appendix C) developed by Wehran for pre-design field activities is included to indicate health and safety considerations at the site. The sampling contractor will need to develop a health and safety plan before routine sampling begins.

3.0 AIR STRIPPER MONITORING

To ensure that air emission rates from the air stripper tower are within permissible levels, a mass balance approach will be used to determine the maximum concentration of VOCs which could be emitted to the atmosphere. This approach will include sampling both the influent and effluent streams for VOCs, and calculating by difference the mass emission to the atmosphere of each VOC detected in the influent.

Air stripper influent and effluent water samples will be collected quarterly, in conjunction with the groundwater monitoring program, to evaluate the emission rates.

4.0 RECORDKEEPING AND REPORTING

Broome County will employ procedures to monitor the operation and maintenance of the groundwater containment program, treatment facility and the landfill, including a program of self-inspection, recordkeeping, and reporting. The procedures are discussed in the following sections.

4.1 RECORDKEEPING

The facility will maintain records to evaluate the inspection, operation, maintenance, and monitoring of the groundwater containment program, treatment facility and the landfill. This information will be recorded and maintained in the County files. Some of the information will be reported to NYSDEC as presented in Section 4.2. The remaining information will be available in the files maintained at the site. Records will also be maintained regarding the results of the Environmental Monitoring Plan.

4.2 REPORTING

Broome County will prepare and submit an annual summary on water quality and on the operation, maintenance, and monitoring of the groundwater containment program, the treatment facility, and the landfill. These reports will contain the following information: ?

- Analytical results of groundwater, leachate seep, treated effluent, and air /evaluation sampling events conducted over the course of the year.
- A review of effectiveness of the groundwater containment program and the treatment system, and an evaluation of any changes in the contaminant plume.
- Results of the influent/effluent mass balance sampling and evaluation of the air stripper emissions.
- An evaluation of the toxicity testing results and a determination on whether any additional studies are required.
- Quantity of Groundwater/leachate pumping & treatment during the reporting period.
- Groundwater elevations – ?
- Effectiveness of containment system?
- DMR's monthly – for discharges

APPENDICES

APPENDIX A
TREATMENT PLANT EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Colesville Landfill, Colesville (T), Broome County

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning December 1, 1992

and lasting until December 1, 1997

the discharges from the facility shall be limited and monitored as specified below:

Outfall Number & Effluent Parameter	Discharge Limitations			Minimum Monitoring Requirements	
	Daily Avg.	Daily Max.	Units	Measurement Frequency	Sample Type
001 - Remedial Discharge to SR-120					
Flow	260,000	Monitor	GPD	Daily	Meter
pH (Range)	(6.5 - 8.5)		SU	Daily	Grab
Solids, Suspended	15	Monitor	mg/l	2/month	3-hr. comp.
Solids, Dissolved	Monitor	500	mg/l	2/month	3-hr. comp.
Solids, Settleable	Monitor	0.1	ml/l	2/month	Grab
BOD$_5$	Monitor	10	mg/l	2/month	3-hr. comp.
Dissolved Oxygen	Monitor	7 (Min)	mg/l	2/month	Grab
Ammonia (as N)	Monitor	1	mg/l	2/month	3-hr. comp.
Hardness (as CaC03)	Monitor	200	mg/l	2/month	3-hr. comp.
Arsenic, Total	Monitor	100	µg/l	2/month	3-hr. comp.
Copper, Total	Monitor	35	µg/l	2/month	3-hr. comp.
Iron, Total	Monitor	300	µg/l	2/month	3-hr. comp.
Lead, Total	Monitor	4	µg/l	2/month	3-hr. comp.
Magnesium, Total	Monitor	35000	µg/l	2/month	3-hr. comp.
Manganese, Total	Monitor	300	µg/l	2/month	3-hr. comp.
Zinc, Total	Monitor	100	µg/l	2/month	3-hr. comp.
Benzene	Monitor	6	µg/l	2/month	Grab
2-Butanone	Monitor	20	µg/l	2/month	Grab
Chlorobenzene	Monitor	5	µg/l	2/month	Grab
Chloroethane	Monitor	10	µg/l	2/month	Grab
Chloroform	Monitor	10	µg/l	2/month	Grab
1,1,-Dichloroethane	Monitor	10	µg/l	2/month	Grab
1,2-Dichloroethane	Monitor	10	µg/l	2/month	Grab
1,1-Dichloroethylene*	Monitor	ND	µg/l	2/month	Grab
1,2-Dichloroethylene	Monitor	10	µg/l	2/month	Grab
Dichlorodifluoroethane	Monitor	10	µg/l	2/month	Grab
Ethylbenzene	Monitor	10	µg/l	2/month	Grab
Methylene Chloride	Monitor	10	µg/l	2/month	Grab
4-Methyl-2-Pentanone	Monitor	20	µg/l	2/month	Grab
Propanone	Monitor	20	µg/l	2/month	Grab
Tetrachloroethylene	Monitor	10	µg/l	2/month	Grab
Toluene	Monitor	10	µg/l	2/month	Grab
1,1,1-Trichloroethane	Monitor	10	µg/l	2/month	Grab
1,1,2-Trichlorethane	Monitor	10	µg/l	2/month	Grab
Trichloroethylene	Monitor	10	µg/l	2/month	Grab
Trichlorofluoroethane	Monitor	10	µg/l	2/month	Grab
Vinyl Chloride	Monitor	10	µg/l	2/month	Grab
Xylenes, Total	Monitor	10	µg/l	2/month	Grab

Special Conditions:

*Must be nondetect using USEPA Method 601 with a PQL of 0.5 µg/l.

Authorization to discharge is valid only for the period noted above but may be renewed if appropriate. A request for renewal must be received 6 months prior to the expiration date to allow for a review of monitoring data and reassessment of monitoring requirements.

Only site generated wastewater is authorized for treatment and discharge.

Discharge is not authorized until such time as an engineering report, plans and specifications are submitted detailing the method of treatment and approval is granted by the Department.

Toxicity Testing Program
Tier 1 - Acute Test

The permittee shall implement an effluent toxicity monitoring program beginning on the effective date of this authorization and lasting for a period of one year. A final determination regarding additional monitoring and/or implementation of a toxicity reduction evaluation will be made by the Department following the completion of this program and given to the permittee in writing by the Regional Water Engineer. The effluent toxicity monitoring program shall be as follows:

Outfall No(s)	Effluent Parameter	Units	Monitoring Requirements Measurement Frequency	Monitoring Requirements Sample Type
001	Effluent Toxicity(a)	% Effluent(b)	c	d

(a) Effluent Toxicity shall mean the toxicity of the effluent in acute static renewal tests specified as Tier 1 testing in New York State Manual for Toxicity Testing of Industrial and Municipal Effluents, NYSDEC, February 1985. Both a vertebrate and invertebrate species shall be used for the tests. Dilution water shall be collected according to the Manual. Receiving water shall be used as dilution water unless the Department approves a different source. Effluent sampling and holding shall be done as outlined in Sections III-6 to III-8 of the Manual.

(b) The 48-hour EC_{50} in and 48-hour LC_{50} in % Effluent for both a vertebrate and an invertebrate species shall be determined and reported in accordance with the specified frequency. The 48-hour EC_{50} and 48-hour LC_{50} in % Effluent shall be compared to the calculated Instream Waste Concentration (IWC) of the effluent. If evaluation of multiple toxicity test results indicates likely toxicity, the Department may require the permittee to conduct chronic (Tier 2) testing or submit a Toxicity Reduction Evaluation (TRE) study proposal.

(c) Discharge monitoring requirements for effluent toxicity shall be monthly during the one year period beginning on the effective date of this authorization. The results of each toxicity test shall be submitted no later than 28 days following the end of each test period. These reports shall be submitted to the Regional Water Engineer at 615 Erie Blvd. West, Syracuse, New York 13204-2400 and the Chief, Compliance Section, Bureau of Wastewater Facilities Operations, 50 Wolf Road, Albany, NY 12233-3506.

(d) Monitoring of chemical and physical parameters limited in this permit shall be coordinated so that the resulting analyses are also representative of the sample used for toxicity testing.

Chlorinated Discharges:

Discharges which are chlorinated for the purpose of disinfection should be sampled prior to chlorination or be dechlorinated prior to toxicity testing evaluation. Discharges which use chlorination as part of the waste treatment process other than for disinfection purposes, for example oxidation of cyanide, should be sampled after the chlorination process and evaluated for toxicity.

Toxicity Testing Program
Tier 2 - Chronic Test

The permittee shall implement an effluent toxicity monitoring program beginning within 15 days after letter notification from the Regional Water Engineer, or within 45 days following issuance of this permit if Tier 1 (acute) testing is not required. This monitoring program shall continue for a period of one year. A final determination regarding additional monitoring and/or implementation of a toxicity reduction evaluation will be made by the Department following the completion of this program and given to the permittee in writing by the Regional Water Engineer. The effluent toxicity monitoring program is as follows:

Outfall No(s)	Effluent Parameter	Units	Monitoring Requirements Measurement Frequency	Sample Type
001	Effluent Toxicity[(a)]	% Effluent[(b)]	c	d

(a) Effluent toxicity shall mean the toxicity of the effluent in chronic tests as specified in New York State Manual for Toxicity Testing of Industrial and Municipal Effluents, NYSDEC, February 1985. Both a vertebrate and invertebrate species shall be used for the tests. Dilution water shall be collected according to the Manual. Receiving water shall be used as dilution water unless the Department approves a different source. Effluent sampling and holding shall be done as outlined in Sections III-6 to III-8 of the Manual.

(b) The Maximum Allowable Waste Concentration (MAWC) in % Effluent for both a vertebrate and an invertebrate species shall be determined and reported. The MAWC in % Effluent shall be compared to the calculated Instream waste Concentration (IWC) of the effluent. The IWC in % Effluent shall be determined using the daily average effluent flow at the time of sampling and a critical receiving water flow of 0 cfs.

(c) Discharge monitoring requirements for effluent toxicity shall be monthly during the one year period beginning on the effective date of this authorization. The results of each toxicity test shall be submitted no later than 28 days following the end of each test period. These reports shall be submitted to the Regional Water Engineer at 615 Erie Blvd. West, Syracuse, New York 13204-2400 and the Chief, Compliance Section, Bureau of Wastewater Facilities Operations, 50 Wolf Road, Albany, NY 12233-3506.

(d) Monitoring of chemical and physical parameters limited in this permit shall be coordinated so that the resulting analysis is also representative of the sample used for toxicity testing.

Chlorinated Discharges:

Discharges which are chlorinated for the purpose of disinfection should be sampled prior to chlorination or be dechlorinated prior to toxicity testing evaluation. Discharges which use chlorination as part of the waste treatment process other than for disinfection purposes, for example oxidation of cyanide, should be sampled after the chlorination process and evaluated for toxicity.

TOXICITY REDUCTION EVALUATION COMPLIANCE SCHEDULE

(a) Permittee shall perform a TRE as specified in this permit for the permit discharge(s) in accordance with the following schedule:

Outfall Number(s)	Compliance Action	Due Date
001	Submission of a proposal for a Toxicity Reduction Evaluation (TRE)* study to the Department of Environmental Conservation, Bureau of Wastewater Facilities Design, 50 Wolf Road, Albany, New York 12233-3503.	45 days after letter notification from Regional Water Engineer

* The proposed TRE shall be directed towards identifying the source of the toxicity, describing procedures to reduce the toxicity to an acceptable level, identifying monitoring parameters suitable for insuring control of the toxicity, and proposing a schedule of compliance.

The TRE, including data findings and recommendations for corrective action, permit limits, and proposed self-monitoring requirements shall be submitted in a form similar to a wastewater facility engineering report. The Department will review the TRE and may redraft the permit to incorporate toxicity limits, monitoring requirements, and a schedule of compliance that will ensure acceptable toxicity levels of the effluent.

(b) The permittee shall submit to the Department of Environmental Conservation the document(s) required in (a) above by the given date(s), and a written notice of compliance or noncompliance with the above schedule date(s) postmarked no later than 14 days following that date. Each notice of the non-compliance shall include the following information:

1. A short description of the noncompliance;
2. A description of any action actions taken or proposed by the permittee to comply with the elapsed schedule requirement without further delay;
3. A description of any factors which tend to explain or mitigate the non-compliance; and
4. An estimate of the date permittee will comply with the elapsed schedule requirement and an assessment of the probability that permittee will meet the next schedule requirement on time.

APPENDIX B
SAMPLING AND ANALYSIS PLAN

DRAFT

BROOME COUNTY
COLESVILLE LANDFILL
ENVIRONMENTAL MONITORING
SAMPLING AND ANALYSIS PLAN

Prepared For

BROOME COUNTY
DEPARTMENT OF PUBLIC WORKS
Broome County, New York
and
GAF CORPORATION
Wayne, New Jersey

February 1993

Wehran-New York, Inc.
Middletown, New York

Environmental Engineers • Scientists • Constructors

DRAFT
BROOME COUNTY
COLESVILLE LANDFILL
ENVIRONMENTAL MONITORING
SAMPLING AND ANALYSIS PLAN

Prepared for

BROOME COUNTY DEPARTMENT OF PUBLIC WORKS
Broome County, New York
and
GAF CORPORATION
Wayne, New Jersey

Prepared by

WEHRAN-NEW YORK, INC.
666 East Main Street
Middletown, New York 10940

WE Project No. 02260 EC

February 1993

TABLE OF CONTENTS

1.0 DECONTAMINATION PROCEDURES

All reusable sampling equipment (bailers, trowels, bowls, etc.) will be pre-cleaned prior to field entry. The following cleaning procedures will be used:

1. Alconox detergent and potable water scrub.
2. Potable water rinse.
3. Ten percent nitric acid rinse (when sampling for heavy metals). Carbon steel split-spoons will be rinsed with a one percent nitric acid solution (when sampling for heavy metals).
4. Deionized water rinse or potable water rinse.
5. Methanol rinse.
6. Deionized water rinse.
7. Air dry.

Following this decontamination procedure, equipment will be wrapped in aluminum foil or stored in sealed polyethylene bags for on-site use. Whenever possible, pre-cleaned equipment will be used; however, if the need arises, equipment will be cleaned in the field according to the general procedures described above.

2.0 GROUNDWATER SAMPLING

The primary objective of groundwater sampling is to collect and preserve representative samples, and adhere to proper custody procedures in their prompt shipment to the certified laboratory for analyses within the specified holding times.

2.1 MONITORING WELL PURGING

Upgradient wells will be purged prior to downgradient wells to minimize any possibility of cross-contamination. Wells are purged using one of the following:

1. Lubricant-free stainless steel submersible pump with polyethylene discharge tubing (Keck Geophysical Instruments, Inc., Model No. SP-81 for 2-inch diameter wells, or equivalent).
2. Peristaltic pump connected to new Teflon tubing will be used if static water levels are higher than 25 feet.
3. Centrifugal pump connected to new drinking water quality polyethylene tubing.
4. Pre-cleaned Teflon bailer connected to new solid braid nylon rope.
5. Pre-cleaned Teflon bailer connected to a new 10-foot nylon monofilament leader between the bailer and the new solid braid nylon rope.

Wells are purged in the following manner:

1. Inspect well protective casing, and remove well casing cap. Make note in field book if cap is missing.
3. Use calibrated steel tape or electronic water level indicator (Slope Indicator Company Model 51453, or equivalent) to measure, within 0.01 inches, the static water level and depth to bottom from reference mark at top of protective casing. Record measurements in field book.
4. Thoroughly rinse steel tape or electronic water level indicator with deionized water.

5. Calculate well volume by subtracting static water level from depth to bottom, and multiply by the appropriate well factor on Table 2-1.
6. Purge a minimum of three well volumes or completely evacuate the well. The pump or bailer should remove water from the top of the water column so as to assure removal of all stagnant water in the well. Specific conductance, pH, Eh (optional), and temperature will be measured during purging to confirm stabilization of water quality.
7. Direct bailed or pumped water away from the well casing or into containers for disposal.
8. Remove purging equipment.
9. Replace well cap and lock protective casing.
10. Allow for recovery of well prior to sampling.

2.2 MONITORING WELL SAMPLING

Upgradient wells will be sampled prior to downgradient wells. Wells are sampled within 24 hours of purging in the following manner:

1. Following adequate recovery, obtain sample with a pre-cleaned Teflon bailer suspended on new, solid-braid nylon rope. Transfer sample directly from the Teflon bailer to the parameter-specific sample vessels labeled appropriately (sample ID Number and preservative), and place in coolers with ice or ice pack. Fill VOA vials so that no air bubbles are present.
2. Record duplicate measurements of pH, Eh, temperature, and specific conductance at this time, along with the date and the time the sample was obtained. Sample appearance such as color, odor, and turbidity will also be recorded.
3. Calibrate all field chemistry equipment every four hours in accordance with the instrument use and calibration SOPs. Details on the calibration and calibration frequency will be recorded in the field logbook.
4. Follow recordkeeping and chain-of-custody procedures as detailed in SOP 8.0.
5. Replace all well caps and lock protective well cover.

Table 2-1

STANDARD OPERATING PROCEDURES FOR

FIELD SAMPLING

WELL FACTOR CHART FOR VOLUME CALCULATIONS

Well Diameter (inches)	Factor (gallons/foot)
3/4	0.02
1	0.04
1-1/4	0.06
1-1/2	0.09
1-3/4	0.12
2	0.16
2-1/2	0.25
3	0.37
4	0.65
5	1.00
6	1.50
8	2.60

6. Between wells, clean bailers using the same decontamination procedures as outlined in SOP 1.0, or use pre-cleaned equipment.
7. At the end of the sampling day, the coolers will be taped shut with custody seals placed on two opposite corners of each cooler. Samples will be shipped via Federal Express to the contract laboratory for morning delivery or delivered directly to the laboratory by the field personnel at the end of the sampling day.
8. Contact with the laboratory will be made within 24 hours after each sampling event to ensure that samples arrived safely and with proper integrity preserved.

3.0 LEACHATE SAMPLING

Leachate samples may be collected if active leachate seeps exist following the pumping of groundwater and a leachate collection system is installed. Samples from the leachate collection system will be obtained in the following manner:

1. Lower a stainless steel bucket into collection system to obtain sufficient sample volume to fill sample containers.
2. Fill sample containers directly from sampling bucket.
3. Place filled sample containers in coolers with ice or ice packs as soon as possible.
4. Record duplicate measurements of temperature, pH, and specific conductance.
5. Field notes will include a description of sample location, field measurements, sample descriptions, and general flow conditions.
6. Follow recordkeeping and chain-of-custody procedures as detailed in SOP 8.0.
7. Steps 1 through 7 will be accomplished at each leachate sampling location. Between sampling locations, clean sampling bucket using the same decontamination procedures as outlined in SOP 1.0, or use pre-cleaned equipment.
8. At the end of the sampling day, the coolers will be taped shut with the custodian's initials placed on the tape at points of entry. Samples will be shipped via Federal Express to the contract laboratory for morning delivery or delivered directly to the laboratory by the field personnel at the end of the sampling day.
9. Contact with the laboratory will be made within 24 hours after each sampling event to ensure that samples arrived safely and with proper integrity preserved.

4.0 TOXICITY TEST SAMPLING

For the toxicity monitoring program, effluent samples will be collected from the discharge point to the stream. Effluent samples will be collected during "normal" or "typical" discharge and operating conditions of the treatment plant. Additionally, dilution water will be collected from the receiving waters at a location just upstream of the discharge point, outside of the zone influenced by the effluent.

The quantity of effluent and dilution water required will be specified by the laboratory performing the test. All samples will be shipped via Federal Express to the contract laboratory in coolers at 4°C following chain-of-custody procedures detailed in SOP 8.0.

5.0 FIELD AND TRIP BLANKS

To check the integrity of field sampling and equipment cleaning techniques, the following field quality assurance/quality control (QA/QC) procedures will be adhered to for this effort.

A field blank will be performed on site utilizing the identical equipment pre-cleaning and sampling techniques. A trip blank will accompany sample containers through all phases of the sampling event to ensure proper bottle preparation and laboratory integrity. Trip blank and field blank samples will receive identical handling and custody procedures as on-site samples.

Trip blanks are samples of analyte-free water prepared at the same location and time as the preparation of bottles which are to be used for volatile organic sampling. They remain with the sample bottles while in transit to the site, during sampling, and during the return trip to the laboratory. At no time during these procedures are they opened. Upon return to the laboratory, they are analyzed as if they were another sample, receiving the same QA/QC procedures as ordinary field samples. If these samples are accidentally opened, it will be noted on the chain-of-custody.

Field blanks are prepared in the field (at the sampling site) using empty bottles and analyte-free water supplied separately (prepared at the same time and place as the bottles used in the sampling). The procedure for non-dedicated sampling equipment is to first pour the analyte-free water into the clean device to be used for sampling, and then into the empty sample bottles supplied for the field blank.

6.0 EFFLUENT SAMPLING

Treatment plant effluent samples will be collected via two methods: grab, and three-hour composite. Effluent samples will be obtained in the following manner:

1. Obtain grab samples for the analysis of VOCs, dissolved oxygen, settleable solids, and pH. Grab samples are collected by filling sample bottles directly at the outfall or by filling the bottles at a point within the plant, post-treatment.
2. Composite samples are collected using an automatic composite sampler which fills a container with a pre-determined quantity of effluent every ten minutes over a three-hour period. Alternatively, composite samples may be collected manually at 30-minute intervals in the event of equipment breakdown.
3. Following completion of the composite, sample bottles are filled by pouring the composite into the appropriate containers.
4. Follow recordkeeping and chain-of-custody procedures as detailed in SOP 8.0.
5. At the end of the sampling day, the coolers will be taped shut with the custodian's initials placed on the tape at points of entry. Samples will be shipped via Federal Express to the contract laboratory for morning delivery or delivered directly to the laboratory by the field personnel at the end of the sampling day.
6. Contact with the laboratory will be made within 24 hours after each sampling event to ensure that samples arrived safely and with proper integrity preserved.

7.0 AIR STRIPPER SAMPLING

To calculate the VOC concentration in the air stripper exhaust, grab samples will be obtained of the influent and effluent of the air stripper unit for VOC analysis. Samples will be collected from sampling points designed in the system for this purpose to allow sample vials to be filled using the following procedures:

1. Fill vials from sampling points, taking care to ensure that no air bubbles exist in sample.
2. Place filled sample containers in coolers with ice or ice packs as soon as possible.
3. Field notes will include a description of sample location, sample descriptions, and general flow conditions.
4. Follow recordkeeping and chain-of-custody procedures as detailed in SOP 8.0.
5. At the end of the sampling day, the coolers will be taped shut with the custodian's initials placed on the tape at points of entry. Samples will be shipped via Federal Express to the contract laboratory for morning delivery or delivered directly to the laboratory by the field personnel at the end of the sampling day.
6. Contact with the laboratory will be made within 24 hours after each sampling event to ensure that samples arrived safely and with proper integrity preserved.

8.0 RECORDKEEPING AND CHAIN-OF-CUSTODY

Field records will be documented in the field logbook and will contain sufficient information such that someone else can reconstruct the sampling event without reliance on the sample collector's memory. The logbook is a controlled document which records all major on-site activities during the investigation. The logbook is a bound notebook with pages that cannot be removed without cutting or tearing pages. Daily entries into the logbook may contain a variety of information. At the beginning of each day the following information must be recorded:

- Date
- Start time
- Weather
- All field personnel present
- Any visitors present

Entries in the field log book will include, at a minimum, the following:

- Start of completion time of borehole, monitoring well installation or sampling activities
- Sampling point name and description
- Type of sample containers used
- Preservatives used
- Well purging procedure and equipment
- Well-specific information such as static water level, depth, and volume purged
- Sample collection procedure and equipment
- Collector's sample identification numbers
- Laboratory's sample identification numbers and sample shipment information
- References such as maps or photographs of the sampling site, if available
- Field observations
- Pertinent weather factors such as temperature, wind direction, and precipitation

- Any field measurements made, such as pH, specific conductance, or sample appearance
- Health and safety protocols, (e.g., level of protection)
- Deviations from established protocols, if any

Chain-of-custody records for all samples shall be maintained. A sample shall be considered to be "in custody" of an individual if said sample is either in direct view of or otherwise directly controlled by that individual. Storage of samples during custody shall be accomplished according to established preservation techniques, in appropriately sealed storage containers. Chain-of-custody shall be accomplished when the samples or sealed sample shuttles are directly transferred from one individual to the next, with the first individual witnessing the signature of the recipient upon the chain-of-custody record.

If samples are to be went via a courier (e.g., Federal Express), signed Chain-of-Custody Forms should be included in each cooler documenting sample content. A copy should be kept with the sampling personnel.

The chain-of-custody records will contain the following information:

- Respective sample numbers of the laboratory and Wehran, if available
- Signature of collector
- Date of time of collection
- Sample type (e.g., groundwater, surface water)
- Identification of well or sampling point
- Number of containers
- Parameters requested for analysis, if appropriate
- Signature of person(s) involved in the chain of possession
- Description of sample bottles and their condition
- Problems associated with sample collection (i.e., breakage, no preservatives), if any

Upon return to the office, field data sheets, test pit logs, and borings logs should be completed and placed in the project file. Photo copies should be made of all field logbook pages and be placed in the site file. This ensures a record exists in the office of all field and sampling activities, and limits the potential loss of field notes due to the loss or destruction of the logbook in the field.

9.0 pH MEASUREMENT

pH is the measure of the acidity or alkalinity of a solution. It is defined as the negative logarithm of the hydrogen ion activity. Hydrogen ion activity is related to the hydrogen ion concentration, which in relatively weak solution is nearly equal. For all practical purposes, pH is the measure of the hydrogen ion concentration.

The operation of a pH meter relies on the same principal as many other ion-specific electrodes. Measurement relies on establishment of a potential difference in the response to hydrogen ion concentration across a membrane in the electrode. The membrane is conductive to ionic concentrations, which in combination with a reference electrode (which can be combined into a single "combination" electrode), can generate a potential difference proportional to the hydrogen ion concentration.

Variation in temperature will effect the association of hydrogen and hydroxide ions, which without proper compensation will effect the pH. pH meters have several controls to compensate for the variations between electrodes and the different responses to changes in temperature.

Because of the great variety of pH meters available, operators should refer to the manufacturer's instruction manual for specific calibration, operation, and troubleshooting procedures for their instrument. The following general procedure is used for measuring pH in the field with a pH meter:

1. The instrument and batteries should be checked and calibrated prior to the initiation of the field effort. pH electrodes should be kept moist at all times.
2. Buffer solutions used for calibration should be checked. Buffer solutions will degrade upon exposure to the atmosphere.
3. Select either 4.01 and 7.00, or 7.00 and 10.01 buffers, whichever will bracket the expected sample range. Calibration with all three buffers will allow Level II data to be generated.
4. Make sure all electrolyte solutions within the electrodes(s) are at their proper levels and that no air bubbles are present within the electrode(s).
5. Immerse the electrode(s) in a pH-7 buffer solution.

6. Adjust the temperature compensator to the proper temperature (on models with automatic temperature adjustments, immerse the temperature probe into the buffer solution). Alternatively, the buffer solution may be immersed in the sample and allowed to reach temperature equilibrium before equipment calibration. It is best to maintain buffer solution at or near expected sample temperature before calibration.
7. Adjust the pH meter to read 7.0.
8. Remove the electrode(s) from the buffer and rinse well with deionized water. Immerse the electrode(s) in pH-4 or -10 buffer solution (depending on the expected pH of the sample) and adjust the slope control to read the appropriate pH. At least three successive readings during calibration, one minute apart, should be within ±0.1 pH unit. For best results, the standardization and slope adjustments should be repeated at least once daily before use and every four hours thereafter. All calibration procedures and measurements should be recorded in the logbook.
9. Immerse the electrode(s) in the unknown sample, slowly stirring the probe until the pH stabilizes. Stabilization may take several seconds to minutes. If the pH continues to drift, the sample temperature may not be stable, a chemical reaction (e.g., degassing) may be taking place in the sample,or the meter or electrode may be malfunctioning. This must be clearly noted in the logbook.
10. Read and record the pH and temperature of the sample, after adjusting the temperature compensator to the sample temperature. pH should be recorded to the nearest 0.1 pH unit.
11. Rinse the electrode(s) with deionized water.

10.0 SPECIFIC CONDUCTANCE MEASUREMENT

Conductivity is a numerical expression of the ability of a water sample to carry an electric current. This value depends on the total concentration of ionized substances dissolved in the water and the temperature at which the measurement is made. It is important to obtain a specific conductance measurement soon after taking a sample, since temperature changes, precipitation reactions, and absorption of carbon dioxide from the air all affect the specific conductance.

Specific conductance can be used to identify the direction and extent of the migration of contaminants in groundwater and surface water. It can also be used to as a measure of subsurface biodegradation or to indicate alternate sources of groundwater contamination.

A conductance cell and a Wheatstone Bridge (for the measurement of potential difference) may be used for measurement of electrical resistance. The ratio of current applied to voltage across the cell may also be used as a measure of conductance. Depending on ionic strength of the aqueous solution to be tested, a potential difference is developed across the cell which can be converted directly or indirectly (depending on instrument type) to a measurement of specific conductance.

Because many conductivity meters are available, operators should refer to the manufacturers instruction manual for specific calibration, operation, ant troubleshooting procedures. The following procedure is used for obtaining specific conductance measurements:

1. Check batteries and calibrate instrument before going into the field.
2. Calibrate the instrument using a potassium chloride standard solution by completely immersing the electrode into the solution. Check the temperature of the calibration solution and adjust temperature dial on meter (if not self-compensating). Record calibration measurements and time in the field logbook.
3. Check the μmho value of the solution in terms of the temperature. Adjust the Cell Constants dial until the display reads the appropriate value.
4. Rinse the electrode with one or more portions of the sample to be tested.

5. Immerse the electrode in the sample, adjust the temperature setting to the sample temperature, and measure the conductivity.
6. Read and record the results in the field logbook. Report the results to the nearest ten units for readings under 1,000 µmhos/cm and the nearest 100 units for readings over 1,000 µmhos/cm.
7. Repeat the procedure with fresh sample until reproducible (i.e., ±5 percent) results are obtained.

If the specific conductance measurements become erratic,or inspection shows that any platinum black has flaked off the electrode, replatinization of the electrode is necessary. See the manufacturer's instructions for details.

11.0 TEMPERATURE MEASUREMENT

In combination with other parameters, temperature can be a useful indicator of the likelihood of biological action in a water sample. It can also be used to trace the flow direction of contaminated groundwater. Temperature measurements should be taken in situ, or as quickly as possible in the field. Collected water samples may rapidly equilibrate with the temperature of their surroundings.

Many meters such as specific conductance or dissolved oxygen meters have temperature measurement capabilities. If these instruments are to be used to make temperature measurements, they should be checked prior to entering the field and at least the start of each day and every four hours thereafter against a thermometer with an unbroken column of mercury.

If a thermometer is used on a collected water sample:

1. Rinse the thermometer with a portion of the collected sample.
2. Immerse the thermometer in the sample until temperature equilibrium is obtained (1-3 minutes). To avoid the possibility of contamination, the thermometer should not be inserted into samples which will undergo subsequent chemical analysis.
3. Record values in a field logbook to the nearest 0.5°C.

12.0 DISSOLVED OXYGEN CONCENTRATION MEASUREMENT

Dissolved oxygen (DO) levels in water depend on the physical, chemical and biochemical activities in the water body. If at all possible, DO measurements should be taken in situ, since concentration may show a large change in a short time if the sample is exposed to the atmosphere.

Dissolved oxygen probes are normally electrochemical cells that have two solid metal electrodes of different nobility immersed in an electrolyte. The electrolyte is retained by an oxygen-permeable membrane. When a suitable potential exists between the two metals, the reduction of oxygen to hydroxide ion (OH) occurs and an electrical current is developed that is directly proportional to the rate of arrival of oxygen molecules.

If the water body being sampled is not flowing, it is necessary to stir the sample or probe to ensure that a fresh supply of sample is in contact with the membrane. Without a fresh water supply, the oxygen in the layer along the membrane is quickly depleted and false low readings are obtained. Stirring, however, should not be so vigorous that additional oxygen is introduced through the air-water interface at the sample surface. Temperature variations can also effect dissolved oxygen measurements, although most instruments provide for automatic temperature compensation

The instrument operator should follow the manufacturer's instructions to obtain an accurate reading. The following general steps should be used to measure the dissolved oxygen concentration:

1. The equipment should be calibrated and its batteries checked before going to the field.
2. The probe should be conditioned in a water sample for as long a period as practical before its use in the field. Long period of dry storage followed by short periods of use in the field may result in inaccurate readings.
3. The instrument should be calibrated in the field at the start of the day and at least every four hours or as necessary by placing the probe in a freshly air-saturated water sample of known temperature. All calibration times, measurements, and adjustments should be recorded in the field logbook. Dissolved oxygen values for air-saturated water can be determined by

consulting a table listing oxygen solubilities as a function of temperature and salinity which should be kept with each instrument.

4. Immerse the probe in the sample. Be sure to provide for sufficient flow past the membrane, either by stirring the sample, or placing the probe in a flowing stream. Probes without stirrers placed in wells can be moved up and down.
5. Record the dissolved oxygen content and temperature of the sample in the field logbook. Also indicate whether or not the measurement was taken in situ. Read the DO dial to the nearest 0.1 mg/L.
6. Recalibrate the probe when the membrane is replaced, or as needed. Follow the manufacturer's instructions. Duplicate analyses should agree within ±0.1 mg/L.

13.0 OXIDATION-REDUCTION POTENTIAL MEASUREMENT

The oxidation-reduction potential (ORP) provides a measure of the tendency of organic or inorganic compounds to exit in an oxidized state. The technique therefore provides evidence of the likelihood of anaerobic degradation of biodegradable organics or the ratio of activities of oxidized to reduced species in the sample.

When an inert metal electrode and a reference electrode are immersed in a solution, an ORP electrode pair is established. This electrode pair allows the potential difference between the two electrodes to be measured which will be dependent on the concentration of the ions in solution using this measurement, the ability of a solution to oxidize or reduce species may be determined. Supplemental measurements, such as dissolved oxygen, may be correlated with ORP to provide a knowledge of the quality of the solution, water, or wastewater.

The following procedure is used for measuring oxidation-reduction potential:

1. The equipment should be calibrated and have its batteries checked before going to the field.
2. Check that the platinum probe is clean and that the platinum bond or tip is unoxidized. If dirty, polish the electrode with emery paper or clean in accordance with manufacturer's instructions.
3. Thoroughly rinse the electrode with deionized water.
4. Verify the sensitivity of the electrodes by noting the change in millivolt reading when the pH of the test solution is altered. The ORP will increase when the pH of the test solution decreases, and the ORP will decrease if the test solution pH is increased. Place the sample in a clean beaker and agitate the sample. Insert the electrodes and not e the ORP or millivolt reading. Add a small amount of a dilute NaOH solution and not the value of the ORP. If the ORP drops sharply when the caustic is added, the electrodes are sensitive and operating properly. If the ORP increases sharply when the caustic is added, the polarity is reversed and must be corrected in accordance with the manufacturer's instructions. If the OPR does not respond as above when the

caustic is added, the electrodes should be cleaned and the above procedure repeated.

5. After the instrument has been checked for sensitivity, rinse the electrodes thoroughly. Place the sample in a clean sample cup and insert the electrodes. Set temperature compensator to the sample temperature. Provide adequate agitation throughout the measurement period. Read the millivolt potential of the solution, allowing sufficient time for the system to stabilize and reach temperature equilibrium. Measure successive portions of the sample until readings on two successive portions differ by no more than 10 mV. A system that is very slow to stabilize properly will not yield a meaningful ORP. Record all results in a field logbook, including ORP (to nearest 10 mV), sample temperature, and pH at the time of measurement.

14.0 TURBIDITY MEASUREMENT

Turbidity is a measure of the clarity of a liquid. Turbidity is effected by suspended colloidal droplets or fine particles. The turbidimeter measures turbidity by passing a light beam through a sample into a light shield which acts to minimize stray light. As the light passes through the sample, some light is scattered by the turbidity of the sample. Light scattered at a 90° angle is sensed by a photocell which drives the meter. Meter scales are generally calibrated in nephelometric turbidity units (NTU) to provide direct readouts.

Operators should refer to the manufacturers instruction manual for specific calibration and operating procedures. The following general procedures should be used when measuring turbidity:

1. Check battery to ensure sufficient power supply
2. Zero instrument electronically in the 1.0 to 10 scale by placing focusing template in sample holder and adjusting zero control to read zero NTU.
3. Check 10 to 100 scale to verify that meter still indicates zero NTU. Readjust meter is necessary.
4. Place turbidity standard into sample holder, place light shield on, and allow meter to stabilize.
5. Adjust span control for a readings of 10 NTU. Remove standard and instrument is ready to use. Do not readjust span.
6. Select appropriate range that will exceed expected turbidity of sample.
7. Place focusing template into sample holder and adjust zero control to read zero NTU.
8. Fill vial with sample to be measured into sample holder. Cover sample with the light shield and allow the meter to stabilize. Read turbidity of sample.
9. Meter should be recalibrated before each set of tests.

When attempting to measure samples with a turbidity greater than the range of the instrument, samples can be diluted with distilled or deionized water. This can be done using a graduated cylinder to measure a dilution water to sample ratio. The meter reading is then multiplied by the ratio to obtain the actual turbidity measurement.

15.0 VOC MEASUREMENT

15.1 HNU

An HNU photoionization detector can be used to detect a variety of trace gasses, particularly volatile organic compounds (VOCs). The HNU uses the principle of photoionization to detect and measure the concentrations VOCs in the atmosphere or being emitted from a sample.

The HNU operates using an ultraviolet light source in the sensor. The ultraviolet light emits photons which are absorbed by gas molecules in the chamber with an ionization potential less than that of the lamp. This causes the release of an electron and resulting in a positive ion. The sensor also contains a pair of electrodes, one a bias electrode and the other a collector electrode. When a positive potential is applied to the bias electrode, the positive ions travel toward the collector electrode. An electric current which is created is then measured and the concentration is displayed on the meter in parts per million.

The following procedure is used for calibrating and operating the HNU:

1. Turn the function switch to BATT. The needle should be in the green; if not, the battery should be recharged.
2. Turn function switch to STANDBY and adjust meter needle to read zero using the ZERO set control.
3. Turn the function switch to the 0-200 range with the probe connected to the calibration gas (isobutylene) and note the meter reading. Adjust the SPAN control as needed to obtain the proper concentration reading.
4. Recheck zero setting; if readjustment is needed, repeat step 3.
5. At this point, a two-point calibration has been made (against zero and the gas standard) and is ready to use.
6. Turn function switch to the 0-20 range. The instrument will measure the concentration of any gasses with ionization potential less than the lamp.
7. Use HNU to monitor breathing zone for health and safety precautions or use to screen samples by placing probe near suspected sources of contaminants.
8. Adjust function switch as needed depending on concentrations detected.

15.2 ORGANIC VAPOR ANALYZER (OVA)

The OVA is designed to detect and measure organic vapors and gases. It can provide an accurate indication of gas concentrations of up to 1,000 ppm.

The OVA uses the principle of hydrogen flame ionization to detect and measure VOCs. Inside the detector chamber, the sample is exposed to a hydrogen flame which burns the organic vapors. This results in positively charged carbon-containing ions which are collected on a collecting electrode. A current that corresponds to the rate at which the ions are being collected is generated, which produces the meter display.'The OVA is very sensitive to hydrocarbons. Because of this, it is very sensitive to methane (unlike the HNU which does not detect methane), limiting its usefulness in detecting hazardous compounds at landfill sites.

The following general procedures should be followed to operate an OVA:

1. Connect the probe assembly to the unit.
2. Move the Instr/Batt switch to the test position. The needle should move past the white line, indicating the unit is full charged.
3. Move the Instr/Batt switch to the ON position, and allow a 5-minute warmup.
4. Turn pump on and move the Calibrate switch to X1 and adjust meter reading to zero, using the Calibrate Adjust knob.
5. Open the hydrogen tank valve and the hydrogen supply valve, 1 or 2 turns. The reading should be 8 to 12 psi.
6. After 1 minute, press the Ignitor button until the flame ignites. The meter needle will rise upscale and then fall back when ignited. (Do not depress ignitor for more than 6 seconds, if the flame does not ignite wait 1 minute and try again.)
7. Set the Calibrate switch on the desired range and survey the areas of interest. If organic vapors are detected, the meter will move upscale.

As with any field instrument, the manufacturer's operating manual should be on hand when in use, and should be referred to for any questions or troubleshooting.

15.3 ORGANIC VAPOR METER (OVM)

The Organic Vapor Meter (OVM) can be used to detect most organic vapors and some inorganic gases. The instrument uses the principle of photoionization to detect and quantitate levels of volatile organic vapors in atmosphere, air sample collection containers or headspace analysis on soil or sediment samples. Several ultraviolet lamps of increasing ionization potential are available (10.0, 10.6, and 11.8eV lamps) and can be used with the same unit.

The OVM is designed with the ultraviolet light source in the sensor. The ultraviolet light emits photons which are absorbed by gas molecules with an ionization potential less than that of the lamp. A release of electrons results from the ionization of the molecules. A detector located within the unit collects the electrons and results in the production of an electrical current. The current is measured and compared to that of the calibration standard. The microprocessor calculates the concentration and displays it in parts per million (PPM).

The following procedure is used for operating and calibrating the OVM:

1. Insert the power plug into the back of the instrument. Depress ON/OFF Switch. A flashing "B" in the left-hand corner indicates the battery should be charged.
2. Press MODE/STORE. Press -/CRSR four times to get to the calibrate mode.
3. The readout should read "RESET TO CALIBRATE". Press RESET button once.
4. Press -/CRSR button. Press RESET button while unit is in ambient air.
5. Adjust span gas to calibration concentration by pushing the RESET button and the +/INC to increment the digit above the cursor or -/CRSR to move the cursor.
6. Connect probe to calibration gas container. Hit RESET button.
7. "RESET TO CALIBRATE" will appear when calibration is finished. Otherwise recalibration is necessary when "CAL ERROR" appears.
8. Hit MODE/STORE button to begin RUN MODE.
9. The maximum concentration is the top reading and is cleared by pushing the reset button. The bottom reading is the current measurement.

Additional operational functions and troubleshooting are referenced with the above directions located in the Owner's manual.

16.0 ANALYSIS PLAN

All groundwater and leachate samples will be analyzed by a New York State-certified laboratory quarterly for target compound list, volatile organic compounds (VOCs). Effluent samples obtained from the treatment plant will be sampled in accordance with the schedule and list of parameters provided in the effluent limitations and monitoring requirements provided in the NYSDEC Permit Equivalency (Appendix A). Air stripper influent and effluent samples will be analyzed quarterly for VOCs.

Toxicity testing will be performed on the treatment facility effluent in accordance with procedures given in the "New York State Manual for Toxicity Testing of Industrial and Municipal Effluents" (NYSDEC 1985). Testing will be performed monthly for three months and quarterly, thereafter, for a one-year period.

APPENDIX C
HEALTH AND SAFETY PLAN

SITE-SPECIFIC HEALTH AND SAFETY PLAN

COLESVILLE LANDFILL

Prepared For

BROOME COUNTY/GAF CORPORATION
COLESVILLE LANDFILL
BROOME COUNTY DEPARTMENT OF PUBLIC WORKS
Binghamton, New York

November 1991

WEHRAN-NEW YORK, INC.
Middletown, New York

Environmental Engineers • Scientists • Constructors

SITE-SPECIFIC HEALTH AND SAFETY PLAN

COLESVILLE LANDFILL

Prepared for

BROOME COUNTY/GAF CORPORATION
BROOME COUNTY DEPARTMENT OF PUBLIC WORKS
Broome County Office Buiding
P.O. Box 1766
Binghamton New York, 13902

Prepared by

WEHRAN-NEW YORK, INC.
666 East Main Street
Middletown, New York 10940

Approvals:

Leslie Birnbaum
Leslie C. Birnbaum
Regional Health and Safety Officer

Mw O'Hara
Project Manager
Michael O'Hara

WE Project No. 02260 BR

November 1991

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 PURPOSE

The purpose of this health and safety plan for Broome County Colesville Landfill (Colesville Landfill) is to provide specific guidelines, establish procedures for the protection of personnel during completion of field work associated with well analysis tasks. This Site-Specific Health and Safety Plan is based on previous studies and information available to date. The Plan and procedures shall be updated based upon the ongoing investigation of the site conditions, including the most current information available for each media.

1.1 PERSONNEL ASSIGNMENT AND SIGN-OFF

All personnel conducting activities on-site in which a potential exposure exist must be in compliance with all applicable Federal/State rules and regulations. All Wehran personnel shall receive a briefing which familiarizes personnel with the procedures, requirements, and provisions of this Plan. In the event of conflicting plans/requirements, personnel must implement those safety practices which afford the highest level of protection.

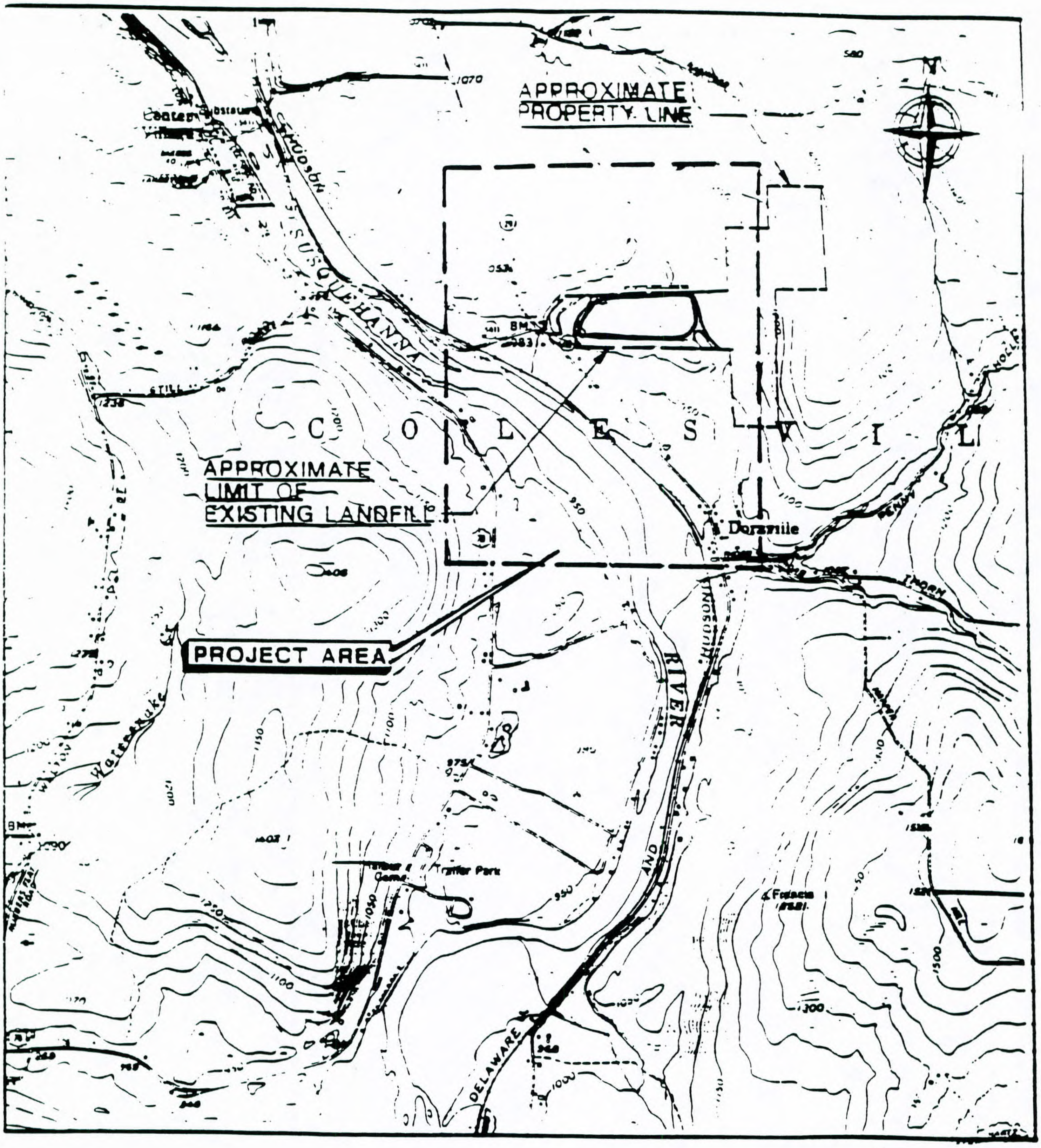
The Regional Health and Safety Officer (RHSO) and the Project Manager (PM) shall sign the title page to verify that the Plan content is factual, acceptable to both parties, and shall be implemented for all field activities conducted at Colesville Landfill.

In addition, all Wehran field personnel shall sign a Plan Acceptance Form to document that they have: 1) attended a pre-entry briefing; 2) received and read a copy of the Plan; and 3) agreed to comply with the Plan.

2.0 BACKGROUND

2.1 SITE LOCATION

Colesville Landfill is a 35-acre inactive landfill located in the Town of Colesville, Broome County, New York (Figure 2-1). The area is rural and surrounded by agricultural tracts, undeveloped woodlands, and scattered residential parcels. The landfill is bound by East Windsor Road to the west, and unnamed streams to the north, east, and west (termed



SOURCE:

TOPOGRAPHY TAKEN FROM

1957 AFTON, N.Y.

U.S.G.S. QUADRANGLE

7.5 MINUTE SERIES

SCALE: 1" = 2000'

FIGURE 2-1

SITE LOCATION MAP

WEHRAN ENGINEERING
CONSULTING ENGINEERS

the North and South Streams) of the site. In early aerial photography, a high power transmission line was identified running along the west edge (see Figure 2.1).

2.2 SITE HISTORY

The landfill operated from 1969 to 1984 primarily for the disposal of municipal solid waste (MSW). Between 1973 and 1975, drums of industrial waste were codisposed with the MSW. These materials included organic solvents such as benzene, cyclohexane, acetone, isopropyl alcohol, methanol, ethanol, hexane, toluene, xylene, methyl cellosolve, and chlorinated solvents as well as mercury cyanide, zinc, aluminum, copper, nickel, lead iodide, and tin. The site has been covered with several feet of soil but has not been capped or closed in accordance with New York State Part 360 regulations.

2.3 SCOPE OF WORK

This Health and Safety Plan covers pre-design tasks to be conducted at Colesville Landfill. Activities for the well analysis task includes:

- Mobilization and demobilization
- Drilling and installation of monitoring wells
- Permeability testing
- Groundwater sampling and analysis
- Surveying

If any additional tasks are added to this project, including an addendum to this, a HASP must be developed to address the specific hazards associated with those tasks.

2.4 HAZARD EVALUATION

Due to the fact that ten of the test borings and subsequent monitoring wells will be developed beyond the limits of the refuse and the remaining three test borings will be performed within the landfill footprint, it is expected that exposure to any chemical hazards are minimal.

The potential hazards for field work activity on-site that may exist at Colesville Landfill include:

- Physical injuries, such as heat stress, frostbite, slip/trip accidents, abrasions;
- Inhalation/ingestion of heavy metal particulates;
- Inhalation of volatile organic vapors;
- Direct contact with contaminated media (splashing of groundwater during and sampling of wells);
- Oxygen deficiency or explosive atmospheres;
- Exposure to biological hazards such as poisonous plants, and insect bites.

Potential hazards during work conducted off site may include inhalation of low levels of volatile organic vapors. Physical and biological hazards as described above may exist.

2.3.1 Task-Specific Hazards

2.3.1.1 Mobilization and Demobilization/Drilling and Well Installation

The primary potential hazard associated with mobilization/demobilization activities, is the physical hazard associated with heavy equipment and construction activities. During decontamination procedures, personnel shall come into direct contact with contaminated soils. Additionally, dusts and nonvolatiles usually not airborne may become a potential inhalation hazard during steam cleaning and other equipment decontamination procedures.

Due to the low levels of volatile organics found in the soil and groundwater, inhalation of vapors is not the primary hazard.

The primary occupational exposure to heavy metals is by inhalation. Therefore, exposure would be expected only if the soil is greatly disturbed due to windy conditions or by movement of heavy equipment.

2.3.1.2 Groundwater Sampling Activities

Minimal concentrations, if any, of volatile organic compounds have been detected at this site resulting in low potential for exposure. However, the potential for explosion hazards/inhalation of organic volatiles are increased during the opening of well caps. Although activities are occurring in an open area, a pressure buildup of landfill gas occurs in the well that is released when the cap is opened. This potential for the release of gases/volatile organics can potentially create an explosion and/or inhalation hazard.

3.0 HEALTH AND SAFETY PROCEDURES AND POLICIES

3.1 GENERAL GUIDELINES

The following is a list of the general guidelines which are required for field activities conducted at Colesville Landfill. These guidelines follow the guidelines established in the Wehran Corporate Health and Safety Program, dated June 1988.

- All field investigation activities must be coordinated through the site safety officer and the project manager.
- **The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated shall result in the evacuation of site personnel, and reevaluation of the hazard and the level of protection.**
- During any activity conducted on site in which a potential exists for exposure to hazardous materials or accident or injury, at least two persons must be present who are in communication with each other.
- Following the procedures, requirements, and provisions of this Plan, all personnel who may be potentially exposed to hazardous materials or wastes must be in compliance with Federal and State regulations, including OSHA 29 CFR 1910.120.
- Samples from areas of known or suspected to be contaminated with hazardous substances must be handled with the appropriate personal protective equipment.
- All equipment used in the site operations must be properly cleaned and maintained in good working order. Equipment must be inspected for signs of defect and/or contamination before and after each use.
- Eating, drinking, chewing gum or tobacco, and smoking are prohibited while working in an area where the potential for chemical and/or explosive hazards may be present. Personnel must wash thoroughly before initiating any of the aforementioned activities.

3.2 SITE-SPECIFIC SAFETY PROCEDURES

3.2.1 Drilling and Well Installation/Mobilization and Demobilization

The primary hazard associated with drilling/mobilization and demobilization is the proximity to heavy equipment and noise. Steel-toed shoes, hard hat, safety glasses, and ear protection shall be worn for all drilling activities.

If soil becomes suspended in air due to a combination of conditions, including lack of vegetative cover and windy conditions, inhalation of heavy metal dust is possible when drilling on site. Dust control measures may be utilized to suppress the dust. These include wetting the area and providing artificial ground cover. As an alternative, respirators with a HEPA filter may be used to prevent against inhalation of heavy metal dust.

Control of exposure to organic vapors shall be obtained by monitoring air concentrations in the breathing zone with an HNU or OVM photoionizer detector (PID). Monitoring can reduce risks by indicating when action levels have been exceeded and personal protective equipment upgraded.

3.2.2 Groundwater Monitoring

Due to the potential for splashing, safety glasses shall be worn during groundwater monitoring activities.

Due to the potential for buildup of methane gas in the well, once the well cap is removed, the headspace shall be monitored using a PID or FID. The level of respiratory protection shall be based on the reading detected at this time. Level D clothing shall be the initial level of protection used for groundwater sampling activities.

Care shall be taken not to place face directly over opened well while taking measurements.

3.3 MEDICAL SURVEILLANCE REQUIREMENTS

Participation in a medical surveillance program is required for all personnel conducting field investigation activities for the Colesville Landfill. The medical surveillance program must be in compliance with the provisions set forth in 29 CFR 1910.120 and the Wehran EnviroTech medical surveillance program.

3.4 TRAINING REQUIREMENTS

All personnel conducting groundwater sampling at Colesville Landfill shall provide evidence that they have received at least 40 hours of health and safety training, and the contents of the training course are in compliance with OSHA 29 CFR 1910.120. All on-site personnel, except for unqualified visitors, shall be thoroughly trained in the following information:

- Names of personnel and alternates responsible for site safety and health, and emergency response procedures;
- Safety, health, and other hazards presented on site;
- Use of personal protective equipment and designated levels of protection;
- Work practices that minimize risk from hazards;
- Safe use of equipment on site;
- Medical surveillance requirements, including recognition of symptoms and signs of overexposure;
- Implementation of this Site-Specific Health and Safety Plan.

4.0 AIR MONITORING

Monitoring shall be performed within all work areas to detect the presence and the relative level of chemical substances. Monitoring shall be conducted to identify other hazardous situations such as the presence of flammable or explosive atmospheres and/or oxygen deficient environments. The data collected throughout monitoring shall be used to determine the appropriate levels of protection.

Monitoring shall be conducted prior to entry in the work area to obtain background levels and periodically while conducting work on site, to evaluate any changes in conditions of the specific work area. Periodic monitoring on site will consist of monitoring initially, and during change of, the site conditions (e.g., opening of a well, change of soil strata during drilling).

Available monitoring equipment must consist of an HNU or OVM photoionizer, a combustible gas indicator, an oxygen meter, and a respirable dust monitor. The HNU/OVM photoionizer have the ability to detect total organic vapor concentration. Both the HNU

TABLE 4.1
COLESVILLE LANDFILL
AIR MONITORING REQUIREMENTS

Monitoring Instrument	Monitoring Frequency	Working Range
HNU/OVM	During all field operations initially, change of conditions, opening wells	1-2000 units
02/LEL Meter	Initially, drilling, opening wells	0-100%LEL 0-25% O^2
Respirable Dust Meter	During dusty or windy conditions; on-site only	.01-10 mg/m^3; 0.1-100 mg/m^3

and OVM will detect from 1 ppm to 2,000 units. The Respirable Dust Meter has the ability to detect particles in the size range from 0.1 to 10 micrometers in diameter momentarily, as a time-weighted average, or 8-hour equivalent shift averages. Concentrations are evaluated by two scales which reads from 0.01 to 10 mg/m^3 smf 0.1 to 100 mg/m^3, respectively. Table 4-1 summarizes monitoring equipment capabilities for instruments to be used at Colesville Landfill.

An Instrument Calibration Form and a Direct Reading Monitoring Form is included in Appendix A. These forms must be completed and returned to the Regional Health and Safety Officer.

5.0 EQUIPMENT

5.1 PERSONAL PROTECTIVE EQUIPMENT

The purpose of personal protective equipment is to shield or isolate individuals from the chemical and physical hazards that may be encountered during work activities. The level of protection must correspond to the level of hazard known, or suspected, in the specific work area. There are four basic levels of protection (A, B, C, and D) of personal protection as established by the USEPA. Level A provides the highest level of protection and Level D the lowest.

All field activities listed in Section 2.2 of this Plan shall commence in Level D protection. Table 5.1 lists the various levels of protection and the corresponding personal protective equipment. Table 6-1 list contingencies for upgrading/downgrading level of protection.

Personal protective equipment has been selected with specific considerations to the hazards associated with the Colesville Landfill. If level of protection must be upgraded to Level C, the air purifying respirator cartridges selected for use are MSA GMC-H which have the ability to protect against total organic vapor concentration up to 1,000 ppm, 10 ppm chlorine, 30 ppm formaldehyde, 50 ppm hydrogen chloride, and 50 ppm sulfur dioxide. The cartridges contain an attached HEPA filter which will protect against dust mist and fumes having a TWA greater that 0.05 mg/m3, asbestos containing dusts and mists, and radionuclides.

TABLE 5.1
COLESVILLE LANDFILL
LEVELS OF PROTECTION

Level D will contain the following:

Tyvek coveralls or work uniform, steel-toed boots, nitrile gloves, safety glasses (where splashing can occur), hard hard (during all drilling, well installation, mobilization/demobilization activities, hearing protection (during all drilling activities.

Level C will contain the following:

Tyvek coveralls, full-faced air purifying respirator equipped with organic vapor, acid gases combination cartridge with attached HEPA filter; inner gloves, chemical resistant outer gloves; steel-toed boots, hard had (during all drilling, well installation, mobilization/demobilization activities).

5.2 SAFETY EQUIPMENT

Basic emergency and first aid equipment will be available at the site. This shall include a first aid kit, DEET spray solution (during the months of April to November), warm, sweet liquids when temperatures are below freezing, fire extinguisher, anti-bacterial soap and water for washing, and potable drinking water.

6.0 HEALTH AND SAFETY ACTION LEVELS

An action level is a point at which increased protection is required due to the concentration of contaminants in the work area. All activities shall be initiated in Level D. An upgrade to Level C is required as shown in Table 6-1.

In addition to the above-mentioned table, an upgrade to Level C during water sampling/landfill gas monitoring is required if:

- Requested by an individual performing the task

An upgrade to Level B during any activity is required if:

- Activities are conducted in areas of confined or enclosed spaces

A work stoppage and evacuation (cease and desist) at the specific work area is required if:

- Concentrations of organic vapors recorded in the work area are greater than 1,000 ppm
- Concentration of oxygen recorded on the O2/LEL are greater than 25 percent oxygen

If ambient levels are measured which exceed the above criteria in areas which are accessible to the public or unprotected personnel, necessary site control measures must be implemented prior to commencing activities at the specific work site.

TABLE 6-1
COLESVILLE LANDFILL
ACTION LEVELS FOR FIELD ACTIVITIES

Field Activity	Monitoring Instrument	Instrument Reading	Level of PPE
On-Site (footprint of landfill)	HNU/OVM**	0-10	Level D
		>10-50	Level C
		<50	Level B or Evacuate
	02/LEL***	<25% LEL	Continue Working
		>25% LEL	Stop Work and Let Area Ventilate
		19.5-21% 02	Continue Work
		<19.5%	Level B or Leave Site
		>21%	Fire Hazard, Leave Site and Let Area Ventilate
	Respirable Dust Monitor**	0-5mg/m^3	Level D; Use Dust Suppressant As Needed
		5-50 mg/m^3	Level C; Use Dust Suppressant
		>50 mg/m^3	Level B or Evacuate Site
Off-Site	HNU/OVM**	0-10	Level D
		>10-50	Level C
		>50	Level B or Evacuate

*All reading above background
**Measured in breathing zone
***Measured at ground level

Personnel should be able to upgrade or downgrade their level of protection with the concurrence of the site safety officer and project manager.

7.0 DECONTAMINATION

Decontamination shall consist of the following procedures:

- Respirator cartridges and other disposables will be removed before meal breaks and at the conclusion of the work day, and replaced with new equipment prior to commencing work;
- Respiratory equipment and other non-disposables will be fully decontaminated with deionized water and soap and then placed in sealed plastic bags before leaving the site;
- Hands and face shall be washed with soap and water before leaving work area;
- All monitoring equipment will be cleaned, removing all mud and soil from the instrument surface.

The decontamination layout for Levels D and C decontamination is shown in Figure 5-1 and 5-2, respectively.

8.0 EMERGENCY PROCEDURES

A Medical Data Sheet shall be completed by each employee conducting field activities at the Colesville site. These completed forms will be kept in the vehicle and transported with the employee to the hospital, in case of a medical emergency. A Medical Data Sheet form is included in Appendix A.

On-site emergencies can range from nonexistent to serious conditions. Various procedures for responding to site emergencies are listed in this section. The site safety officer or alternate site safety officer is responsible for contacting local emergency services in emergency situations. One person must remain with the victim once they are evacuated from the work area. An emergency information sheet containing the hospital location, directions, emergency phone numbers and other emergency information, will be posted in the support area next to the telephone. A weather-resistant copy of the emergency information sheet will be supplied to site personnel.

If an emergency occurs on site necessitating a response to an emergency, other personnel on site are to be immediately alerted to the incident. This notification shall be an audible alarm by use of an air horn. Personnel should reassemble at the decontamination area to take a head count, order to evacuate, or other assignments as necessary to mitigate the emergency.

8.1 EMERGENCY PROCEDURES FOR CONTAMINATED PERSONNEL

Whenever possible personnel should be decontaminated before administering first aid. In the contamination reduction zone there will be a separate decontamination line for emergency use only, in order to reduced the risk of exposure.

- ***Skin Contact*** – Remove contaminated clothing, wash immediately with water, use soap if available.

- ***Inhalation*** – Remove victim from contaminated atmosphere. Remove any respiratory protection equipment. Initiate artificial respiration if necessary. Transport to the hospital.

- ***Ingestion*** – Remove from contaminated atmosphere. Do not induce vomiting if victim is unconscious. Also, never induce vomiting when acids, alkalines, or petroleum products are suspected.

If site personnel have inexplainably collapsed, all personnel must evacuate work area. Rescue personnel must don supplied air respiratory protection before evacuating victim from work area.

In case of fire, all personnel must evacuate work area and contact local fire department.

8.2 PHYSICAL INJURIES

Basic first aid supplies (bandages, gauze, tape) will be located in the first aid box. The first aid box, along with first aid manuals, will be located in the vehicle.

8.3 HEAT STRESS

Temperature stress is one of the most common illnesses at hazardous waste sites. Acclimatization and frequent rest periods must be established for conducting activities where temperature stress may occur. Below are listed signs and symptoms of heat stress; personnel should follow appropriate guidelines if any personnel exhibit these symptoms:

- ***Heat Rash*** – Redness of skin. Frequent rest and change of clothing.

- ***Heat Cramps*** – Painful muscle spasms in hands, feet, and/or abdomen. Administer lightly-salted water by mouth, unless there are medical restrictions.

- ***Heat Exhaustion*** – Clammy, moist, pale skin, along with dizziness, nausea, rapid pulse, fainting. Remove to cooler area and administer fluids.

- ***Heat Stroke*** – Hot dry skin; red, spotted or bluish; high body temperature of 104° F, mental confusion, loss of consciousness, convulsions or coma. Immediately cool victim by immersion in cool water. Wrap with wet sheet while fanning, sponge with cool liquid while fanning; treat for shock. DO NOT DELAY TREATMENT. COOL BODY WHILE AWAITING AMBULANCE.

8.4 COLD STRESS

Ambient air temperatures during site activities may create cold stress for on-site workers. Procedures for recognizing and avoiding cold stress must be followed. Cold stress can range for frostbite to hypothermia. Below are listed the signs and symptoms of cold stress. Personnel should follow the appropriate guidelines if any personnel exhibit these symptoms:

- ***Frostbite*** – Pain in the extremities and loss of manual dexterity. "Frostnip" or reddening of the tissue, accompanied by a tingling or loss of sensation in the extremities. Continuous shivering.

- ***Hypothermia*** – Pain in the extremities and loss of manual dexterity. Severe, uncontrollable shivering. Inability to maintain level of activity. Excessive fatigue, drowsiness, irritability, or euphoria. Severe hypothermia: clouded consciousness, low blood pressure, pupil dilation, cessation of shivering, unconsciousness, and possible death.

Remove the patient to a warm, dry place. If clothing is wet, remove and replace with dry clothing. Keep patient warm. Rewarming of patient should be gradual to avoid stroke symptoms. Dehydration of the loss of body fluids may result in cold injury due to a significant change in blood flow to the extremities. If patient is conscious and alert, warm, sweet liquids should be provided. Coffee and other caffeinated liquids should be avoided because of diuretic and circulatory effects. Extremities affected by frostbite should be gradually warmed up and returned to normal temperature. Moist compresses should be applied; begin with lukewarm compresses and slowly increase the temperature as changes in skin temperature are detected. Keep patient warm and calm, remove to a medical facility as soon as possible.

9.0 EMERGENCY INFORMATION

9.1 EMERGENCY TELEPHONE NUMBERS

Emergency Agency	Location	Phone Number
Local Police	Harpursville	(607) 772-1010
Fire Department	Harpursville	(607) 772-1010
Ambulance	Harpursville	(607) 772-1010
Hospital - Routine	Lourdes Binghamton, NY	(607) 798-5111
Hospital - Emergency	Lourdes Emergency Room	(607) 798-5231
Wehran Safety Officer Leslie Birnbaum	Work Home	(914) 343-0660 (914) 782-6762
Project Manager Michael O'Hara	Middletown	(914) 343-0660

STATE YOUR NAME, LOCATION, AND THE NATURE OF THE EMERGENCY

9.2 DIRECTIONS TO LOCAL HOSPITAL

Lourdes Hospital

Take Route 17 West. When entering Binghamton, Route 17 turns into Route 17/ Interstate 81. Once on 17/81, keep to your right. Get off Exit 4F (Riverside Drive Exit). Go straight on Riverside Drive for about 2 to 3 miles. Hospital is on left side.

ATTACHMENTS

FIELD TEAM REVIEW

Each Wehran employee conducting field work shall sign this section after the pre-entry briefing is completed and before being permitted to work on site. A copy of this signed form shall be kept at the site, and the original sent to the RHSO.

EMPLOYEE SIGN-OFF

I have attended a pre-entry briefing outlining the specific health and safety provisions on this site.

I have received a copy of the Site-Specific Health and Safety Plan for Colesville Landfill
I have read the plan, and will comply with the provisions contained therein.

EMPLOYEE:

Name Printed ____________ Signature ____________ Date ____________

WITNESS:

Name Printed ____________ Signature ____________ Date ____________

DIRECT READING INSTRUMENT CALIBRATION SHEET

INSTRUMENT: ______________________________

SERIAL #: ______________________________

Date	Project Number	Calibration Gas & ppm	Battery Check (Good/Bad)	Calibrated By	Remarks

DIRECT READING AIR MONITORING FORM

GENERAL INFORMATION

Date: ______________________ Name: ______________________
Project Number: ______________________ Project Name: ______________________
Background Level: ______________________ Background Location: ______________________
Weather Conditions: ______________________
Estimated Wind Direction and Speed: ______________________
(i.e. calm, moderate, strong, etc.)

FIELD ACTIVITIES

Field Activity	Start Time	Stop Time	Comments
1.			
2.			
3.			
4.			

EQUIPMENT USED

HNu		O_2/LEL		Chemical Specific Monitor		Colormetric Detector Tubes	
Range: ______ Span: ______		Alarm–LEL: ______ O_2: ______		Chemical: ______		Chemical: ______	
Instrument #: ______		Instrument #: ______		Instrument #: ______		Pump Strokes: ______	
Time	Reading	Time	Reading	Time	Reading	Time	Reading

COMMENTS

____
____
____

MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all Wehran Personnel potentially working on-site and will be kept in the Support Zone during the conductance of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to a hospital facility is required:

Site: ______________________________

Name: ____________________ Home Telephone: ( ) __________

Address: ______________________________

Age: ________ Height: ____________ Weight: __________

Person to Contact in Case of Emergency:

____________________ Phone No. ( ) __________

Blood Type: ____________________

Drug or Other Allergies: ____________________

Particular Sensitivities: ____________________

Do You Wear Contacts? ____________________

Provide a Checklist or Previous Illnesses or Exposures to Hazardous Chemicals:

____

____

____

What Medications are you Presently Using? ______________

____

Do you have any Medical Restrictions? ______________

____

____

Name, Address, and Phone Number of Personal Physician: ________

____

____

MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all Wehran Personnel potentially working on-site and will be kept in the Support Zone during the conductance of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to a hospital facility is required:

Site: ______________________________

Name: ______________________ Home Telephone: ( ) __________

Address: ______________________________

Age: ________ Height: __________ Weight: ________

Person to Contact in Case of Emergency:

______________________ Phone No. ( ) __________

Blood Type: ______________________

Drug or Other Allergies: ______________________

Particular Sensitivities: ______________________

Do You Wear Contacts? ______________________

Provide a Checklist or Previous Illnesses or Exposures to Hazardous Chemicals:

____

____

____

What Medications are you Presently Using? __________

____

Do you have any Medical Restrictions? __________

____

____

Name, Address, and Phone Number of Personal Physician: __________

____

____

MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all Wehran Personnel potentially working on-site and will be kept in the Support Zone during the conductance of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to a hospital facility is required:

Site: ______________________________

Name: ____________________ Home Telephone: ( ) __________

Address: ______________________________

Age: ______ Height: __________ Weight: ________

Person to Contact in Case of Emergency:

____________________ Phone No. ( ) __________

Blood Type: __________________

Drug or Other Allergies: ____________________

Particular Sensitivities: ____________________

Do You Wear Contacts? ____________________

Provide a Checklist or Previous Illnesses or Exposures to Hazardous Chemicals:

____

____

____

What Medications are you Presently Using? __________

____

Do you have any Medical Restrictions? __________

____

____

Name, Address, and Phone Number of Personal Physician: ______

____

____

MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all Wehran Personnel potentially working on-site and will be kept in the Support Zone during the conductance of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to a hospital facility is required:

Site: ______________________________

Name: ____________________ Home Telephone: ( ) __________

Address: ______________________________

Age: ______ Height: ________ Weight: ______

Person to Contact in Case of Emergency:

____________________ Phone No. ( ) __________

Blood Type: ____________________

Drug or Other Allergies: ____________________

Particular Sensitivities: ____________________

Do You Wear Contacts? ____________________

Provide a Checklist or Previous Illnesses or Exposures to Hazardous Chemicals:

____

____

____

What Medications are you Presently Using? __________

____

Do you have any Medical Restrictions? __________

____

____

Name, Address, and Phone Number of Personal Physician: __________

____

____