APPENDIX A

HEALTH AND SAFETY PLAN

FLUOR DANIEL GTI

HEALTH AND SAFETY PLAN
REQUESTED AND PREPARED FOR

NEW YORK STATE ELECTRIC AND GAS CORPORATION
KIRKWOOD INDUSTRIAL PARK
KIRKWOOD, NEW YORK 13902

FOR SITE ACTIVITIES AT

BIRDSALL STREET
NORWICH, NEW YORK

JANUARY 29, 1997

LEWIS STREETER, LSP
PROJECT MANAGER

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HEALTH AND SAFETY MANAGER

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SITE EMERGENCY FORM

Contaminants of Concern: MGP Waste (PAH's, VOC's, Heavy Metals, Cyanides, Sulfides)
Minimum Level of Protection: Level D
Hazard Determination: Serious____ Moderate____ Low__X___

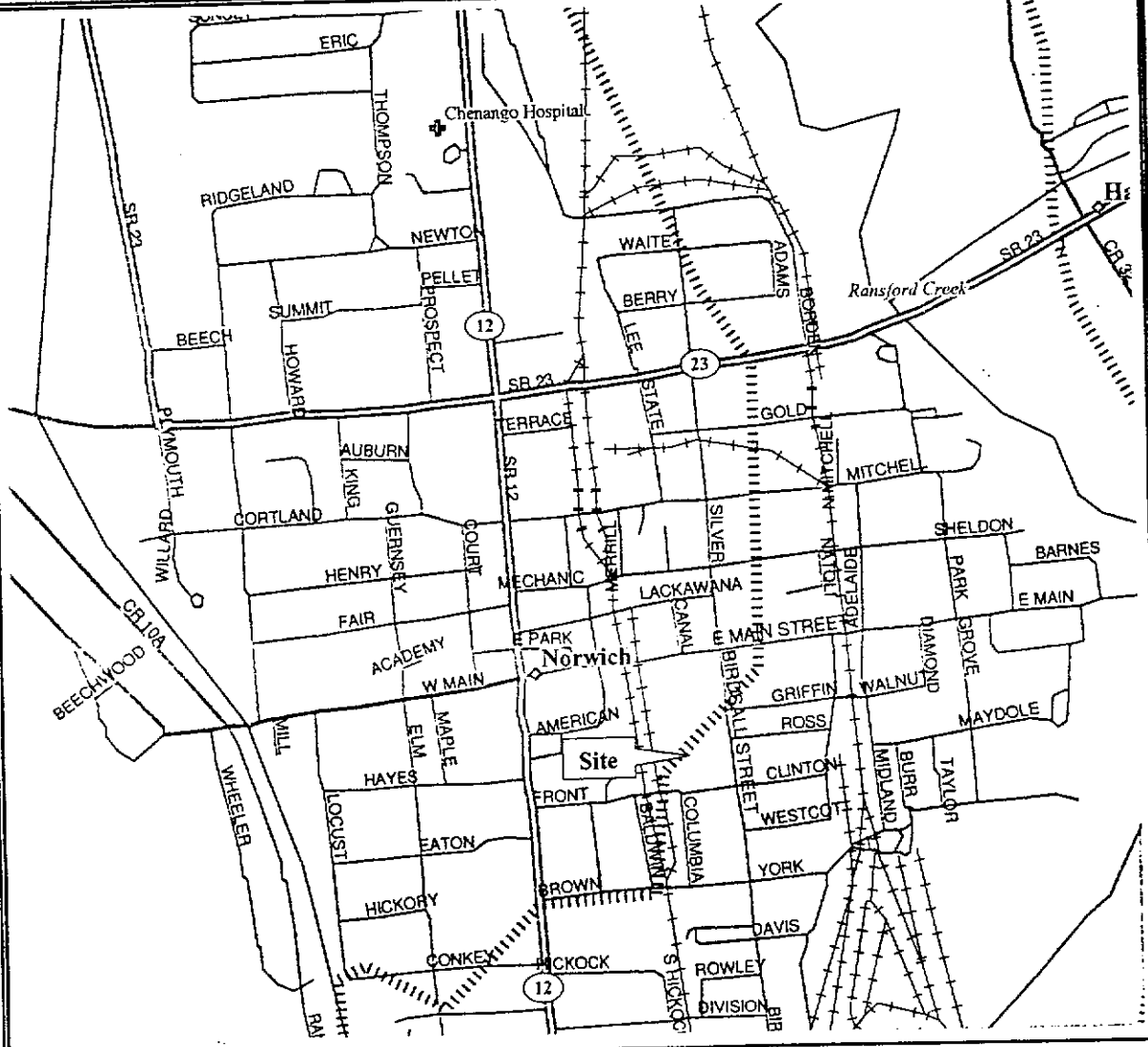
Do not endanger your own life. Survey the situation before taking any action.

Fluor Daniel GTI Office Telephone	518-370-5631
Site Location Address	Birdsdall St., Norwich, New York

EMERGENCY PHONE NUMBERS **IN THE EVENT OF ANY EMERGENCY CONTACT PROJECT MANAGER (PM) OR HEALTH AND SAFETY REPRESENTATIVE**

Ambulance	911
Fire	911
Police	911
Poison Control	800-333-0542
Hospital Name	Chenago County
Hospital Phone Number	607-335-4157
Project Manager	Lewis Streeter, 518-370-5631
Site Safety Officer	Kevin Carpenter, 518-370-5631
Health and Safety Manager	Barry Bedaw, 518-370-5631
Client Contact	Bert Finch, 607-762-8683
State Agency	NYSDEC, 518-457-9280

HOSPITAL LOCATION MAP



HOSPITAL DIRECTIONS:

From site, follow Front St. west to Rt.12. Turn right (north) and follow to hospital on the left.

HOSPITAL INFORMATION:

Name: Chenango County
Address: North Board St.
City, State Norwich, New York

Phone: Emergency: 607-335-4157

EMERGENCY FIRST AID

FIRST AID

Ingestion:	DO NOT INDUCE VOMITING. Call Poison Control - follow instructions. Administer cardiopulmonary resuscitation (CPR), if necessary. Seek medical attention.
Inhalation:	Remove person from contaminated environment. Administer CPR if necessary. Seek medical attention. DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED AND A STANDBY PERSON IS PRESENT.
Skin Contact:	Brush off dry material, remove wet or contaminated clothing. Flush skin thoroughly with water. Seek medical attention if irritation persists.
Eye Contact:	Flush eyes with water for 15 minutes. Seek medical attention.
Exposure Symptoms:	Headache, dizziness, nausea, drowsiness, irritation of eyes, nose, throat, breathing difficulties.
Contingency Plan:	Report incident to PM and Health and Safety Manager (HSM) after emergency procedures have been implemented.

RESPONDER MUST HAVE A CURRENT CERTIFICATE TO ADMINISTER FIRST AID OR CPR

1. Survey the situation. Do not endanger your own life. DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED AND A STANDBY PERSON IS PRESENT.

2. Call 911 (if available) or the fire department **IMMEDIATELY**. Explain the physical injury, chemical exposure, fire, or release.

3. Decontaminate the victim without delaying life-saving procedures.

4. If the victim's condition appears to be noncritical, but seems to be more severe than minor cuts, he/she should be transported to the nearest hospital by trained Emergency Medical Services (EMS) personnel: let the doctor assume the responsibility for determining the severity of the injury. If the condition is obviously serious, EMS must transport the victim.

5. Notify the PM and the HSM. Complete the Fluor Daniel GTI Preliminary Incident Report (PIR) within 24 hours.

EMERGENCY FIRST AID PROCEDURES	
To Stop Bleeding	**CPR**
1. Give medical statement.	1. Give medical statement.
2. Assure airway, breathing, circulation.	2. Arousal: Check for consciousness.
3. Use **DIRECT PRESSURE** over the wound with clean dressing or your hand (use nonpermeable gloves). Direct pressure will control most bleeding.	3. Open airway with chin-lift.
4. Bleeding from an artery or several injury sites may require **DIRECT PRESSURE** on a **PRESSURE POINT**. Use pressure points for 30 - 60 seconds to help control severe bleeding.	4. Look, listen, and feel for breathing.
5. Continue primary care and seek medical aid as needed.	5. If breathing is absent, give 2 slow, full rescue breaths.
	6. Check the pulse for 5 to 10 seconds.
	7. If pulse is present, continue rescue breathing: **1 breath every 5 seconds**.
	8. If pulse is absent, initiate CPR; 15 compressions for each two breaths.

1.0 INTRODUCTION

New York State Electric and Gas Corporation (NYSEG) has retained Fluor Daniel GTI, Inc. (Fluor Daniel GTI) to perform environmental services at Birdsall Street, Norwich, New York.

The Health and Safety Plan (HASP) is written to ensure the well-being of all field personnel and the community surrounding the site. Accordingly, project staff and approved Fluor Daniel GTI subcontractors must follow the policies and procedures established in the HASP. All personnel assigned to this project must sign the Agreement and Acknowledgement Sheet (Appendix B) to confirm that they understand and agree to abide by the provisions of the plan.

All work will comply with the Occupational Safety and Health Act (OSHA) Standard, "Hazardous Waste Operations and Emergency Response," (29 CFR 1910.120) and other federal, state, and local procedures that require the development and implementation of a HASP. Generation of this document certifies that the workplace has been evaluated for the hazards as described. A hazard assessment has been performed and the adequacy of the personal protective equipment (PPE) selected is hereby certified per 29 CFR 1910.132(d) and is duly noted by the signature(s) and date appearing on the cover page of this document.

This plan addresses the safety issues associated with this interim remedial measures project for excavation and handling of MGP residues of varying physical and chemical characteristics involving the following site tasks:

- Excavation
- Screening of soils
- Heavy Equipment Operation
- Soil Transfer

The minimum level of protection for this site is Level D. For each task, the potential hazards for employee exposure to site contaminants and/or air monitoring results, will determine the level of protection. Modified Level D will be worn during tasks that may have the potential for skin contact with contaminated media (soil or water). Upgrade to Level C and/or B will occur when the possibility of exposure exists from the onset of site specific tasks or results of real-time monitoring exceed established action levels listed in Table 3, Air Monitoring Action Levels. This HASP must be modified or amended when circumstances or conditions develop that are beyond the scope of this plan.

Any changes in project work scope and/or site conditions as described must be amended in writing by the Health and Safety Manager (HSM) on the HASP Amendment Sheet (Appendix A).

Table 1 presents an overview of the Fluor Daniel GTI health and safety programs in which all field personnel are required to participate. These include the medical surveillance and comprehensive training programs in accordance with OSHA Hazardous Waste Operations and Emergency Response standard, 29 CFR 1910.120.

1.1 Site Description/Background Information

For site information refer to the PHASE III Interim Remedial Measures Work Plan dated October1996.

Table 1. Fluor Daniel GTI Health and Safety Programs

Activity	Description	Action
Medical Surveillance	▪ The program tracks the physical condition of the Company's employees in compliance with Department of Transportation (DOT) regulations and OSHA standards, and other customer requirements. ▪ Specific components of the medical surveillance program are described in Fluor Daniel GTI's Health and Safety Procedure Manual, Policy and Procedure # 5, "Health Monitoring."	▪ Medical examinations and consultations are completed for all employees prior to assignment, annually, upon termination, and in the event of injury and/or illness resulting from exposure at the work site.
Training	▪ Training requirements and programs comply with the OSHA Hazardous Waste Operations and Emergency Response standard, 29 CFR 1910.120 ▪ Specific components of the training program are described in Fluor Daniel GTI's Health and Safety Procedure Manual, Policy and Procedure #8, "Safety Training."	▪ Field personnel must complete a minimum of 40 hours of hazardous waste activity instruction. ▪ Field personnel must complete a minimum of 3 days supervised field instruction. ▪ Field personnel assigned to the site will also receive 8 hours of refresher training each year. ▪ On-site managers and supervisors directly responsible for employees engaged in hazardous waste operations receive an additional 8 hours of supervisory training. ▪ Field personnel assigned to site also receive first aid/CPR and blood borne pathogen training.

2.0 HAZARD IDENTIFICATION AND CONTROL

Precautions must be taken to prevent injuries and exposures to the following potential hazards.

Potential Hazard	Control
Exposure to Chemical Products (See Appendix E: MSDS Definitions and MSDSs) **MGP Waste (PAH's, VOC's,**	1. Stand up-wind of chemical products whenever possible. 2. Minimize contact and contact time with chemical products. 3. Avoid walking through discolored areas, puddles, leaning on drums, or contacting anything that is likely to be contaminated. 4. Do not eat, drink, smoke and/or apply cosmetics in the hot or warm zones. 5. Wear gloves when in contact with contaminated surfaces. 6. Safety glasses must be worn at a minimum. 7. Splash goggles must be worn when working with liquids. 8. > 5 ppm organic vapors in breathing zone sustained for five minutes, requires upgrade to Level C. 9. > 250 ppm organic vapors in breathing zone requires upgrade from Level C to Level B. 10. If unknown materials are encountered, call the HSM.
Exposure to Surface/ Subsurface Airborne Dust **Heavy Metals, Cyanides, Sulfides**	1. Stand up-wind whenever intrusive activities occur and generate visible signs of airborne dust. 2. Monitor air for airborne soil dust (surface or subsurface soil) with portable aerosol dust-direct reading instrument. 3. > 0.15 mg/M^3 in breathing zone requires upgrade to Level C. 4. > 50 mg/M^3 in breathing zone requires upgrade to Level B. Approval for Level B must first be approved by HSS. 5. Utilize wet methods (spraying ground, wet drilling, etc.) when visible signs of airborne dust are generated.
Vehicular Traffic (Interior and Exterior)	1. Wear traffic safety vest when vehicle hazard exists. 2. Use cones, flags, barricades, and caution tape to define work area. 3. Use vehicle to block work area. 4. Ensure that heavy equipment is equipped with a back-up alarm.

Table 2. Potential Hazards and Control (continued)

Potential Hazard	Control
Operating screening equipment and conveyor belts	1. Ensure that all moving parts, rollers and pinch points are adequately guarded to prevent accidental contact. 2. Test emergency shut-off switches on a daily basis. 3. Chock wheels to prevent movements. 4. Perform LOTO prior to cleaning, adjusting, or maintaining the equipment.
Erecting Temporary Structure	1. Wear leather gloves while attaching support members to protect against pinching injuries. 2. While working from elevated levels greater than 6 feet, ensure that all employees have 100% fall protection with full body harnesses and guardrails. 3. Do not stand under loads that are being raised or lowered with cranes or aerial lifts. 4. Conduct pre-operational inspection of aerial lifts to include; tire air pressure, hydraulic fuel level and pressure check, make sure pivot pins are secured, check hoses for worn areas, check for cracks or deviations in welded parts, the safety limit switch should work freely, security of the guard rail system on the platform, check both ground and platform control functions, raise and lower each boom system separately, listen for any unusual noises, vibrations, or uneven operations. 5. Maintain a safe distance of 20 feet from unguarded overhead power lines. 6. Conduct site evaluation to determine proper positioning for the unit. Make sure surface is level. Cordon off holes, dropoffs, bumps, or weak ground surfaces. 7. Never climb a raised platform or stand on the mid-rail or top-rail. 8. Tools should always be hung or put into a belt whenever possible.
Inclement Weather	1. Stop outdoor work during electrical storms and other extreme weather conditions such as extreme heat or cold temperatures. 2. Take cover indoors or in vehicle. 3. Listen to local forecasts for warnings about specific weather hazards such as tornados, hurricanes, and flash floods.

Table 2. Potential Hazards and Control (continued)

Potential Hazard	Control
Interior Operation of Heavy Equipment	1. An adequate ventilation system must be designed into the building to provide for sufficient air changes to remove potential carbon monoxide (CO) gas and nitrogen dioxide (NO_2) and keep the vapors from reaching 10% LEL. 2. During interior operations utilizing combustion engines, CO and NO_2 monitoring must be conducted. 3. The minimum illumination within the interior shall be 5 foot candle power.
Utility Lines Contact	1. Contact Dig Safe to have utility lines marked prior to excavation/trenching 2. Refer to site drawings or customer interviews if on private property for utility locations. 3. Hand dig 3 to 5 feet down and 5 feet each side of utility marker to avoid breaking utility lines. 4. Refer to Appendix H for Underground Utility Contact Prevention and Management Plan.
Noise	1. Wear hearing protection when equipment such as a drill rig, jackhammer, cut saw, air compressor, blower or other heavy equipment is operating on the site. 2. Wear hearing protection whenever you need to raise your voice above normal conversational speech due to a loud noise source; this much noise indicates the need for protection. 3. Hearing protection is required when measured sound pressure levels (SPL) exceed 85 dB(A) where employees stand or conduct work. 4. Conduct noise monitoring of suspected high noise operations at the beginning of the workday or start up of new operations to verify noise control/hearing protection requirements. 5. Refer to Section 3.2, Noise Monitoring for guidance.

Table 2. Potential Hazards and Control (continued)

Potential Hazard	Control
Electric Shock	1. Maintain appropriate distance from overhead utilities; **20-foot minimum clearance from power lines required; 10-foot minimum clearance from shielded power lines.** 2. Use ground-fault circuit interrupters as required. 3. Perform lockout/tagout procedures (Appendix G). 4. Use three-pronged plugs and extension cords. 5. Contact your local underground utility-locating service. 6. Follow code requirements for electrical installations in hazardous locations.
Physical Injury	1. Wear hard hats and safety glasses when on-site. 2. Maintain visual contact with the equipment operator and wear orange safety vest when heavy equipment is used on-site. 3. Avoid loose-fitting clothing (driller and driller's helper). 4. Prevent slips, trips, and falls; keep work area uncluttered. 5. Keep your hands away from moving parts (i.e., augers). 6. Test the emergency shut-off switch on the drill rig daily.
Back Injury	1. Use a mechanical lifting device or a lifting aid where appropriate. 2. If you must lift, plan the lift before doing it. 3. Check your route for clearance. 4. Bend at the knees and use leg muscles when lifting. 5. Use the buddy system when lifting heavy or awkward objects. 6. Do not twist your body while lifting.
Heat Stress	1. Increase water intake while working. 2. Increase number of rest breaks and/or rotate workers in shorter work shifts; take breaks in shaded areas. 3. Watch for signs and symptoms of heat exhaustion and fatigue. 4. Plan work for early morning or evening during hot months. 5. Use ice vests when necessary. 6. Rest in cool, dry areas. 7. In the event of heat stroke, bring the victim to a cool environment and initiate first aid procedures. Refer to Appendix K.

Table 2. Potential Hazards and Control (continued)

Potential Hazard	Control
Cold Stress	1. Take breaks in heated shelters when working in extremely cold temperatures. 2. Remove the outer layer of clothing and loosen other layers to promote evaporation of perspiration, upon entering the shelter. 3. Drink warm liquids to reduce the susceptibility to cold stress. Refer to Appendix K.
High Crime Areas	1. Be aware of surroundings. 2. Use the buddy system. 3. Request police detail when appropriate.
Insects	1. Tuck pants into socks. 2. Wear long sleeves. 3. Use insect repellent.
Poisonous Plants (Such as Poison Ivy, Oak or Sumac)	1. Don't enter areas infested with poisonous plants. 2. Immediately wash any areas that come into contact with poisonous plants.
Ladders	1. Make sure ladder rungs are sturdy and free of cracks. 2. Use ladders with secure safety feet. 3. Pitch ladders at a 4:1 ratio. 4. Secure ladders at the top when possible. 5. Do not use ladders for access to air stripper towers. 6. Use non-conductive ladders near electrical wires.
Fire Control	1. Smoke only in designated areas. 2. Keep flammable liquids in closed containers. 3. Keep site clean; avoid accumulating combustible debris such as paper. 4. Follow Hot Work Safety Procedures when welding or performing other activities requiring an open flame. 5. Isolate flammable and combustible materials from ignition sources. 6. Ensure fire safety integrity of equipment installations.

Table 2. Potential Hazards and Control (continued)

Potential Hazard	Control
Static Electricity	1. Do not create static discharge in flammable atmospheres. 2. Electrically bond and ground pumps transfer vessels, tanks, drums, bailers and probes, when moving liquids. 3. Electrically bond and ground vacuum trucks and the tanks they are emptying. 4. Do not splash fill containers with flammable liquids.
Soil Sampling	1. Wear appropriate PPE to avoid skin, eye, and inhalation contact with contaminated soil. 2. Stand upwind when conducting tasks and minimize possible inhalation exposure. 3. Conduct air monitoring to determine level of respiratory protection. 4. Utilize engineering controls such as portable venturi air movers to draw away or blow away chemical vapors.
Welding, Cutting, Brazing	1. Conduct fire safety evaluation. 2. Complete Hot Work Permit (Appendix L). 3. Ensure flammable materials are protected from hot work, sources of ignition. 4. Ensure fire watch/fire extinguisher is on standby by hot work location.
Cleaning Equipment	1. Wear appropriate PPE to avoid skin and eye contact with isopropyl alcohol, alconox, or other cleaning materials. 2. Stand upwind to minimize any potential inhalation exposure. 3. Dispose of spent cleaning solutions and rinses accordingly.
First aid kit, blood borne pathogen kit, emergency eye wash/shower station, fire extinguisher and absorbent pads will be located on-site either in the decontamination zone, or in the Fluor Daniel GTI company vehicle.	

3.0 AIR MONITORING

3.1 Air Monitoring

Air monitoring must be performed on all sites in accordance with Fluor Daniel GTI practices. Organic vapor and/or concentrations are monitored in the field with a photoionization detector (PID) with an 10.2 Ev lamp. Airborne dust/particulate concentrations are measured with a real-time aerosol monitor (using a scattered light photometric sensing cell) when there are visible signs of airborne dust. Specific real-time air monitoring equipment will be utilized for carbon monoxide and nitrogen dioxide from combustion engine exhaust. Detector tube grab sampling is conducted for benzene, when results of non-specific real-time monitor action levels are reached or when their presence is suspected. Both area and personal air monitoring readings are to be taken to characterize site activities. Air monitoring results must be documented on the Vapor Monitoring Form (Appendix F).

Calibration and maintenance of air monitoring equipment must follow manufacture specifications and documented. Recalibration and adjustment of air monitoring equipment must be completed when site conditions and equipment operation reveal the need. Record all air monitoring equipment calibration and adjustment information on form in Appendix F.

Air monitoring action levels (Table 3) have been developed by the Fluor Daniel GTI HSM, to indicate the chemical concentrations in the breathing zone that require an upgrade in level of PPE. All workers on-site must have been properly fitted with PPE (i.e., respirators) and have been trained in their use (i.e., donning and doffing). Air monitoring measurements will be taken in the breathing zone of the worker most likely to have the highest exposure. Transient peaks will not automatically trigger action. Action will be taken when levels are consistently exceeded in a 5-minute period. Similarly, if chemical odors are detected that are a nuisance, bothersome, or irritating, an upgrade in respiratory protection can provide an extra level of comfort or protection when conducting site activities. Job tasks that require air monitoring, the applicable action levels that apply for those tasks, and the frequency of air monitoring are described in Table 3 and Table 4. Additional guidelines for frequency of air monitoring are presented in Table 5.

Engineering controls such as the venturi air mover (supplied by compressed air) to exhaust or dilute solvent vapors emanating from monitoring wells or when conducting intrusive activities can be utilized as a means to downgrade PPE requirements (Level B to C, Level C to D).

Table 3. Air Monitoring Action Levels

Instrument*	Function	Measurement	Action
Flame Ionization Detector (FID) or Photoionization Detector (PID) (10.2 Ev lamp) - Measures Total Organic Vapors			
Conduct air monitoring for volatile organic compounds during activities where contaminated media are present.		> 0 - 5 ppm	Level D/Modified Level D required. Check for benzene with detector tubes.
		> 5 - 250 ppm	Upgrade to Level C.
		> 250 - 1,000 ppm	Upgrade to Level B. Coordinate with PM and HSM for guidance.
		> 1000 ppm	Stop Work required. Leave Work Area, Contact PM and HSM for guidance.
Benzene Detector Tubes			
Conduct grab sampling for benzene when sustained PID/FID readings are detected in the breathing zone.		0 - 0.5 ppm	Level D/Modified Level D required.
		>0.5 - 50 ppm	Upgrade to Level C required.
		>50 - 1,000 ppm	Upgrade to Level B required.
		>1,000 ppm	Stop work required. Contact PM and HSM for guidance.
Dust/Particulate Monitor (For Non-impacted Soils)			
Conduct air monitoring for dust particulate when sustained (> 5 minute) levels of visible dust are generated and engineering controls such as wet methods are ineffective.		0 - 1.25 mg/M^3	Level D required.
		1.25 - 50 mg/M^3	Upgrade to Level C.
		> 50 mg/M^3	Stop work. Contact PM and HSM for guidance.
Dust/Particulate Monitor (Impacted Soils)			
Conduct air monitoring for dust particulate when sustained (> 5 minute) levels of visible dust are generated and engineering controls such as wet methods are ineffective.		0 - 0.15 mg/M^3	Level D required.
		0.15 - 50 mg/M^3	Upgrade to Level C.
		> 50 mg/M^3	Stop work. Contact PM and HSM for guidance.

Table 3. Air Monitoring Action Levels (continued)

Instrument*	Function	Measurement	Action
Carbon Monoxide (CO) and Nitrogen Dioxide (NO_2) Measures NO_2 and CO			
Conduct air monitoring for CO and NO_2 when conditions exist within the building interior.		< 15 ppm CO	Acceptable
		> 15 - 35 ppm CO	Verify reasons for CO with appropriate air monitoring instrumentation before work continues. Utilize appropriate engineering controls/PPE once atmospheric contaminants have been verified.
		> 35 ppm	**Leave area immediately;** this atmosphere is extremely dangerous. Notify PM or HSM for guidance.
		< 2.5 ppm NO_2	Acceptable
		> 2.5 ppm NO_2	**Leave area immediately;** this atmosphere this atmosphere is extremely dangerous. Notify PM or HSM for guidance. Verify reasons for NO_2 levels with appropriate air monitoring instrumentation before work continues. Utilize appropriate engineering controls/PPE once atmospheric contaminants have been verified.
*Note: Instruments must be calibrated according to manufacturer's recommendations.			

Table 4. Hazard Summary

AIR MONITORING SUMMARY			
Job Task	Level PPE	Instrument	Frequency
Soil Screening and Crushing	Modified Level D (See Table 3 and Table 9)	PID[1] or DT[2], DM[3], CO[4], NO_2[5]	Start up of work, then 15 minutes to continuously based on sampling results and sample location. Continuously if action level is exceeded.
Soil Transportation	Modified Level D (See Table 3 and Table 9)	PID, DT, DM	Start up of work, then 15 minutes to continuously based on sampling results and sample location. Continuously if action level is exceeded.
Excavation/ Trenching	Modified Level D (See Table 3 and Table 9)	PID, DT, DM	Start up of work, then 15 minutes to continuously based on sampling results and sample location. Continuously if action level is exceeded.
Soil Sampling	Modified Level D (See Table 3 and Table 9)	PID, DT, DM	Start up of work, then 15 minutes to continuously based on sampling results and sample location. Continuously if action level is exceeded.

[1] PID, Photoionization Detector
[2] DT, Benzene Detector Tube
[3] DM, Dust/ Particulate Monitor
[4] CO, Carbon Monoxide Meter
[5] NO_2, Nitrogen Dioxide Meter

Note: "Start up of work at each new task location" means to monitor the air quality at each new operation on the site. The breathing zone is the area inside a 1-foot radius around the head.

Table 5. Air Monitoring Frequency Guidelines

Conduct periodic monitoring when:

1. It is possible that an immediately dangerous to life or health (IDLH) condition or a flammable atmosphere has developed, or

2. There is an indication that exposures may have risen over permissible exposure limits or published exposure levels since the last monitoring. Look for a possible rise in exposures associated with these situations:

   - **Change in site area** - work begins on a different section of the site.
   - **Change in contaminants** - handling contaminants other than those first identified.
   - **Visible signs of particulate exposure from intrusive activities such as drilling/boring and excavation.**
   - **Perceptible chemical odors or symptoms of exposure.**
   - **Change in on-site activity** - one operation ends and another begins.
   - **Handling leaking drums or containers.**
   - **Working with obvious liquid contamination** (e.g., a spill or lagoon).

Table 6. Specific Criteria and Protocol for Specifying Health and Safety for Projects Involving Specific Chemical Agents or Other Industrial-Specific Conditions

Potential Chemical Exposure or Exposure Scenario	Criteria and Protocol for Health and Safety Specification
Carbon Monoxide	1. CO is colorless, odorless, and tasteless, so exposure must be assessed with specific monitoring equipment. 2. Primary concern with carbon monoxide is chemical asphyxiation. CO binds to red blood cells preventing oxygen from being carried and utilized by cells. 3. Symptoms of exposure include headache, dizziness, drowsiness, and nausea. Initially, skin may be pale; continued exposure would cause skin and mucous membranes to become cherry-red in color. **Cartridge respirators <u>are not</u> effective protection.** 4. If suspected exposure occurs, go to fresh air and seek medical evaluation. If available, breath in oxygen. 5. The action level for CO is 35 ppm. Follow guidelines outlined in Table 2 when CO gas is suspected.

Potential Chemical Exposure or Exposure Scenario	Criteria and Protocol for Health and Safety Specification
Coal Tar	1. Coal Tar can contain up to 160 aromatic compounds such as phenol, pyrol, and pyridine plus additional poly aromatic hydrocarbons (PAHs). It is listed as a carcinogenic substance by IARC, NTP, and OSHA. 2. Coal tar is toxic by inhalation, ingestion and skin contact. The range of toxicity depends on the exposure, concentration and duration. Effects may include irritation to skin, mucous membranes and respiratory system upon exposure from direct contact short term contact to respiratory and skin diseases from repeated long term exposure. Symptoms include redness and itching to skin leading to a dermatitis from skin contact, severe eye irritation when contacted in the eye, and trouble breathing from inhalation. 3. Precautions to take to avoid exposure to Coal Tar are wearing appropriate PPE to avoid skin and eye contact when working with contaminated soil and water. Minimize breathing in contaminated soil by using wet methods to control dust or wear a cartridge respirator with HEPA filter. In the event of contact or suspected exposure, rinse the affected area with water, and seek medical attention.
Heavy Metals	1. Main concern with heavy metals is inhalation exposure to the dust, as well as ingestion of heavy metals on food or from hand to mouth contact. 2. A health and safety professional should develop an exposure assessment prediction that identifies likely exposure. If the predicted exposure is in excess of 50% of the PEL, utilization of Level C should occur.

Potential Chemical Exposure or Exposure Scenario	Criteria and Protocol for Health and Safety Specification
Cyanide	1. Cyanide gas may be formed when organocyanide or ferrocyanide compounds in coal gasification by-products are in highly acidic soil or come in contact with acidic solutions/water. Alkali metal salts are very soluble in water. 2. Avoid direct contact with coal gasification by-products or contaminated soils and or waters and cyanide gas. Wear appropriate PPE - a minimum Modified Level D with polyethylene coated tyvek suits is required where contact with cyanide compounds is suspected. 3. **Cyanide is a highly toxic, lethal gas. It can cause death in minutes. Conduct air monitoring with detector tubes or cyanide real time monitor when cyanide gas is suspected. Supplied air respirators with positive pressure demand are required to be work at the action level of 2.5 mg/M^3.** 4. Inhalation of cyanide gas is an immediate medical emergency.

Potential Chemical Exposure or Exposure Scenario	Criteria and Protocol for Health and Safety Specification
Polynuclear Aromatic Hydrocarbons (PAHs)	1. PAHs are a class of compounds containing closed hydrocarbon rings. PAHs cause irritation to skin, eyes, and respiratory tract when direct contact occurs or inhalation of vapors or contaminated soil occurs. Some PAHs are probable human carcinogens while others are considered animal carcinogens and mutagens. 2. Avoid direct contact from PAHs to skin and eyes. This could be in the form of coal gasification by-products and associated contaminated soils. Avoid breathing off-gassing vapors of coal gasification by-products and associated contaminated soil. 3. Wear appropriate PPE when potential to skin, eye, or inhalation exposure can occur. This includes modified Level D, with upgrade to Level C/B depending on air monitoring results. Use full face cartridge respirator with organic vapor/HEPA cartridges. For supplied air, full face positive pressure demand type must be worn. Utilize wet methods to minimize PAH contaminated dust generation when excavating/mixing processes are underway. 4. PAHs are combustible. Avoid contact with open flames or other direct heating sources. 5. Ensure proper personal decontamination is conducted after site activities. Wash/rinse face/hands and any other exposed skin. Immediately rinse affected skin or eyes if contact occurs, and seek medical attention. Move to fresh air when inhalation exposure occurs and seek medical attention.
Aromatic Hydrocarbons Benzene	1. Health hazards associated with aromatic hydrocarbons are central nervous system depression by inhalation exposure and irritating to skin, eyes, and mucous membranes. 2. Potential for exposure can be controlled by setting appropriate action levels and following general safe work practices. Verification of specific aromatic hydrocarbons can be accomplished using colorimetric detector tubes when PID/FID readings are in excess of 5 ppm.

4.0 CHEMICAL HAZARD CONTROL

4.1 Chemical Handling Procedures

Personnel must practice the chemical-specific handling procedures outlined below.

Table 8. Chemical Handling Procedures

Chemical	Description	Procedures
Acids and Bases Acids: including hydrochloric, nitric, and sulfuric acids Bases: including sodium hydroxide	Extremely corrosive materials with a variety of uses.	▪ Wear gloves and eye-splash protection while using acid dispensed from a small dropper bottle during water sampling. ▪ Wear a full-face, air-purifying respirator equipped with combination cartridges (organic vapor/acid gas) as well as Tyvek® coveralls and nitrile and/or NBR gloves for large volume applications. ▪ Have an eye wash bottle or portable eye wash station on-site. ▪ Cap all drums after dispensing chemicals. ▪ Do not add anything into a virgin chemical drum, including unused product. ▪ Avoid mixing strong acids and bases. Consult HSM for task-specific evaluation. If mixing is absolutely necessary, do it slowly. Avoid vapors or fumes that are generated. ▪ When diluting acids, add the acid to water in small quantities and mix cautiously. ▪ When diluting bases, add water to the base in small quantities and mix cautiously.
Activated Carbon	Granular adsorbent medium used to remove residual hydrocarbons from water and/or air.	▪ Use respiratory protection when activated carbon creates a dusty environment. ▪ Avoid using Activated Carbon Filter Beds for Ketone Solvents - an exothermic reaction can develop over time and result in possible explosion. ▪ Contact HSM for task-specific evaluation.

4.2 PPE

Based upon the hazards that may be encountered during site activities, PPE as follows was selected. Only PPE that meets the following American National Standards Institute (ANSI) standards are to be worn.

- Eye protection - ANSI Z87.1-1989
- Head protection - ANSI Z89.1-1986
- Foot protection - ANSI Z41-1991

Employees must maintain proficiency in the use and care of PPE that is to be worn. Typically this is covered during formal and informal refresher training sessions presented by Fluor Daniel GTI.

Level D is the minimum acceptable level for this site. Levels of protection are based on the activity of task to be conducted.

Table 9. PPE

Level	Requirements
Level D	■ Work uniform ■ Steel-toed boots ■ Approved safety glasses or goggles ■ Hard hat ■ Fluorescent vest, when vehicular traffic is on or adjacent to the site ■ Nitrile gloves for water sampling handling
Modified Level D	**One or more of the following:** ■ Chemical resistance (acid or solvent) boot covers ■ PE-coated Tyvek® suit, NBR outer and nitrile inner gloves if skin contact with contaminants is possible. ■ Hearing protection (muffs and/or plugs).
Level C	■ Level D and Modified Level D ■ National Institute for Occupational Safety and Health (NIOSH)-approved full-face respirator with organic vapor/HEPA cartridge.
Level B	■ Level D and Modified Level D ■ NIOSH/Mine Safety and Health Administration (MSHA) approved full face positive pressure demand supplied air respirator, either airline or self contained.
Prior to use, all equipment must be inspected to ensure proper working condition.	

4.3 Site Control: Work Zones

Work zones will be established in order to:

- Delineate high-traffic locations,
- Identify hazardous locations, and
- Contain contamination within the smallest area possible.

Employees entering the work zone must wear the proper PPE for that area. Work and support zones will be established based on ambient air monitoring data, necessary security measures, and site-specific conditions. Work zones will be identified as either Hot Zone (HZ)/Exclusion Zone (EZ); Decontamination Zone (DZ)/Contamination Reduction Zone (CRZ); or Clean Zone (CZ)/Support Zone (SZ).

The following PPE requirements apply for Work Zones

- HZs/EZs requires Modified Level D/Level C PPE
- DZs/CRZs require Modified Level D PPE
- SZs/CZs require Level D PPE

Listed are general guidelines for delineation of work zones. CRZs will be developed for decontamination procedures listed in Section 4.5.

1. The HZ/EZ is identified as the processing building interior and the perimeter of the product storage area.

2. The DZ/CRZ will be all other portions of the property within the chainlink fence.

3. Support areas are the areas located upwind and away from CRZ and HZ and the former Norwich Aero Products building and property.

Table 10. Site Security Measures

WORKING IN STREET OR ROADWAY ■ Wear traffic vest and hardhat when vehicle hazard exists. ■ Use cones, flag-mounted cones, caution tape and/or barricades. ■ Use vehicle strobe light and block area with truck. ■ Develop traffic patternization plan for high traffic situations: • use flag person, • use flashing arrow sign, • use "MEN WORKING" signs liberally, • obtain lane closing permits, and • engage police details.
WORKING AT EXCAVATION/TRENCHING SITES ■ "Competent person" is required per OSHA 29 CFR 1926 Subpart P. ■ Safetyguard open excavations by restricting unauthorized access. ■ Highlight work area using prominent warning signs (cones, saw horses/barricades and signage) placed a minimum of 10' back from excavation opening. ■ Maintain zone definition along perimeter with **continuous string** of yellow orange caution tape.
EXCAVATIONS LEFT UNATTENDED OR OVERNIGHT **Use one of the following methods to address these situations:** ■ Surround entire perimeter with plastic or cloth construction net fencing. Anchor fence to ground using steel posts driven into ground. Space out posts no greater than 8 feet apart. Fence height minimum 4-feet high. Fence material must be of a quality capable of withstanding a pressure of 200 pounds. Place fence a minimum of 10 feet back from excavation opening. ■ Place 8-foot long barricades affixed with flashing lights end to end with 4-foot high construction net fence attached to barricades. ■ Utilize temporary curbing or concrete "jersey" barriers affixed with flashing signal lights or other effective warning signs.

4.4 Decontamination Procedures

Operations conducted at this site have the potential to contaminate field equipment and PPE. To prevent the transfer of contamination to vehicles, administrative offices and personnel, the procedures presented in Table 12 must be followed. Specific decontamination requirements will be followed by utilizing the equipment for that purpose. Employees then must follow up with a shower and change into street clothes, leaving any contaminated clothing on-site for appropriate disposal. Work uniforms and Level D PPE must not be brought to employee residences and left either on-site, at the office location, or in the company vehicle. Laundering of company uniforms must be by Fluor Daniel GTI approved laundering services and not done at employees residence.

Table 11. Decontamination Procedures

Item	Examples	Procedure
Field equipment	Bailers, interface probes, hand tools, drill augers, and miscellaneous sampling equipment	■ Decontaminate with a solution of detergent and water; rinse with water prior to leaving the site. ■ Protect from exposure by covering with disposable covers such as plastic to minimize required decontamination activities.
Disposable PPE	Tyvek® suits, inner latex gloves, respirator cartridges	■ Dispose of according to the requirements of the client and state and federal agencies. ■ Change out respirator cartridges on a daily basis and dispose accordingly.
Nondisposable PPE	Respirators	■ Wipe out respirator with disinfecting pad prior to donning. ■ Decontaminate on-site at the close of each day with a solution of an approved sanitizing powder and water.
	Boots and gloves	■ Decontaminate outside with a solution of detergent and water; rinse with water prior to leaving the site. ■ Protect from exposure by covering with disposable covers such as plastic to minimize required decontamination activities.

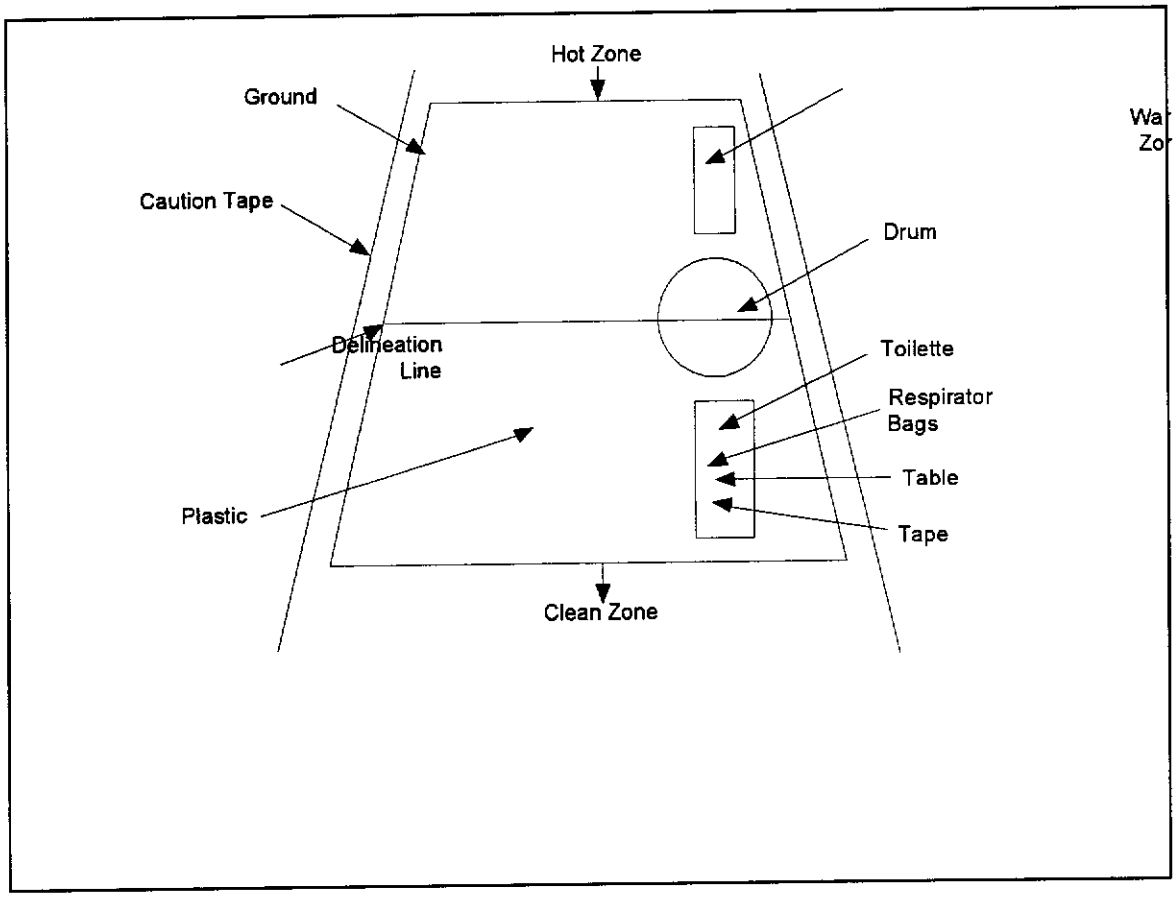
All water used in decontamination procedures should be stored in portable storage tanks until sufficient amount are stockpiled to facilitate disposal treatment. Disposable sampling and PPE will be place in plastic bags and temporarily stored in designated drums. These drums shall be disposed of according to regulatory guidelines, if necessary.

4.5 Example Decontamination Diagram

If Level C or Level B PPE is required, a CRZ will be constructed in a centralized common area with a travel path from the EZ demarcated with three-foot high cones. The decontamination procedure for this project site is a two stage process.

STAGE 1
- Gross contamination removal with a brush.
- Remove outer boots and dispose in a drum.
- Remove Tyvek suit and dispose in a drum.
- Remove outer gloves and dispose in a drum.
- Walk to Stage 2.

STAGE 2
- Remove respirator.
- Remove cartridge and dispose in a drum.
- Clean respirator and insert into a bag.
- Remove inner gloves and dispose.
- Wipe hands with a toilette and dispose.
- Walk out of decontamination area.


Hot Zone
Ground
Caution Tape
Drum
Delineation Line
Toilette
Respirator Bags
Table
Plastic
Tape
Clean Zone

5.0 CONTINGENCY PLANS

Table 12 (Sections 5.1 - 5.4) presents contingency plans for potential emergency situations.

Table 12. Contingency Plans for Site Emergencies

Situation	Action
5.1 Evacuation	1. Immediately notify all on-site personnel of an emergency requiring evacuation. 2. Leave the dangerous area and report to a designated rally point. 3. Notify EMS, as appropriate. 4. Account for all personnel. 5. Contact the PM and the HSM as soon as possible. 6. Maintain site security and control measures for community safety until emergency responders arrive.
5.2 Medical Emergency	1. Survey the situation: **Do not enter an area that may jeopardize your safety.** ▪ Establish the patient's level of consciousness. ▪ Call for help. ▪ Contact EMS and inform them of patient's condition. 2. Primary assessment (patient unconscious) ▪ Arousal ▪ Airway ▪ Breathing ▪ Circulation **Only trained personnel should perform CPR or First Aid.** 3. Secondary assessment (patient conscious) ▪ Check for bleeding: Control with direct pressure. ▪ Do not move patient (unless location is not secure). ▪ Monitor vital signs. ▪ Provide First Aid to the level of your training. ▪ Contact the PM and HSM as soon as possible. ▪ Document the incident on Fluor Daniel GTI's PIR form.
5.3 Fire Emergency	1. **Evacuate the area.** 2. Notify the EMS. 3. Extinguish small fires with an all-purpose extinguisher. 4. Contact the PM and HSM. 5. Document the incident using the PIR form.

Situation	Action
5.4 Spill/ Release	Prevent problems by documenting the location of underground lines (e.g., product, sewer, telephone) before starting site work. If you drill through a line or tank or another leak occurs, document the spill/release in writing. Include dates, times, actions taken, agreements reached and names of people involved. In the event of a spill/release, follow this plan. 1. Wear appropriate PPE; stay upwind of the spill/release. 2. Turn off equipment and other sources of ignition. 3. Turn off pumps and shut valves to stop the flow/leak. 4. Plug the leak or collect drippings in a bucket, when possible. 5. Place sorbent pads to collect product, if possible. 6. Call Fire Department immediately if fire emergency develops. 7. Inform Fluor Daniel GTI PM about the situation. 8. Determine if the client wants to repair the damage of if the client will use an emergency repair contractor. 9. Based on agreements, contact emergency spill contractor for containment of free product. 10. Advise the client of spill discharge notification requirements and determine who will complete and submit forms. Do not submit or report to agencies without the client's consent. Document each interaction with the client and regulators and note, in writing; name, title authorizations, refusals, decisions, and commitments to actions. 11. Do not transport or approve transportation of contaminated soils or product until proper manifests have been completed and approve. Be aware that soils/product may meet criteria for hazardous waste. 12. Do not sign manifests as generator of wastes; contact the regional compliance manager to discuss waste transportation.
*Notifications - **a spill/release requires completion of a PIR and Class III notification.***	
The PM must contact the client or generator. The generator is under obligation to report to the proper government agencies. If the spill extends into waterways, the Coast Guard and the National Response Center ([800] 424-8802) must be notified immediately by the client or with his permission.	

6.0 PROJECT PERSONNEL

Fluor Daniel GTI will oversee and act accordingly during all phases of the project. The following management structure will be instituted for the purpose of successfully and safety completing this project.

6.1 Medical/Technical Advisors

Elayne Theriault, MD
Fluor Daniel GTI, CONSULTING PHYSICIAN (800) 229-3674 x 326

Jeffrey Stumpf, CIH, CSP, CHMM
Fluor Daniel GTI, Englewood, CO (303) 799-4241

David Crowley, CSP, CET, CHMM
Fluor Daniel GTI, Norwood, MA (617) 769-7600

The specific duties of the medical/technical advisors include:

- providing technical input into the design of the site health and safety plan,
- advising worker exposure potential along with appropriate hazard reduction methods, and
- recommending a suitable medical monitoring program for the site workers is the responsibility of an occupational health physician in conjunction with consultation of the above listed personnel.

A SHSO will be assigned on a full time basis to each site during site activities and shall assist and shall represent the HSM. The SHSO shall have the responsibility and authority to implement and enforce the approved HASPs, this includes modifying/halting work, and removal of personnel from the site if work conditions change and effect on-site/off-site health and safety matters. The SHSO will serve as the main contact for any on-site emergency situation.

Table 13. Responsibilities of On-Site Personnel

Title	General Description	Responsibilities
PM Lewis Streeter	Reports to upper-level management. Has authority to direct response operations. Assume total control over site activities.	▪ Prepares and organizes background review of the project, the work plan, the HASP, and the field team. ▪ Obtains permission for site access and coordinates activities with appropriate officials. ▪ Sees that the work plan is properly carried out and on schedule. ▪ Briefs the field personnel on specific assignments. ▪ Together with the SHSO sees that health and safety requirements are met. ▪ Prepares final report and follow up on PIR events.
SHSO Kevin Carpenter	Advises the PM on all aspects of health and safety on site. Stops work if site operations threaten worker or public health and safety. Informs health and safety specialist of any changes in site conditions or project status.	▪ Periodically inspects protective clothing and equipment. ▪ Sees that protective clothing and equipment are properly stored and maintained. ▪ Controls entry and exit at the access control points. ▪ Monitors the workers for signs of stress, including heat stress, cold exposure, and fatigue. ▪ Implements the HASP. ▪ Conducts periodic inspections to assess whether the HASP is being followed. ▪ Enforces the "buddy" system. ▪ Informed of emergency procedures, evacuation routes, and telephone number of local hospital, poison control center, fire department, and police department. ▪ Notifies, when necessary, local public emergency officials. ▪ Submits PIRs promptly to site supervisor and PM. ▪ Maintains communication with health and safety representative on site activities.

Title	General Description	Responsibilities
SHSO (continued)		▪ Coordinates emergency medical care. ▪ Sets up decontamination lines and decontamination solutions appropriate for the chemical contaminants encountered. ▪ Controls the decontamination of equipment, personnel, and samples from contaminated areas. ▪ Facilitates the proper disposal of contaminated clothing and materials. ▪ Maintains the availability of required equipment. ▪ Advises Fluor Daniel GTI Technology health services and medical personnel of potential exposures. ▪ Notifies emergency response personnel in the event of an emergency. ▪ Maintains and oversees operation of monitoring equipment and interpretation of data from the monitoring equipment.
Project Supervisor Kevin Carpenter	Reports to PM. Has authority to direct response operations. Assumes total control over site activities.	▪ Manages field operations. ▪ Executes the work plan and schedule. ▪ Enforces safety procedures. ▪ Coordinates with the SHSO in enforcing worker protection levels. ▪ Enforces site control. ▪ Documents field activities and sample collection. ▪ Notifies when necessary, local public emergency officials. ▪ Submits PIRS and initiates follow up with PM and SHSO.
Work Team	Reports to project supervisor for on-site activities. Work parties must comprise at least two people for high hazard operations.	▪ Safely completes on-site tasks required to fulfill the work plan. ▪ Complies with the HASP. ▪ Notifies SHSO or supervisor of suspected unsafe conditions. ▪ Submits PIRs to SHSO and Project Supervisor.

APPENDIX A

HASP AMENDMENT SHEET

HASP AMENDMENT SHEET

Project Name:

Project Number:

PM:

Location:

Changes in field activities or hazards:

Approved by:
Health and Safety Manager

Date

APPENDIX B

AGREEMENT AND ACKNOWLEDGEMENT SHEET

AGREEMENT AND ACKNOWLEDGEMENT SHEET

Fluor Daniel GTI, Inc. (Fluor Daniel GTI) personnel have the authority to stop field activities at this site if any activity is not performed in accordance with the requirements of the HASP. All Fluor Daniel GTI project personnel, subcontractor personnel, and visitors are required to sign the Agreement and Acknowledgement Sheet **prior** to conducting field activities at this site.

FLUOR DANIEL GTI
AGREEMENT AND ACKNOWLEDGEMENT STATEMENT

1. **I have read and fully understand the HASP and my responsibilities.**
2. **I agree to abide by the provisions of the HASP.**

Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date

AGREEMENT AND ACKNOWLEDGEMENT SHEET

Fluor Daniel GTI personnel have the authority to stop field activities at this site if any activity is not performed in accordance with the requirements of the HASP. All Fluor Daniel GTI project personnel, subcontractor personnel, and visitors are required to sign the Agreement and Acknowledgement Sheet **prior** to conducting field activities at this site.

FLUOR DANIEL GTI
AGREEMENT AND ACKNOWLEDGEMENT STATEMENT

1. **I have read and fully understand the HASP and my responsibilities.**
2. **I agree to abide by the provisions of the HASP.**

Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date

AGREEMENT AND ACKNOWLEDGEMENT SHEET

Fluor Daniel GTI personnel have the authority to stop field activities at this site if any activity is not performed in accordance with the requirements of the HASP. All Fluor Daniel GTI project

personnel, subcontractor personnel, and visitors are required to sign the Agreement and Acknowledgement Sheet **prior** to conducting field activities at this site.

FLUOR DANIEL GTI
AGREEMENT AND ACKNOWLEDGEMENT STATEMENT

1. **I have read and fully understand the HASP and my responsibilities.**
2. **I agree to abide by the provisions of the HASP.**

Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date

APPENDIX C

VISITOR/TRAINEE GUIDELINES

VISITOR/TRAINEE GUIDELINES

Fluor Daniel GTI is committed to providing a safe environment on all work sites for visitors, trainees, employees and/or passersby. In order to accomplish this, the following guidelines must be followed.

1. VISITORS

Any person not actively participating in the work at the site is regarded as a "visitor" and must follow Fluor Daniel GTI's visitor/trainee guidelines. Visitors must be accompanied by a representative while on-site.

Sites must be marked with signs, placards, and/or barricades to designate hazardous boundaries. Visitors will not be allowed on any site that is not adequately marked.

2. TRAINEES

Trainees are employees of Fluor Daniel GTI who have not yet completed Fluor Daniel GTI's required safety training program. New hires and in-house company transfers will be considered trainees until safety training requirements are met.

Trainees will be informed of restrictions by their supervisor and must abide by them before visiting active sites.

Trainees will be permitted to visit Fluor Daniel GTI sites as observers as long as the following conditions are met:

- Trainees are supervised at all times while observing on-site.
- Trainees do not perform work functions of any type while on-site.
- Trainees do not handle any equipment, tools and/or supplies while on-site.
- Trainees do not enter any hazardous or HZ or confined space areas while on-site.

Supervisors will be responsible for informing trainees of the above conditions and for ensuring that the conditions are met. Supervisors will also ensure that trainees will not be asked to violate the conditions listed above.

A Trainee/Observer Agreement Form must be signed by both the trainee and the supervisor and placed on file in the Regional Human Resources department.

Infractions of the above agreement will be viewed as extremely serious and will be subject to discipline up to and including termination for either the trainee and/or supervisor.

TRAINEE/OBSERVER AGREEMENT FORM

Fluor Daniel GTI is committed to providing a safe working environment for all employees. In addition, Fluor Daniel GTI will comply with OSHA requirements for employee safety training prior to working on any hazardous site.

The following section is to be filled out by trainee.

Agreement between:

______________________________ __________________ and Fluor Daniel GTI.

Name (print/type) SS#

Because we have your safety in mind, you will be considered a trainee until all training criteria are met. This means you must complete all training requirements prior to performing work activities on-site. As a requirement of the training program, you will be asked to visit Fluor Daniel GTI sites as an observer. You must be supervised on all of these site visits.

As an on-site observer trainee, your signature below indicates your agreement to these restrictions.

You may not:

1. Perform work functions of any type.
2. Handle any equipment/tools and/or supplies of any type.
3. Enter any hazardous or hot zone areas.

I agree to adhere to the above conditions in all instances while on-site as a trainee/observer.

______________________________ ____________________

Signature Date

- -

This section is to be filled out by supervisor.

As supervisor to the above trainee, I agree to the above restrictions and agree not to request him/her to perform activities contrary to those restrictions.

______________________________ ____________________

Signature Date

APPENDIX D

PIR FORM

FLUOR DANIEL GTI
PIR

Check Incident Type:
Class I_____

Person Completing Report _____ Office _____ Date _____ Incident Date _____

Incident Time:_____ Location:_____ Home Dept. #:_ _ _ _ _ Visiting Dept. #:_ _ _ _ _

Person Involved in Incident:_____ Telephone:_ _ _-_ _ _-_ _ _ _

Driver Name (if motor vehicle accident):_____ Telephone:_ _ _-_ _ _-_ _ _ _

Type of Incident:

- ☐ Near Miss Event
- ☐ Unsafe Condition/Action
- ☐ Equipment Damage
- ☐ Theft
- ☐ Property Damage
- ☐ Permit/Code Compliance
- ☐ Personal Injury/Illness
- ☐ Chemical Exposure
- ☐ Fire/Explosion
- ☐ Spill/Release
- ☐ Customer Incident
- ☐ Newspaper/Radio/TV
- ☐ Other
- ☐ Motor Vehicle Accident

Assoc. Leasing Vehicle #: _ _ _ _ _ _ _ _ _ _

VIN #_____

If Fluor Daniel GTI vehicle, call Associates Leasing at 800-255-2607

Circle one based on initial findings: Preventable/Non-Preventable

---

Personal Injury ☐ Yes ☐ No (If no, go to next section)

- ☐ First Aid Only
- ☐ Hospitalization
- ☐ Medical Treatment
- ☐ Possible Injury, Not Confirmed

Person Injured:

- ☐ Fluor Daniel GTI Employee (If FDGTI employee, complete First Report of Injury)
- ☐ Subcontractor
- ☐ Customer/Public/Other

Nature of Injury, Illness or Exposure: _____

Describe nature of incident, how it occurred, who was involved, witnesses and possible causal factors: (Attach additional sheets if necessary)

☐ First Report of Injury Attached ☐ Police Report Attached

Describe immediate actions taken and persons notified: (Attach additional sheets if necessary)

Line Manager (Responsible for Follow-up):_____ Office _____

DISTRIBUTION

Provide this report to the line manager immediately. The line manager is responsible for the proper distribution of the PIR form per the Incident Reporting Guide (see reverse side). Notify Corporate of all Class II and III incidents immediately by phone at (800) 876-0647, Mailbox 11911, and fax a copy of the PIR to Norwood at (617) 769-9861 .

INCIDENT REPORTING GUIDE

Incident Class	Class I: A minor incident that is dealt with at the local level	Class II: A serious incident that requires notification to Corporate within 24 hours	Class III: A highly significant incident requiring immediate notification and assistance from Business Unit and Corporate
Examples of Incidents	o First Aid injury o Minor damage <$200 o Non-reportable quantity spill o Near miss event o Unsafe condition or action Note: If there is a question as to Class I or II, follow Class II notification actions.	o Personal injury (more than first aid to employee, subcontractor or public) o Any motor vehicle accident o Damage to property greater than $200 but less than $10,000 o Near miss incident that could have been very serious o Fire/Explosion o Non-emergency notification of regulatory agency is required o Served with subpoena (DO NOT ACCEPT, have delivered to CT Corporation System, Registered Agent. Contact Legal Dept. in Norwood for assistance.)	o Hospitalization (of one or more persons) o Multiple injury of employees, sub-contractors or public o Unprotected chemical exposure o Death o Damage to property greater than $10,000 o Reportable quantity spill release o Emergency notification of regulatory agency o Regulatory agency response to incident site (inspection) o Contact or appearance of news or public media
Notification Actions	1. On-scene person notifies Line Manager* immediately by phone 2. Provide PIR form to Line Manager and H&S Representative(s)** immediately following the incident 3. Line Manager investigates and follows up within 48 hours. *Line management = reporting manager, project manager, operations/office manager and district hub, or area manager **H&S = includes district H&S representatives and business unit H&S manager	1. On-scene person notifies Line Manager* immediately by phone 2. Line Manager notifies the Business Unit Manager, District, Hub or Area Manager; H&S Representative(s)**, Human Resources Representative; and Corporate H&S Director with PIR form immediately following the incident 3. Manager provides a detailed final investigation report within 48 hours to Business Unit Manager, H&S Representative and Corporate Director H&S Note that all lost-time injury events will be investigated by the respective Business Unit Manager with a final report to the CEO.	1. On-scene person notifies Line Manager* immediately by phone 2. Manager immediately notifies Business Unit Manager, H&S Representative(s)**, Human Resources and Corporate Director H&S (800-876-0647, Mailbox #11911) by phone. PIR form is provided by fax immediately to (617-769-9861) addressed to Corporate Director H&S 3. Incident management team conferences by phone and formulates an action plan

Rev. 1/97

APPENDIX E

- MSDS
- DEFINITIONS

DEFINITIONS

(TLV-TWA)	**Threshold Limit Value - Time Weighted Average.** The time-weighted average concentration for a normal 8-hour work day and a 40-hour work week, to which nearly all workers may be repeatedly exposed without adverse effect.
(PEL)	Time-weighted average concentrations similar to (and in many cases derived from) the Threshold Limit Values.
(REL)	*Recommended Exposure Limit* as defined by NIOSH similar to the Threshold Limit Values.
(IDLH)	*Immediately dangerous to life or health* means any atmospheric condition that poses an immediate threat to life, or which is likely to result in acute or immediate severe health effects. This includes oxygen deficiency conditions.
(LEL)	*Lower Explosive Limit* The minimum concentration of vapor in air below which propagation of a flame will not occur in the presence of an ignition source.
(UEL)	*Upper Explosive Limit* The maximum concentration of vapor in air above which propagation of a flame will not occur in the presence of an ignition source.
Flash Point (F.P.)	The lowest temperature at which the vapor of a combustible liquid can be made to ignite momentarily in air.
Vapor Pressure (V.P.)	The pressure characteristic at any given temperature of a vapor in equilibrium with its liquid or solid form, often expressed in millimeters of mercury (mm Hg).
Odor Threshold	A property displayed by a particular compound, low detection indicates a physiological sensation due to molecular contact with the olfactory nervous system (Based on 50 percent of the population).
Ionization Potential	The amount of ionization characteristic a particular chemical compound (I.P.) displays.

APPENDIX F

AIR MONITORING FORM

FLUOR DANIEL GTI
AIR MONITORING FORM

Project Name:

Project Number:

Contaminants:

Date	Time	PID	Gas Monitoring			Detector Tube Reading	Location	Purpose	Initials
			CO	NO_2	MiniRam	ppm			

NOISE MONITORING FORM

Project Name:

Project Number:

Noise:

Date	Title	Location	Noise Reading dB(A)	Initials

DAILY INSTRUMENT CALIBRATION CHECK SHEET

Project Name_____ Instrument_____

Job Number_____ ID #_____

DATE	INSTRUMENT	BATTERY CHECK OK?	ZERO ADJUST OK?	CALIBRATION GAS (PPM)	READING (PPM)	CALIBRATED BY:	COMMENTS

APPENDIX G

SITE-SPECIFIC LO/TO PROCEDURES

SITE-SPECIFIC LO/TO PROCEDURES		
Equipment	Operation	Lockout Method/Location

APPENDIX H

UNDERGROUND UTILITY CONTACT PREVENTION AND MANAGEMENT PLAN

UNDERGROUND UTILITY CONTACT PREVENTION AND MANAGEMENT PLAN (continued)

UTILITY MARK-OUT RECORD SHEET

Facility:_____ Location:_____

FDGTI Representative:_____ Date Called:_____

County of Work:_____ Township of Work:_____

Contact Miss Dig to have subgrade utilities marked. The nearest intersecting street for this site is: _____. We need the entire site area marked since we do not know exactly where we will be drilling/excavating. The site needs to be marked by:_____

List which utilities they will have marked. Confirmation Number:_____

List other known utilities in the area that they do not mark:_____

Contact other known utilities not contracted by Miss Dig to have them mark the site.

MAJOR UTILITIES MARKED BY COLOR CODE

ELECTRIC - RED

GAS - YELLOW

COMMUNICATIONS/CABLE - ORANGE

WATER - BLUE

SEWER - GREEN

OTHER CONTACTS:

IMPORTANT NOTE: ALL UNDERGROUND UTILITIES MAY NOT BE LOCATED BY MISS DIG.

UNDERGROUND UTILITY CONTACT PREVENTION AND MANAGEMENT PLAN

Check Off When Completed

STEPS	TASK DESCRIPTION	RESPONSIBLE EMPLOYEE
☐ STEP 1	Obtain site blueprints from client, if available, to show buried utility/conduits.	Project Manager (PM)
	If site blueprints are unavailable **other methods should be employed to identify subsurface conduits in the field. Examples include privately contracted utility locators such as SM&P, a hand-held utility location device, field observations (cut pavement, signs and overhead lights, water, electric, and gas meters, etc.), and customer personnel with knowledge of conduit locations. No one tool should be relied upon. Instead, as many tools as practicable should be employed to insure that all known/suspect conduits have been identified.**	PM and/or field personnel
	Mark out any proposed digging locations with white survey paint.	
☐ STEP 2	Contact underground utility locating service (before you dig). Give proposed drilling dates, location, etc. **Documented notification of the proper underground notification service at a minimum of 48 or 72 hours prior to the scheduled site work.* (Check with the state for notification requirements).**	PM Assistant for contacting "miss dig" and/or field personnel
	If possible, arrange site visit with client, facilities maintenance manager, or other site knowledgeable person to verify, utility and drilling/excavation locations.	PM
	Regarding subcontractors: at a minimum, excavation subcontractors will be required to supply sufficient labor to complete all requested installation tasks.	PM
☐ STEP 3	**The Health and Safety Plan (HASP) will be amended to include emergency telephone numbers for all utility companies identified during the notification process.**	Office safety coordinator updates HASP with PM approval.
☐ STEP 4	On the day that on-site activities are scheduled to begin, **at the first tailgate safety meeting, the locations of all known/suspect utilities (subgrade and overhead) will be reviewed with all personnel in the field (Fluor Daniel GTI and subcontractors).**	PM and/or field personnel
	Make sure that all underground utility locator markings are visible for each noted utility, etc. Note any discrepancies. Visually inspect for undocumented trenches, laterals, etc. that may be visible as discolored areas, patched pavement, and not marked accordingly.	PM and/or field personnel
☐ STEP 5	Pre-screen each drilling/digging location by hand augering and/or post hole digger to a depth of at least 3 to 5 feet using a 3-inch OD minimum clam-shell style post hole digger and/or hand auger. Inspect excavation periodically with flashlight to check for visual obstructions. Discontinue immediately upon encountering any substantial resistance to hand auger and/or post hole digger.	Subcontractors to conduct hand augering and/or post hole digging under Fluor Daniel GTI, Inc. (FDGTI) oversight.

UNDERGROUND UTILITY CONTACT PREVENTION AND MANAGEMENT PLAN (continued)

STEPS	TASK DESCRIPTION	RESPONSIBLE EMPLOYEE
☐ STEP 6	**During excavation/trenching activities, barricades and cones with flags will be used to mark the 10-foot distance from a located conduit. This will serve as a reminder of the conduit's presence and to alert the Fluor Daniel GTI supervisor that it is time to pay close attention to excavation/trenching activities.**	Field personnel
☐ STEP 7 ENCOUNTER	In the unlikely event that a subsurface utility/conduit is encountered, immediately halt all drilling/digging operations and secure the area. Try to determine the source (i.e., gas line, water line, etc.) and contact the emergency numbers for that utility. Contact the PM immediately. Take all safety precautions to insure that all flames, etc. are extinguished, and all personnel are kept away from the area. Monitor for lower explosive limit (LEL), oxygen (O2), photoionization detector (PID), and any other substances that may be present as appropriate for that utility encounter (i.e., gas line). The Preliminary Incident Report (PIR) is filled out by field personnel and submitted to the PM.	FDGTI field personnel secures area and contacts PM immediately. PM contacts client, etc., to discuss appropriate actions. FDGTI field personnel contacts local emergency officials as necessary (i.e., fire, police, EPA, public works, etc.). PM submits PIR to appropriate Fluor Daniel GTI management and prepares follow-up report.

APPENDIX I

SITE MAPS

APPENDIX J

JSA

JOB SAFETY ANALYSIS

HEAVY EQUIPMENT OPERATION

TASK - JOB STEPS	JOB HAZARDS	CONTROL/SAFEGUARDS
Heavy Equipment Operations (Backhoes, Loaders, Dump Trucks)	1. Employee run over or hit by moving equipment	1. a. back up signals on equipment; b. traffic safety vest for all field personnel; c. foot traffic restricted in areas of operation; d. establish standard hand signals for laborers assisting in equipment operations.
	2. Physical hazards; a. hit in head b. foreign body in eye c. foot injury	2. a. hard hat; b. safety glasses c. steel toe boots
	3. overhead utilities/overhead obstacles	3. Minimum 20' distance, 10' distance if insulated

JOB SAFETY ANALYSIS
Excavation of Contaminated Soils

JOB STEPS	JOB HAZARDS	SAFEGUARDS/PRECAUTIONS
Operate backhoe or excavator to remove contaminated soils	1. Underground utilities	1. Level D personal protective equipment
	2. Cave in	2. Audible alarms (back-up, etc.) for heavy equipment
	3. Vehicle/equipment traffic	3. Test for LEL (10% LEL action level) and ppm (25 ppm on PID for action level to Level C)
	4. Falling loads	4. Slope and shore per specification in OSHA standard 1926.650-652
	5. Toxic or hazardous environments	5. Competent person supervising
		6. Secure opening of excavation when fall hazard exists (e.g., barricade openings)
		7. Stop work if strong odors reach property perimeter
		8. Prevent all skin contact

JOB SAFETY ANALYSIS

SOIL TRANSPORTION

JOB STEPS	JOB HAZARDS	SAFEGUARD AND PRECAUTIONS
Soil Transfer/Consolidation	1. Employee run over or hit by moving equipment.	1. a. Back up signals on equipment. b. Traffic safety vest for all field personnel. c. Restricted foot traffic in area. d. Establish hand signals for laborers assisting in equipment operations.
	2. Physical Hazards (hit in head, foreign body in eye, foot injury, etc.)	2. a. Hard Hat, safety glasses, steel toe boots, work gloves.
	3. Overhead utilities/overhead	3. Minimum 20' distance, 10' distance if insulated.
	4. Dust problem	4. a. Monitor for ambient dust per SSP. b. Wearing level D PPE. c. Spray dust with water.
	5. Noise levels exceeding the OSHA PEL.	5. Earmuffs and/or ear plugs effectively reduce noise levels.
	6. Toxic vapors	6. Monitor for contaminants using real time air monitoring per SSP stay upwind.

JOB SAFETY ANALYSIS

SOIL SCREENING

JOB STEPS	JOB HAZARDS	SAFEGUARDS & PRECAUTIONS
Soil Screening	1. Exposure to airborne contaminants released during screening activities.	1. Monitor for airborne contaminants in accordance with section 3 of the HASP.
	2. Injury from screen nip points and moving parts.	2. All moving shall be properly guarded and site personnel must stay clear of moving parts.
	3. Injury while clearing screen blockage.	3. Ensure that all mechanical equipment is locked and tagged out during any repair work.
	4. Congested work area due to too many workers in a small area.	4. Maintain ample work room between workers.
	5. High noise levels from screening operations.	5. Wear ear plugs during operations.
	6. Injury from heavy equipment used to load soils into the screening unit.	6. Wear reflective traffic vest when working around heavy equipment. Heavy equipment shall have backup alarms installed.

APPENDIX K

HEAT/COLD STRESS PROCEDURES

HEAT/COLD STRESS PROCEDURE

1.0 HEAT STRESS

Heat stress is a significant potential hazard associated with the work task performed and the type and degree of protective equipment used in hot weather environments. Local weather conditions may produce conditions which will require restricted work schedules in order to protect employees. Monitoring for heat stress will follow one of two protocols depending on whether impermeable clothing (Tyvek, saranex, rain gear, etc.) or permeable clothing (cotton coveralls) is worn. This section will apply to both hazardous and non-hazardous waste workers at the site. The SSHO with direction from HSM will determine the environmental wet bulb globe temperature (WBGT) and physiological (heart rate [HR] and oral temperature [OT]) monitoring to be conducted for both types of workers.

1.1 Workers Wearing Permeable Clothing

The American Conference of Governmental Industrial Hygienists (ACGIH) have set Threshold Limit Values (TLVs) for worker exposure to heat stress in which it is believed that nearly all workers may be repeatedly exposed without adverse health effects. The TLVs assume that workers are acclimatized, fully clothed in permeable clothing with adequate water and salt intake, and capable of functioning effectively under the given working conditions without exceeding a deep body temperature (BT) of 100.4°Fahrenheit (F). Measurement of the WBGT has been found to be the most adequately measurable environmental factor in which to correlate with the deep BT and other physiological responses to heat. The following table reviews the work/rest regimen to be followed by all permeably clothed workers based upon routinely measured WBGT.

Permissible Heat Exposure TLVs Applicable to Workers Wearing Permeable Clothing

Work/Rest Regimen	Workload		
	Light	Moderate	Heavy
Continuous work	86 (76)	80 (70)	77 (67)
75% work - 25% rest, each hour	87 (77)	82 (72)	78 (68)
50% work - 50% rest, each hour	89 (79)	85 (75)	82 (72)
25% work - 75% rest, each hour	90 (80)	88 (78)	86 (76)

Values are given in °F WBGT.

Rest means minimal physical activity. Rest should be accomplished in the shade. Any activity requiring only minimal activity can be performed during rest period.

() Parentheses indicate the 10 degree adjustment for working in impermeable protective clothing.

1.2 Workers Wearing Impermeable Clothing

Workers who must wear impermeable clothing are held at a higher risk of suffering heat stress. Impermeable clothing impedes sweat evaporation, one of the body's major cooling mechanisms. It is the duty of each employer to alert or notify the SSHO if symptoms of heat stress occur to their respective site personnel. Physiological and environmental monitoring of personnel wearing an impermeable protective equipment ensemble will commence when the ambient temperature rises above 70°F. Environmental monitoring will be conducted continuously for as long as the ambient temperature stays above 70°F and physiological monitoring will be conducted immediately before and after each work period. Frequency of physiological monitoring will increase as the ambient temperature increases or if slow recovery rates are indicated. The break time must be sufficient to allow workers to recover from the effects of heat stress. This will be accomplished by measuring the recovery HR and OT. The break time duration will be determined using the following methodology and criteria:

- Seat person being monitored,
- Take OR,
- Measure pulse in the following sequence:
  - Pulse #1: 30 seconds to 1 minute after sitting, and
  - Pulse #2: 2½ to 3 minutes after sitting,

An excessive heat stress condition exists when any of the following conditions exist:

1. Oral or ear temperature exceeds 99.5°F,
2. If pulse #2 is greater than 90 beats/minute, or
3. Pulse #1 is greater than 100 beats/minute.

Worker cannot return to work until:

- Oral or ear temperature is below 99.5°F,
- Pulse rate is below 90 beats/minute, and
- Recovery HR for workers with Hrs over 90 beats per minute is less than 10 beats per minute less than the original HR.

Adhering to the guidelines for heat stress prevention and monitoring will greatly minimize the possibility of the occurrence of heat stress. Site personnel must also be aware of the symptoms of heat-related disorders and be prepared to administer the appropriate treatments.

1.1.2 Prevention

A. Provide plenty of fluids. A 50 percent solution of fruit juice or similar solution in water, or plain water will be available. For workers performing work inside an EZ, fluid intake may occur in the contaminated reduction zone (CRZ). Workers must first perform a partial decontamination process which will include removal of gloves and washing of hands and face prior to consumption of fluids. The SSHO will monitor the partial decontamination and fluid consumption process to ensure that ingestion of site contaminants does not occur.

B. Work in pairs. No activity where personnel are in Level C/B or CSE will be conducted alone.

C. Provide cooling devices. Ice vests or on-site showers can be provided to reduce BT and/or cool protective clothing.

   The amount and type of undergarments worn will be left to the preference of each individual unless prone to heat stress, especially heat rash. In this case, the worker can wear "long john" cotton type underwear to keep skin off chemical resistant clothing.

D. Adjustment of the work schedule. When practicable, the most labor-intensive tasks should be carried out during the coolest part of the day.

E. Shaded or cooled rest areas. Shaded or cooled rest areas will be provided when site environmental and/or workers physiological responses warrant.

1.1.3 Heat Stress Monitoring

Physiological monitoring of personnel wearing an impermeable protective ensemble will be conducted at regular intervals at the beginning and conclusion of the work period. HR must be periodically measured for all site personnel when heat stress conditions (climate or wearing impermeable clothing). Additional physiological monitoring such as BT and body water temperature (BWT) monitoring can be measured for extreme temperatures and when impermeable clothing is worn.

A. HR must be measured by the radial pulse for 30 seconds as early as possible in the resting period and repeated approximately 3 minutes into rest period.

The HR at the beginning of the rest period should not exceed 110 beats per minute. The HR also should not exceed 90 beats per minute after approximately 3 minutes of rest. If the HR does exceed the criteria, the next work period will be shortened by 33 percent, while the length of the rest period will remain the same. If the HR still exceeds the criteria at the beginning of the next rest period, the following work period will be shortened by 33 percent.

B. BT can be measured orally with a clinical or disposable thermometer, in accordance with manufacturer's instructions, as early as possible in the rest period (before drinking liquid). Oral or ear temperature at the beginning of the rest period should not exceed 99.5°F. If it does, the next work period will be shortened by 33 percent while the length of the rest period will remain the same. However, if the OT exceeds 99.5°F at the beginning of the next rest period, the following work period will be shortened by another 33 percent. A worker will not be permitted to wear a semi-permeable or impermeable protective ensemble when his/her BT exceed 99.5°F.

C. Body water loss (BWL) due to perspiration can be measured by having the worker weigh him/her self at the beginning and end of each work day. Similar clothing should be worn at both weighing. BWL should not exceed 1.5 percent total body weight in a work day.

Suggested Frequency of Physiological Monitoring for Fit and Acclimated Workers[1]

Adjusted Temperature[2]	Normal Work Ensemble[3]	Impermeable Ensemble[4]
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°-90°F (30.8°-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 minutes of work	After each 120 minutes of work

1 For work levels of 250 kilocalories per hour.

2 Calculate the adjusted air temperature (T_{adj}) using the following equation:

T_{adj} (°F) = T_{adj} (°F) + (13 x percent sunshine)

Measure the air temperature (T_{adj}) using a standard mercury-in-glass thermometer with the bulb shielded from radiant heat.

3 A normal work ensemble consists of cotton overalls with long sleeves and pants.

4 An impermeable work ensemble consists of impermeable coveralls with long sleeves and pants.

1.1.4 Recognition and Treatment

Any personnel who observes any of the following forms of heat stress either in themselves or in another worker, will report this information to his or her immediate supervisor or the SSHO.

A. Heat rash (or prickly heat)

Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.

Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.

Treatment: Remove sources of irritation and cool the skin with water or wet cloths.

B. Heat Cramps or Heat Prostration

Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Sudden development of pain and/or muscle spasms in the abdominal region.

Treatment: Remove the worker to the CRZ. Remove protective clothing. Decrease BT and allow a period of rest in a cool location.

C. Heat Exhaustion - **SERIOUS**

Cause: Overexertion in a hot environment and profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing.

Treatment: Perform the following while simultaneously making arrangements for transport to a medical facility.

Remove the worker to the CRZ. Remove protective clothing. Lie the worker down on his or her back in a cool place, and raise the feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of a salt water solution consistency of one teaspoon salt in 12 ounces water. Transport the worker to a medical facility.

D. Heat Stroke - **EXTREMELY SERIOUS**

Cause: Same as heat exhaustion.

Symptoms: **No perspiration**, dry mouth, pain in the head, dizziness, nausea.

Treatment: Perform the following while making arrangements for transport to a medical facility.

Remove the worker to the CRZ. Remove protective clothing. Lie the worker down in a cool place and raise the head and shoulder slightly. **Cool without chilling**. Apply ice bags or cold wet cloth to the head. Sponge bare skin with cool water or rubbing alcohol. If possible, place the worker in a tub of cool water. Do not give stimulants. Transport to a medical facility.

2.0 COLD STRESS

If work on this project begins in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Systemic cold exposure is referred to as hypothermia. Localized cold exposure is generally labeled frostbite.

A. Hypothermia: hypothermia is defined as a decrease in the patient core temperature below 96°F. The BT is normally maintained by a combination of central (brain and spinal cord) and peripheral (skin and muscle) activity. Interferences with any of these mechanisms can result in hypothermia, even in the absence of what normally is considered a "cold" ambient temperature. Symptoms of hypothermia include: shivering, apathy, listlessness, sleepiness, and unconsciousness.

B. Frostbite: frostbite is both a general and medical term given to areas of local cold injury. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperatures are less than freezing and usually less than 2°F. Symptoms of frostbite are: a sudden blanching or whitening of the skin; the skin has a waxy or white appearance and is firm to the touch; tissues are cold, pale, and solid.

Prevention of cold related illness can be aided by educating workers on recognizing the symptoms of frostbite and hypothermia and by identifying and limiting known risk factors. The workers should be provided with enclosed, heated environments on or adjacent to the site, dry changes of clothing, and warm drinks.

To monitor the worker for cold related illnesses, start (oral) temperature recording at the job site:

- At the field team leader's discretion when suspicion is based on changes in a worker's performance or mental status.
- At a worker's request.
- As screening measure, two times per shift, under unusually hazardous conditions (e.g., wind-chill less than 20°F, or wind-chill less than 30°F with precipitation).
- As a screening measure whenever any one worker on the site develops hypothermia.

Workers developing moderate hypothermia (a core temperature of 92°F) should not return to work for at least 48 hours.

Table 3. Progressive Clinical Symptoms of Hypothermia

Core Temperature (°F)	Symptoms
99.6	Normal rectal temperature
96.8	Metabolic rate increases
95.0	Maximum shivering
93.2	Victim conscious and responsive
91.4	Severe hypothermia
89.6 - 87.8	Consciousness clouded, blood pressure difficult to obtain, pupils dilated but react to light, shivering ceases
86.0 - 84.2	Progressive loss of consciousness, muscular rigidity increases, pulse and blood pressure difficult to get, respiratory rate decreases
78.8	Victim seldom conscious
64.4	Lowest accidental hypothermia victim to recover

In order to minimize the risk of the hazards of working in cold environments, workers will be trained and periodically reinforced in the recognition of the physiologic responses of the body to cold stress. In addition, the use of insulated work clothing, warm shelters and work/warming regimens may be used to minimize the potential hazards of cold stress. Also, special attention will be paid to equipment warm-up time and freeze protection for vessels, piping, equipment, tools, and walking/working surfaces. The current ACGIH TLVs for cold stress found in this appendix will be used as a guideline.

HEAT STRESS MONITORING FORM

Project Name:_____

Project Number:_____

Site Safety and Health Officer:_____

Date	Title	Ambient Temp	WBGT	Work/ Rest Regimen	Employee/ Location	Pulse Rate	Body Temp	Body Water Loss	Comments

APPENDIX L

HOT WORK PERMIT

Project Name_____

Job #_____

Hot Work Task Description:_____

Workers/Welders Conducting Hot Work_____

PERMIT MUST BE COMPLETED IN ITS ENTIRETY AND POSTED BEFORE HOT WORK BEGINS

Action Item	Yes	No	NA
Has client representative been notified of intended hot work?			
Hazardous materials involved? Name:_____			
Will hot work impact the general public, customers or operations employees?			
Will the intended hot work need to be coordinated with other contractors who may be working on the site to make them aware of any hazards and the scope of work to be performed?			
Have hazardous energy sources been identified, isolated, and locked out - tagged out before the start of the project?			
Will hot work be conducted within a confined space?			
All testing equipment (i.e., combustible gas indicator, oxygen meter, etc.) and fire fighting equipment (i.e., extinguisher, etc.) have been checked to ensure proper operation and calibration before the start of this project?			
Does task require a designated fire watch **(30 minutes after work)**?			
Flammable and combustible materials within 35 feet have been cleared or shielded.			
All fuel sources have been identified and protected (USTs, ASTs, sewers, piping).			
The area has been restricted with proper barriers and signs.			
The area has been tested to be certain that atmosphere is 0% LEL before starting hot work.			
Flame sensitive areas and equipment (including cylinders and gas delivery lines) exposed to slag, heat, and sparks are protected by flame a resistant blanket, shield, or removed from the area?			
Escape routes have been identified before starting work?			
Is ventilation equipment needed? Type needed:_____			

THE FOLLOWING PROTECTIVE EQUIPMENT WILL BE REQUIRED:

	Yes	No		Yes	No
Welding Goggles/Shield___ Tint	—	—	Hearing Protection	—	—
Safety Boots	—	—	Head Protection	—	—
Leather Gloves	—	—	Safety Harness	—	—
Supplied Air Respirator	—	—	Welding Leathers - Top	—	—
APR ____ Cartridge	—	—	Welding Leathers - Bottom	—	—

Cold Cut Only Method Required:_____ Hot Cut Method Allowed:_____

APPROVALS:

_____ _____

Fluor Daniel GTI Site Manager or Site Safety Officer — Date:

_____ _____

Name of Employee Performing Hot Work — Fire Watch Representative

APPENDIX M

DAILY SAFETY MEETING FORM

FLUOR DANIEL GTI DAILY SAFETY MEETING

Project/Site:_____ Date:_____

Presented by:_____ Title:_____

Topic(s)/Information Reviewed:_____

_____

_____

_____

Comments/Follow-up Actions:_____

_____

_____

_____

Sign in:

NAME	SIGNATURE	COMPANY

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form and file with HASP.
- Follow-up on any noted items and document resolution of any action items.

APPENDIX B

CITIZEN PARTICIPATION PLAN

FLUOR DANIEL GTI

REVISED
CITIZEN PARTICIPATION PLAN
PHASE III
INTERIM REMEDIAL MEASURES
FOR
NORWICH FORMER MGP SITE
NORWICH, NEW YORK

Fluor Daniel GTI Project 011100604

January 30, 1997

Prepared for:

New York State Electric and Gas Corporation
Kirkwood Industrial Park
Kirkwood, NY 13902

Prepared by:

Fluor Daniel GTI, Inc.
1245 Kings Road
Schenectady, New York 12303

#106reports/nyseg/0604cpp.197

Table of Contents

Figures

1.0 INTRODUCTION

The New York State Electric and Gas Corporation (NYSEG) owns a parcel (the Site) located in the City of Norwich, Chenango County, New York, as shown on figure 1-1. The Site was used in the past for the manufacture of gas from coal, and was referred to as a Manufactured Gas Plant (MGP). An interim remedial measure (IRM) has been proposed by NYSEG for the removal of waste matter, soil, and other residuals from the past usage of the Site. NYSEG has retained Fluor Daniel GTI, Inc. (Fluor Daniel GTI) to develop this document (*Citizen Participation Plan*, CPP) to facilitate two-way communication with individuals, groups, and organizations which have expressed an interest in the Site or are affected by the Site's program, and to enable citizens to participate more fully in the decision making process associated with the remediation of the site. This plan will detail the citizen participation activities that have been and will be implemented for the Site.

A *Phase III Interim Measures Work Plan (Work Plan)* has been produced to describes the techniques to be utilized for the remediation of the Site. This CPP is included as an appendix to the *Work Plan*.

2.0 BASIC SITE INFORMATION

The Site is currently owned by NYSEG and is an irregularly shaped parcel of land located in the central portion of the Village of Norwich (figure 2-1). The Site is bounded by the Victory Market warehouse facility to the north, a NYSEG electrical substation and residences to the east, residences and the former Norwich Aero Products facility to the south, and railroad tracks and a day care center adjacent to a freight station to the west. The Site is being used by NYSEG gas services department as a regulator station and operations center.

The Site was used to manufacture gas for approximately 66 years, from 1887 to 1953. Figure 2-2 shows the general layout of the former plant, based on historical information. The main structures of the former MGP facility included an electric plant (formerly a coal storage warehouse), a gas plant (formerly a retort house) and a purifier house. The structures were located in the western and central portions of the Site, respectively. The gas plant structure reportedly housed a tar-storage vessel. A subsurface tar well was also located west of the purifier house. Two separate gas holders were used at various times during the years of gas production. The original gas relief holder, an approximately 50-foot-diameter vessel constructed of a metal lined brick inner wall and a stone outer wall extending to approximately 10 feet below existing ground surface, remains buried on site. The second holder, a distribution holder,

was a 100,000 cubic foot steel structure constructed above grade on a concrete foundation. Several oil storage tanks and a storage building were also located on the Site. The concrete foundations to the distribution holder and an aboveground 100,000-gallon oil tank remain buried on site.

Coal tars are a by-product from manufacturing gas at former MGP sites. These materials may exceed Resource Conservation and Recovery Act (RCRA) regulatory limits due to the leachable concentrations of benzene. The coal tars were stored on-site in the former underground relief holder and tar well. Both of these structures are believed to be constructed of brick or concrete. Coal tars typically have a British Thermal Unit (BTU) heat content of approximately 9,000 to 12,000 BTUs per pound and are an excellent fuel for large boilers and furnaces. These materials generally contain moderate to high levels of PAHs and VOCs.

Coal tar soils are a mixture of soil, coal tars, and demolition debris (i.e., brick, timbers, scrap metal, etc.) that typically do not exceed RCRA regulatory limits. The mixtures were co-disposed in several areas on-site. These materials generally contain low concentrations of polynuclear aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and heavy metals.

Purifier wastes are the spent materials (i.e., wood shavings) used to remove impurities (hydrogen sulfide) from the gas stream produced by the former MGP. These materials vary in their concentration of sulfides and cyanides. This circumstance renders some of the purifier wastes to be defined by RCRA as non-hazardous while concentrated disposal areas may meet the definition of a hazardous waste.

Petroleum products were used on-site for a couple of purposes (cracking and fuel source), as part of the former MGP operations. These materials were potentially spilled on-site as a result of material handling practices common to the industry. The petroleum products were a heavier fraction (i.e., diesel, No. 6, bunker C, etc.) and primarily contain PAHs.

3.0 PROJECT DESCRIPTION

A Remedial Investigation (RI) was conducted by NYSEG on-site, beginning in 1990. The purpose of the RI was to define the nature and extent of any contamination resulting from the previous activities at the Site. The RI was conducted in the three phases (tasks). Task 1, Prioritization of the Former Norwich MGP Site, was completed in September 1991, by Engineering-Science, Inc. The Task 1 report included results from an NUS Corporation investigation of the Site, authorized by the USEPA. Task 2, Initial Field Investigation Program was completed in July 1992, by Engineering-Science, Inc. The Task 2 report

contains a preliminary qualitative risk assessment. Task 3, Supplemental Field Investigation Program, was completed in January 1993, by Engineering-Science, Inc.

The analytical data obtained in the RI were compared to environmental Standards, Criteria, and Guidance (SCGs) to determine interim remedial alternatives. Based upon the RI, a comparison of analytical data to the SCGs, and environmental exposure risks, indicate that certain areas and media of the Site require remediation.

In order to remediate the impacted areas and media at the Site, an IRM was proposed by NYSEG consisting of excavation and thermal treatment of Site MGP residues, and as contained in section III of the Order on Consent (Index No. DO-0002-9309) between NYSEG and New York State Department of Environmental Conservation (NYSDEC). The selected IRM included the excavation, material handling, processing, and transportation of processed MGP residues to a properly-permitted NYSEG utility boiler. These materials were and will be used as an alternative fuel and thermally destroyed within the boiler unit. The processing of the Site MGP residues will produce a fuel that meets the requirements of these permits. This effort was and will continue to be performed under the oversight of the NYSDEC and the New York State Department of Health (NYSDOH).

Completion of the IRM includes three phases. The work plan for Phase I was submitted to and approved by the NYSDEC in November 1994, and Phase I was completed in the last quarter of 1994. Phase I included excavation of the former distribution holder area. This work generated approximately 1600 tons of MGP residues, which were stockpiled at the site. Phase II involved the transport of the 1,600 tons of MGP residues and stockpiled soils at the Site to Border City (Geneva, New York) for processing and thermal treatment at NYSEG's Hickling Station boiler unit. Phase III will include the removal by excavation of additional source areas (a former relief holder and tar well) and general excavation of soil site-wide to an approved clean-up goal. Material blending equipment will be brought to the Site to stabilize the MGP residues. This activity may include screening, crushing, temporary stockpiling, and possible material blending, if required, to render the materials in accordance with RCRA Subtitle C limits. After processing of these materials has been completed at Norwich, they will then be transported to a properly permitted NYSEG utility boiler for thermal treatment. Phase III is scheduled to be initiated in the winter of 1996, and will be completed by August of 1997.

4.0 PROJECT OBJECTIVES

The objectives for the Site IRM are to remove significant MGP residues from source areas at the Site. For the purposes of this document, MGP residues refer to coal tar soils, coal tars, purifier wastes, and petroleum products.

5.0 INTERESTED/AFFECTED PUBLIC

5.1 Elected Officials

Mayor Joseph Biviano
31 E. Main St.
Norwich, NY 13815

Acting Mayor
Patrick MccNeil
31 E. Main St.
Norwich, NY 13815

President of Council
Charles Angelino
31 E. Main St.
Norwich, NY 13815

Supervisor, Wards 1, 2, 3
John E. Dolan
104 Pleasant St.
Norwich, NY 13815

Supervisor, Wards 4, 5, 6
Linda Natoli
12 Clinton St.
Norwich, NY 13815

First Ward Alderman
George Carnrike
28 Jones Ave.
Norwich, NY 13815

Third Ward Alderman
Robert Rabinowitz
22 Hillview Drive
Norwich, NY 13815

Fourth Ward Alderman
Barbara Schermerhorn
6 Terrace St.
Norwich, NY 13815

Fifth Ward Alderman
Mat Thall
9 River St.
Norwich, NY 13815

Chief of Police
Joe Angelino
31 E. Main St.
Norwich, NY 13815

City Engineer & Supervisor of Public Works
James Suozzo
31 E. Main St.
Norwich, NY 13815

Fire Chief
31 E. Main St.
Norwich, NY 13815

Fire Chief, 1st Assistant
Graydon Titus
31 E. Main St.
Norwich, NY 13815

Fire Chief, 2nd Assistant
Stanley Brightman
31 E. main St.
Norwich, NY 13815

Health Officer
Dr. Richard Hosbach
60 W. Main St.
Norwich, NY 13815

Code Enforcement Officer
Joseph Loscavio
31 E. Main St.
Norwich, NY 13815

Department of Public Health
R. C. Woodford
Environmental Health Services Director
5 Court St.
Norwich, NY 13815

5.2 Citizens and Adjacent Businesses

NY Susq. & Western Railway Corp.
Front St.
Norwich, NY 13815

Barry Sutton
3 N. Front St.
Norwich, NY 13815

Opportunities for Chenango Children's Center
5 N. Front St.
Norwich, NY 13815

James Broten
21A Front St.
Norwich, NY 13815

Robert Broten
23 Front St.
Norwich, NY 13815

Andy & Patty Meigs
26 Front St.
Norwich, NY 13815

Michael Stroh
30A Front St.
Norwich, NY 13815

Dale Crosby
37 Front St.

Josephine Harrington
40 Front St.
Norwich , NY 13815

John Gonzalez
41 Front St.
Norwich, NY 13815

Rose Phelps
42 Front St. 1Fl.
Norwich, NY 13815

Sherry Taranto
42 Front St. 2Flr
Norwich, NY 13815

Emma Graef
43 Front St.
Norwich, NY 13815

Morse Developing
45 Front St.
Norwich, NY 13815

Douglas Kelly
46 Front St.
Norwich, NY 13815

Elizabeth Youngs
46 Front St. 1Flr.
Norwich, NY 13815

Ann Marschke
48 Front St.
Norwich, NY 13815

William Sherman
49 Front St.
Norwich, NY 13815

Catholic Charities
51A Front St.
Norwich, NY 13815

Boris Lissitschenko
51 Front St.
Norwich, NY 13815

Terry Price
51A Front St.
Norwich, NY 13815

Julie Yacono
52 Front St.
Norwich, NY 13815

Donald Coleman
53 Front St.
Norwich, NY 13815

Donna Deckers School of Ballet
7 Birdsall St.
Norwich, NY 13815

Mark Coleman
10 Birdsall St.
Norwich, NY 13815

David Adams, DDS
11 Birdsall St.
Norwich, NY 13815

Justine Adams
11 Birdsall St.
Norwich, NY 13815

Ellen Larsson
11 Birdsall St.
Norwich, NY 13815

Charles Romano
11 Birdsall St. 1R
Norwich, NY 13815

Mark Hollifield
11 Birdsall St., 2 Fl
Norwich, NY 13815

Vivian Garber
12 Birdsall St. 1Fl
Norwich, NY 13815

Anna Byrne
12 Birdsall St. 1FlF
Norwich, NY 13815

Patricia Rotundo
12 Birdsall St. 1FlR
Norwich, NY 13815

George Blood
13 Birdsall St.
Norwich, NY 13815

Thomas Krucher
13 Birdsall St.
Norwich, NY 13815

Coney Toranto
14 Birdsall St.
Norwich, NY 13815

Yakov Shkurovich
14 Birdsall St. 2Fl
Norwich, NY 13815

Dorothy Mason
14 Birdsall St. 2R
Norwich, NY 13815

Daniel & Linda Heuer
15 Birdsall St.
Norwich, NY 13815

James Bevilacqua
17 Birdsall St. 1st Flr
Norwich, NY 13815

Robert Gallo
19 Birdsall St. 1Fl
Norwich, NY 13815

David Francis
20 Birdsall St.
Norwich, NY 13815

Lillian Donnelly
21 Birdsall St.
Norwich, NY 13815

JoAnne Smith
21 Birdsall St. 2Fl
Norwich, NY 13815

Richard Cummings
22 Birdsall St.
Norwich, NY 13815

Joseph Spano
22A Birdsall St.
Norwich, NY 13815

Gordon Cole
25 Birdsall St.
Norwich, NY 13815

HGH Construction
26 Birdsall St.
Norwich, NY 13815

Rose Miller
26 Birdsall St. 1 Fl
Norwich, NY 13815

Duane Miller
26 Birdsall St., 1R
Norwich, NY 13815

Rocky Nuzzolese
26 Birdsall St., 2R
Norwich, NY 13815

Mable Dilworth
27 Birdsall St.
Norwich, NY 13815

Alice Curtis
28 Birdsall St.
Norwich, NY 13815

Marian Curtis
28 Birdsall St.
Norwich, NY 13815

Deborah Rose
30 Birdsall St.
Norwich, NY 13815

Marion Cooper
31 Birdsall St.
Norwich, NY 13815

James Ryan
33 Birdsall St.
Norwich, NY 13815

Bernie Windsor
38 Birdsall St.
Norwich, NY 13815

Brenda Choe
41 Birdsall St.
Norwich, NY

Arrow Laundry - c/o Charles Stearns
70 E. Main St.
Norwich, NY 13815

Norwich Chenango FCU
PO Box 528
Norwich, NY 13815

5.3 Media

The Evening Sun
29 Lackawanna Street
Norwich, NY 13815
Phone: (607 334-3276
Fax: (607) 334-8273

Tri-Town News, Inc.*
P.O. Box 388
Sidney, NY 13838-0388
Phone: (607-563-2321
Fax: (607) 563-7118

*Includes:
Chenango America
Hancock Herald
Oxford Review Times
Tri-Town News
Whitney Point Reporter

WCHN-AM/WKXZ-FM
43 Hale Street
Norwich, NY 13815-2038
Phone: (607) 334-2218
Fax: (607) 334-9867

WDOS-AM/WSRK-FM
Route 23 Southside
Oneonta, NY 13820-9603
Phone: (607) 432-1500
Fax: (607) 432-8952

WZOZ-FM
172 Main Street
Oneonta, NY 13820-2568
Phone: (607) 432-1030
Fax: (607) 432-4128

6.0 DOCUMENT REPOSITORY

All of the documents associated with the R I and IRM tasks are available for public review at the following document repositories:

- NYSEG
  65 Country Club Road
  Oneonta, NY 13820-1098
  Attn: Huemac Garcia
  (607) 431-9122

- NYSDEC - Region 7 Kirkwood Sub-Office
  Division of Hazardous Waste Remediation
  1679 NY Route 11
  Kirkwood, NY 13795
  (607) 775-2545
  By Appointment Only
  Attn: Tom Suozzo, P.E.

- NYSDEC
  50 Wolf Road
  Albany, N.Y. 12233
  (518) 457-9280
  Attn: Eric Obrecht

- Guernsey Library
  3 Court Street
  Norwich, New York 13815
  (607) 334-4034
  Attn: Harriette Kawar, Director

7.0 DESCRIPTION OF CITIZEN PARTICIPATION ACTIVITIES FOR EACH MAJOR ELEMENT OF THE REMEDIAL PROGRAM

To facilitate the remedial process, NYSEG with NYSDEC oversight will inform the public and local officials of planned remedial activities and address concerns raised by the community. The public participation plan will include at least the following:

- NYSEG will prepare a fact sheet describing the planned remedial activities and distribute the fact sheet to those on the list;
- NYSEG will prepare and distribute a press release announcing the planned remediation;
- NYSEG, with NYSDEC oversight, will hold a public meeting*, prior to intrusive activities at the site, to describe the planned remedial activities and address any community concerns;
- NYSEG will offer a site tour prior to the start of excavation;
- NYSEG will provide a telephone number for the public to call with any questions or concerns which may arise during the project**; and
- NYSEG will prepare and distribute a fact sheet summarizing the results of the remedial activities when the field activities have been completed. All citizen participation activities will occur prior to initiation of on-site remedial work.

* A public meeting is anticipated for the end of February; however, no firm date has been set.

** A call to the posted phone number during normal business hours will be answered by one of a specially trained group of operators who can provide information from the fact sheet. If additional information is required, the operator can contact members of the project team from a call list. After normal business hours, for emergencies, this phone number rings directly to a dedicated trained answering service which will contact a project team member directly from the call list.

APPENDIX C

SAMPLING AND ANALYSIS PROTOCOL FOR ACCEPTANCE OF COAL TAR SITE RESIDUES AT NYSEG'S GENERATING STATIONS

New York State Electric & Gas
Application to Burn Coal Tar Soil with Coal
Hickling Station NYSDEC # 8-4638-00011/00010-0
Jennison Station NYSDEC # 7-0822-00014
SAMPLING AND ANALYSIS PROTOCOL FOR COAL TAR SITES

Item 1 Coal Tar Soil Site Sampling Protocol

The following sampling protocol will be used for material being removed from MGP sites for use at one of NYSEG's generating stations permitted to burn coal tar soil material. NYSEG will have the option to submit an alternative site specific plan for sampling and testing and/or to submit a revision to this protocol as may be appropriate based on field experience and/or developing technology and databases. Any revised protocols are subject to review and approval by the Department.

There may be varying or unique circumstances at different sites. Therefore, other sampling protocols may be acceptable to the Department, providing they meet the intent of the sampling protocol, which is to assure only non-hazardous material is delivered to the plant. Any new protocol will be provided to the Department in advance, for review and approval. The Department will review the protocol within 5 days. The Department will respond with their approval, or disapproval, within 5 days of receipt of the new protocol from NYSEG.

The specification for coal tar soils to be delivered to NYSEG is that all material pass through a 1 inch screen. This may require crushing or screening, or both, at the site. The site material, or portions thereof, may be mixed and blended with other soil, coal, coal fines, clean wood, sawdust, or other suitable material, prior to being processed.

Nothing in this protocol or the permits to which it pertains relieves a site owner or other responsible party from the obligation to comply with all requirements imposed by applicable federal or state law, regulation, permit or order with respect to the investigation of a site of excavation, or the treatment, handling, or storage of wastes prior to preparation of the CTS for shipment to a NYSEG facility for thermal destruction.

Once the material is processed, it will be sampled and analyzed, in accordance with the following procedure and the lists which are part of this protocol. In general, each 50 tons of material will be sampled and analyzed for List 1 components. Each 200 tons will be sampled and analyzed for List 2 components. Every 1000 tons will be sampled and analyzed for total TCLP components. (Tons are approximate.) The details are as follows:

S.1. Three separate samples will be collected from each 50 tons of material that meets NYSEG specifications. Each sample container will be identified with the date of the sample, site location or name, site owner, and numbered with its individual identification number.

S.1.1 The first sample will be split. One portion will be used for List 1 analysis. The other sample will be saved. When the results of List 1 are received, providing none exceed the limit, the save sample may be disposed. If any of the List 1 items exceed the limit, then, the following will occur.

S 1.1.1 The save portion may be analyzed for TCLP of List 3 components. If it passes, then the 50 ton portion is acceptable. If it fails, then the entire pile the 50 ton portion is in, must be reprocessed, or may be removed and disposed at a facility fully permitted to accept the waste.

S.1.1.2 The entire pile containing the material represented by the 50 ton sample may be mixed and blended with itself, or with other materials such as coal, coal fines, wood, sawdust, or other suitable material. The entire sampling procedure, starting at S.1 will be initiated at an appropriate time as the material is being reprocessed.

S.1.2 The second sample will be held until three additional 50 ton sample increments are obtained. Once four 50 tons samples are obtained, they will be composited, and the composite will be split. One portion will be analyzed for List 2 components.[1] The other sample will be saved. When the results of List 2 are received, providing none exceed the limit, the save sample may be disposed. If any of the List 2 items exceed the limit, then the following may be done.

---

[1] Samples will be analyzed for Iron to develop a data base to evaluate the relationship between Iron and a possible false positive Selenium TCLP result.

S 1.2.1 The save portion may be analyzed for TCLP of List 2 metals. If it passes, then the 200 ton portion is acceptable. If it fails, then the entire pile the 200 ton portion is in, must be reprocessed, or may be removed and disposed at a facility fully permitted to accept the waste.

S.1.2.2 The entire pile containing the material represented by the 200 ton sample may be mixed and blended with itself, or with other materials such as coal, coal fines, wood, sawdust, or other suitable material. The entire sampling procedure, starting at S.1 will be initiated at an appropriate time as the material is being reprocessed.

S.1.3 The third sample will be held until up to nineteen more 50 ton increments are obtained. The 50 ton interval samples will be composited into one sample, and dated with the date on which the compositing of the sample is performed. This sample represents up to a 1000 ton pile. The composite will be split in half, one portion will be analyzed for full TCLP, List 4 components and the other sample will be saved. When the results of the analysis are received, providing none exceed the limit, the save sample may be disposed, and the material may be transported to one of NYSEG's generation stations. If any of the components exceed the limit, then the following may occur.

S 1.3.1 The save portion may be analyzed for the full TCLP components (List 4). If it passes, then the 1000 ton portion is acceptable, and may be shipped to one of NYSEG's generating facilities. If it fails, then the entire 1000 ton pile must be reprocessed, or may be removed and disposed at a facility fully permitted to accept the waste.

S.1.3.2 The entire pile represented by the 1000 ton sample may be mixed and blended with itself, or with other materials such as coal, coal fines, wood, sawdust, or other suitable material. The entire sampling procedure, starting at S.1 may be initiated at an appropriate time as the material is being reprocessed as noted in this section.

NYSEG will notify the DEC of any site which has hazardous waste which is known, or becomes known, which is to be remediated, or its material shipped to one of NYSEG's facilities. The DEC will reserve the right to request additional sampling and testing of those specific hazardous components at that site following the sampling protocol noted previously in this sampling protocol section.

The TCLP results for the final processed pile will be submitted to the DEC.

Each 1000 ton composite sample will also be analyzed for percent sulfur, BTU/pound, and sulfur (pounds/MMBTU). If an analysis exceeds 2.5 Sulfur (pounds/MMBTU)(Reference: 6NYCRR Part 225-1), the 1000 ton pile will be reprocessed and/or, blended with coal, wood, sawdust, and/or other suitable material. The 1000 ton pile will be resampled at 50 ton intervals. These samples will be composited, and analyzed for Sulfur (pounds/MMBTU).

All sample test results will be properly recorded with date of sample, site location, and sample specific ID number. This information will be filed, and may be reviewed by the DEC at any time.

List 1 - Totals for Benzene & limit

List 2 - Totals for metals & limits

List 3 - TCLP of Benzene & limit

List 4 - Full TCLP list & limits

LIST 1

	Acceptable limits for Total analysis (mg/Kg)
Benzene	10.0

LIST 2

	Acceptable limits for Total analysis[2] (mg/Kg)
Arsenic	80
Barium	1600
Chromium	80
Cadmium	16
Lead	80
Mercury	3.2
Selenium	16
Silver	80
Iron*	

* See paragraph S.1.2

LIST 3

	Acceptable limits for TCLP analysis (mg/L)
Benzene	0.5

[2] These limits are based on 80% of 20 times the TCLP limits.

LIST 4

	Acceptable limits for TCLP analysis (mg/l)
Arsenic	5.0
Barium	100.0
Chromium	5.0
Cadmium	1.0
Lead	5.0
Mercury	0.2
Selenium	1.0
Silver	5.0
Benzene	0.5
Carbon Tetrachloride	0.5
Chlordane	0.03
Chlorobenzene	100
Chloroform	6.0
Cresol (total of o,m,p)	200
2,4-D	10.0
1,4 Dichlorobenzene	7.5
1,2 Dichloroethane	0.5
1,1 Dichloroethylene	0.7
2,4 Dinitrotoluene	[1] 0.13
Endrin	0.02
Heptachlor	0.008
Hexachlorobenzene	[1] 0.13
Hexachlorobutadiene	0.5
Hexachloroethane	3.0
Lindane	0.4
Methoxychlor	10.0
Methyl ethyl ketone	200
Nitrobenzene	2.0
Pentachlorophenol	100
Pyridine	[1] 5.0
Tetrachloroethylene	0.7
Toxaphene	0.5
Trichloroethylene	0.5
2,4,5 Trichlorophenol	400
2,4,6 Trichlorophenol	2.0
2,4,5-TP(Silvex)	1.0
Vinyl Chloride	0.2

[1] Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.

Other Analyses

Percent Sulfur	
BTU/pound	
Sulfur (pounds/MMBTU)	2.5
Reactive Cyanide[2]	250mg/Kg

[2] Parameter added for Owego remediation as per letter dated May 25,1994 from Region 8 Solid Waste Engineer

APPENDIX D

CONSTRUCTION QUALITY CONTROL PLAN

GT ENGINEERING

GT Engineering, P. C.
1245 Kings Road, Schenectady, NY 12303 USA
Tel: (518) 370-0392 Fax: (518) 370-5864

CONSTRUCTION QUALITY ASSURANCE PLAN
NEW YORK STATE GAS AND ELECTRIC
PHASE III IRM
NORWICH, NEW YORK

FDGTI Project: 011100180

January 29, 1997

Prepared for:

New York State Electric and Gas Corporation
Kirkwood Industrial Park
Kirkwood, NY 13902

Submitted by:

GT Engineering, PC
1245 Kings Road
Schenectady, New York 12303

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Appendixes

1.0 INTRODUCTION

This *Construction Quality Assurance Plan* (CQAP) is designed to assure the quality of the project by monitoring, inspecting, and testing the processes and materials associated with Phase III of the Interim Remedial Measure (IRM) to be completed at New York State Electric and Gas Corporation's (NYSEG's) Norwich, New York former MGP site. This CQAP supplements the *Interim Remedial Measures Work Plan (November 1996)* (work plan) prepared for this project by Fluor Daniel GTI, Inc.

1.1 Construction Quality Assurance Plan (CQAP) Objectives

The objective of this CQAP is to identify and standardize measures to provide confidence that activities in all phases of the project will be completed in accordance with the *Work Plan*, applicable local, state and federal regulations and appropriate industry standards. The Quality Assurance Plan will be implemented through inspection, sampling, testing, review of services, workmanship, and materials. Specific objectives of this plan establish protocols and procedures for the following components:

1. **Responsibility and Authority** — The responsibility and authority of the key personnel involved in the completion of the project.

2. **Inspection and Testing Activities** — Establish the observations and implement inspections and tests that will be used to ensure that the construction activities for the project meet or exceed all design criteria, (i.e., plans, specifications, and local, state and federal regulations).

3. **Sampling Strategies** — Establish responsibility for sampling activities and methods including frequency and acceptance criteria for ensuring that material and performance specifications and applicable regulations will be met during the construction process.

4. **Documentation and Reporting** — Establish appropriate field documents (i.e. summary reports, photographic reports, inspection data sheets, problem identification and corrective measures reports).

2.0 RESPONSIBILITY AND AUTHORITY

Responsibilities of each member of the construction project team are described below.

2.1 Contractor

The contractor is responsible for coordinating field operations of the IRM, including coordination of subcontractors, to comply with the requirements of the *Work Plan* and permitting agencies. The Contractor is responsible for completing and submitting documentation required by the CQA program, assuring that the temporary structures are constructed as specified in the *Work Plan,* and also has the authority to accept or reject the materials and workmanship of any subcontractors at the site.

The contractor is also responsible to ensure a functional construction quality control (CQC) organization is active during the project and provide support for the CQC system to perform inspections, tests and retesting in the event of failure of any item of work, including that of the subcontractors, and to assure compliance with the contract provisions. The CQC system includes, but is not limited to, the inspections and tests required in the technical provisions of the *Work Plan*, and will cover all project operations.

2.2 Construction Quality Assurance Officer (NYSEG; Bert Finch)

The responsibility of the CQA officer is to perform those activities in this CQAP deemed necessary to assure the quality of construction and support quality control efforts. To avoid conflicts of interest, the CQA is performed by an entity other than the CQC and provides the permitting agency an assurance that the facility was constructed as specified in the design. The CQA will be on-site as required during construction activities. The responsibility of the CQA officer is to ensure the quality of construction meets or exceeds that defined by specification and/or engineering plans and identified in the CQAP.

Specific responsibilities of the CQA officer include:

- Directing and supporting the Construction Quality Control (CQC) Representative inspection personnel in performing observations and tests by verifying that the data are properly recorded, validated, reduced, summarized, and interpreted
- Evaluating the construction activities and the CQC's efforts
- Evaluating sampling activities and efforts of the SQA officer
- Providing the NYSDEC a copy of all QA reports

- Educating CQC inspection personnel on CQC requirements and procedures
- Scheduling and coordinating CQA inspection activities

2.3 Sampling Quality Assurance Officer (NYSEG; Peter Batrowny)

The responsibility of the sampling quality assurance (SQA) officer is to perform those activities in this CQAP deemed necessary to assure the quality of sampling and testing and support quality control efforts.

To avoid conflicts of interest, the SQA is performed by an entity other than the CQC, and provides the permitting agency an assurance that all sampling efforts, for both field and laboratory analysis, meet or exceed that defined by specification and/or engineering plans and identified in the CQAP. The SQA officer will be on-site as required during the project. The SQA officer will report directly to the CQA officer. Specific responsibilities of the SQA officer include:

- confirming that the test data are properly recorded and maintained (this may involve selecting reported results and backtracking them to the original observation and test data sheets);
- confirming that the testing equipment, personnel, and procedures do not change over time or making sure that any changes do not adversely impact the inspection process; and
- confirming that regular calibration of testing equipment occurs and is properly recorded.

2.4 Construction Quality Control Representative (Contractor)

A CQC representative, supplemented as necessary by additional personnel, is to be on the work site at all times during the construction process, with complete authority to take any action necessary to ensure compliance with the design plans and specifications as necessary to achieve quality in the constructed facility. The CQC representative will be the field engineer. Specific responsibilities of the CQC representative include:

- Reviewing design, plans, and specifications for clarity and completeness so that the construction activities can be effectively implemented.
- Verifying that a contractor's construction quality is in accordance with the CQAP.
- Performing on-site inspection of the work in progress to assess compliance with the design plans, and specifications.

- Reporting the results of all observations and tests as the work progresses and interacting with the contractor to provide assistance in modifying the materials and work to comply with the specified design. This includes:
  - providing to the facility owner/operator reports on the inspection results;
  - review and interpretation of all data sheets and reports;
  - identification of work that the CQC representative believes should be accepted, rejected, or uncovered for observation, or that may require special testing, inspection, or approval; and
  - rejection of defective work and verification that corrective measures are implemented.
- Reporting to the CQA officer results of all inspections including work that is not of acceptable quality or that fails to meet the specified design.
- Verifying that the equipment used in testing meets the test requirements and that the tests are conducted according to the proper standardized procedures.
- Submitting blind samples (knowns, duplicates, and blanks) for analysis by one or more independent laboratories.
- Verifying that materials are installed as specified, except where necessary field modifications were required.

The CQC personnel will report directly to the Quality Assurance Officer.

3.0 FIELD QUALITY CONTROL INSPECTIONS, TESTING, AND SAMPLING REQUIREMENTS

The definable features of work (DFW) identified below are described in section 4 of the *Work Plan* . This section of the CQAP describes the anticipated inspection, testing, and sampling requirements of these DFWs. The quality of operational work steps such as crushing, screening, and blending (if necessary) is assured by the *Sampling and Analysis Plan/Quality Assurance Project Plan* in section 6 of the same work plan.

3.1 Site Preparation

Elements of the site preparation, including clearing, grubbing, grading and compacting the temporary structure area will be inspected as they occur to assure compliance with the work plan. The grading will be inspected to confirm no variance greater than 2% from a plane surface per the building vendor's specifications. Inspection of the siltation fence shall confirm that it is contiguous and its skirt is embedded along its length.

3.2 Coal/Carbon and Material-for-Destruction Stockpile Liner Construction

Preparation for the lined stockpile areas will be performed by the excavation sub-contractor. The areas will be prepared as described in the work plan. The coal/carbon liner will be constructed of native material, sand and a synthetic barrier. The liner bedding material will be approved by the liner manufacturer prior to installation. The material (anticipated to be medium sand) that will bed the liner will be inspected upon arrival to confirm its acceptability. Each layer will be compacted then visually inspected for protrusions, and spot checked for final thickness. The Material-for-Destruction stockpiler liner will consist of an existing asphalt surface, sand liner bedding and a synthetic liner. The inspection process for this liner system will be similar to the coal/carbon liner system.

Preparation of stockpiles will be performed by the excavation contractor with materials as noted in the work plan. The stockpile liners will be polyethylene and require visual inspection to confirm no voids or rips in the liner, and continuity of the berm.

3.3 Erection of Temporary Structure

The temporary structure will be erected by an experienced, factory trained crew provided by the building vendor. A representative from the building vendor will oversee the building erection, and approve the installation upon completion. The CQC representative will visually inspect the building during installation and upon completion of the installation to assure compliance with the work plan. An engineer licensed to practice in New York will supervise a "pull test" on the building anchoring system to confirm that the anchoring system will withstand the design wind and snow loads.

The ventilation system will be installed and tested by a qualified environmental technicians and/or heating, ventilating, and air conditioning (HVAC) technicians upon completion of the building installation. Design air flow rate, and back pressure through the particulate and carbon filters will be confirmed using field instrumentation.

3.4 Equipment Set-up

All materials and equipment are designed to meet specific project needs. Each delivery of materials and/or equipment will be inspected upon arrival by the CQC representative and stored at a designated area of the site. Equipment will be set-up per the work plan design and drawings. Equipment (screening plant and track-hoe) exhaust ducting will be tested to confirm no exhaust leaks within the structure. This will be confirmed by field sampling for nitrogen dioxide along the exhaust piping using a Draeger[tm] tube or by confirming a negative pressure in the duct if a purge blower is installed in line in the duct. The range of motion of the track-hoe will be evaluated to confirm that exhaust piping will accommodate all anticipated operations.

3.5 Staging of Materials

Material for destruction will be transported from the screening plant to temporary staging area. Any materials which resulted from processing hazardous CTS will be staged separately and uniquely marked to cross-reference analytical data. Piles will be inspected a minimum of once per day to assure that covers are in place and intact, and standing water is removed from the liner as needed. Covers will be replaced as needed to prevent precipitation from contacting the material and dust from being generated by the material.

3.6 Loading of Material for Destruction

Staged products will be loaded with a rubber tired articulated wheel loader into dump trailers for transportation to the permitted boiler for destruction. Polyethylene sheeting will be placed between the pile and the truck to retain any material spilled from the loader. The spilled material will be added back to the pile following completion of loading of each truck. The loading area will be visually inspected to confirm that material remains within the bermed stockpile area.

3.7 Excavation of Existing MGP Residue

MGP residue will be excavated from the former relief holder, tar well, and surface and subsurface of the site in accordance with the work plan. All excavation activities will be observed and recorded by the CQC inspector noting soil type, color, moisture, foreign objects, odor and any other noticeable characteristics. All excavated soils will be visually inspected and approved by the CQC representative prior to processing. Limits of the excavation will be measured by the CQC representative upon

completion of the excavation for documentation drawings. Sampling of the excavated materials and residual soils is covered in a separate sampling assurance plan.

3.8 Site Restoration

Site restoration will be observed by the CQC representative. The excavation noted above will be backfilled with as specified in the work plan, and the surface will match the existing surfacing material. Virgin backfill material will be inspected upon arrival. Backfilling and compacting of the excavation will be observed and documented by the CQC inspector. All liners will be removed and disposed. No stockpiles will remain on-site at the end of the project. All affected areas will be graded to match existing grades. The final drainage patterns and surfacing materials will be similar to existing. The existing surface is crushed stone, and negligible vegetative cover is present. Visual inspections will confirm that the site surfacing meets owner approval.

4.0 DOCUMENTATION AND REPORTING REQUIREMENTS FOR CQA/CQC ACTIVITIES

The value of the CQAP will be assured by proper documentation techniques. The CQAP inspection team will be guided by data sheets, schedules and checklists. The documentation of the inspection activities will facilitate the adherence to the design documents and maintain the level of reporting required by the parties involved in the project.

4.1 Inspection Reports

In general, documentation may involve daily summary and photographic reports including sketches of a particular section or activity, inspection log, corrective measure summary, or schedule summary. The documentation will be summarized in weekly reports. Specific documentation procedures are listed in the following subsections. The CQC representative shall ensure that one set of full sized (D-sized, 24x36) contract drawings are marked on a daily basis to record deviations from the contract drawings, including buried or concealed structures and utilities which are revealed during the course of site work. The CQC representative shall initial each variation or revision. The CQC representative shall, upon completion of site work, certify the accuracy of the record drawings, and submit them to the NYSEG project manager.

Daily Report
The CQC representative shall submit by fax a daily report to the NYSEG Project Manager identifying subcontractors work force and their labor hours, location and description of work performed, lost time accidents, equipment left on job site, equipment/materials received and if applicable, submittal status, non-compliance notices received, errors and/or omission in plans and specifications, visitors to the job site, weather conditions and temperatures, and any other pertinent information.

SQA Officer Report
The SQA Officer will submit a weekly report to the NYSEG project manager inspections and/or testing performed, location of work, results of inspections, testing, location and description of deficiencies, deficiencies corrected, the date of the report, and comments on the review of the corresponding daily reports. This report shall be signed by the authorized CQA Officer.

Daily Construction Log
Daily construction logs will document and monitor the daily activities and problems that occurred during the work day. They will allow the reader to follow the flow of progress on the site and relate the CQC inspections to that progress. The daily logs must be completed by the CQC representative.

As-Built Sketch Log
The as-built sketch log is designed to compliment the daily construction log by providing appropriate sketches of specific construction activities. The as-built sketch log should be filled out by the CQC representative.

Progress Photo Log
Progress photo logs are designed to document construction activities by still photos. Photo logs may also be used to photographically record activities recorded in a daily construction log or an as-built sketch log. Photos will be collected by the CQC representative.

Daily Inspection Log
The daily inspection log is designed to document all inspection activities and how they correspond to the engineered plans and specifications. All observations, field and/or laboratory tests will be recorded on a daily inspection log. It is important to note recorded field observations may take the form of notes, charts, sketches, or photographs. The daily inspection log will be completed by the CQC representative.

Phone Logs
Telephone conversations will be recorded on phone log sheets. Contact, titles, telephone numbers, topics and conversation summaries will be recorded to maintain the CQAP plan as information and situations are relayed to/from the CQC representative. Facsimile communications and transmittals will be copied to supplement the phone logs.

Meeting Logs

Each meeting involving an individual or individuals and any member of the CQC team will be recorded by a designated CQC representative on a Meeting Log. To maintain information continuity, minutes of each meeting as well as subject, location, and action items will be recorded and a copy given to each participant. Meeting logs are designed to limit misunderstandings that may develop in controlled conversations.

Variance Logs

Required changes to the engineered plans and specifications will be processed through the use of a variance log. Approvals from the engineer of record as well as the CQA Officer is required to recommend a change to the engineered drawings and specifications. Once an approved recommended plan change is received from all parties by the design engineer an addendum to the engineered plans and specifications can be completed and returned to the job site.

4.2 Completion Report

At the completion of the project the CQC Officer will prepare and submit a final report to the Project Manager/CQA officer. This report will include a summary of all of the daily construction logs, inspection logs, photographic log, phone logs, meeting logs, and as-built data sheets. This document will be certified, approved and signed on the front page of the report by the Project Manager/CQA Officer and the construction contractor indicating its completeness. The report will be certified by an engineer licensed to practice engineering in New York State verifying that the work was performed and constructed substantially in accordance with the plans and specifications. The final report will to include the following information:

A. Cover page

1. Project name and location
2. Completion Date
3. Type of report
4. PM/CQA Officer approval signature

B. Index

1. abstract with weekly summary
2. daily construction logs
3. as built sketch logs
4. progress photo logs
5. daily inspection logs

6. corrective measures report
7. daily cost sheets
8. health and safety logs

Two copies of the report in final form will be delivered NYSEG for their files. This report will supplement the final project report to provide the sources of background information which were used to develop findings and conclusions.

APPENDIX A

ORGANIZATION CHART

APPENDIX B

TYPICAL LOG FORMS

DIL
Project:
Page of:

DAILY INSPECTION LOG

Location: _____

Work being performed: _____

Inspection type: _____

Personnel involved: _____

Observations or test data: _____

_____

_____

Inspection results compared with specification requirements: _____

_____

_____

Was a corrective measure report completed? _____

If so cross reference # _____

Authorized CQC representative on site _____

Date _____

DBS
Project:
Page of

DAILY AS-BUILD SKETCH LOG

Location of sketch area:_____

Sketch area below include cross sections/plan views:_____

_____

_____ _____

Authorized CQC representative on site Date

DPL
Project:
Page of

DAILY PHOTOGRAPHIC LOG

Location: _____

Time: _____

Photograph purpose: _____

Weather: _____

Description: _____

_____

_____

_____

_____ _____

CQC Representative on Site Date

VL
Project
Page of

VARIANCE LOG

Location: _____

Drawing/specification reference # _____

Description/proposed changes to engineered plans and specs _____

_____

_____

_____

_____

Requested by _____ Date: _____

Approved by _____ Date: _____
Project Manager

_____ Date: _____
CQA Program Manager

_____ Date: _____
CQC representative on site

ML
Project:
Page of

MEETING LOG

Date:_____

Time:_____

Location:_____

Participants:_____

Subject:_____

Minutes of the meeting:_____

_____

_____

Action items and due dates:

1._____

2._____

3._____

Comments:_____

_____ _____

CQC Representative on Site Date

PL
Project:
Page of

PHONE LOG

Date:_____

Call received by (signature):_____

Made call ☐ Received call ☐ Returned call ☐

Contact:_____ Title _____

Company name:_____ Phone _____

Address:_____

Topic:_____

_____

Summary of conversation:_____

_____

_____

_____

_____ _____

CQC Representative on Site Date

INSTRUMENT CALIBRATION LOG

INSTRUMENT:

FDGTI #: SERIAL #:

Date Inspected	Calibrated	Condition	Battery	Repairs

APPENDIX E

AIR PURIFICATION SYSTEM DESIGN CALCULATIONS

Anticipated Indoor Air Quality
NYSEG Norwich Phase III IRM
Revision Date 11/12/96

Shift Length (hours) 8

sel Exhaust	Excavator	Loader	Total Horsepower	Weighted Horsepower
Horsepower	225	225	450	225
Unvented Run Time (% of shift)	0%	100%		

Parameter	NOx	CO	SOx	CO2
Power Output (g/hp-hr)	14	3.03	0.931	525

Process

	Screening Plant Hopper	Conveyors	Mixing Box	Excavation/ Stockpile
Af	23	36	13	13
Wa (ft)	8	4	8	60
(cm)	243.84	121.92	243.84	1828.8
La (ft)	12	30	20	60
(cm)	365.76	914.4	609.6	1828.8
V (mph)	0.13	0.13	0.13	0.13
(cm/sec)	5.81	5.81	5.81	5.81

Wind Speed Iteration

cfm	opening ft2	mph
25000	392	0.72

Organic Vapors

Compound		Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
Conc. (mg/kg)		1275	2040	296	1632	6630
(g/g)		0.001275	0.00204	0.000296	0.001632	0.00663
Pv (atm)		0.125	0.0374	0.0125	0.0145	0.000307
Da (cm^2/sec)		0.088	0.085	0.076	0.067	0.051
Molecular Weight (g/mole)		78.11	92.14	106.17	106.17	128.17
f		0.984	0.985	0.985	0.985	0.985
Emissions (cm3/sec)	Screening Plant	13.576	6.390	0.293	1.760	0.132
	Conveyors	16.920	7.964	0.365	2.193	0.165
	Mixing Box	9.978	4.696	0.215	1.293	0.097
	Excavation/	129.615	61.003	2.798	16.800	1.656
	Total (cm3/sec)	170.089	80.053	3.671	22.046	2.050
	(g/sec)	0.534	0.297	0.016	0.094	0.011
por Reduction Factor from Bio Solve		95%	95%	95%	95%	95%
	Adj. (g/sec)	0.0267	0.0148	0.0008	0.0047	0.00

Air Quality	Ventilation Flow Rate (cfm)	Emission (g/sec)	Concentration at Flow Rate (mg/m3)	Limit OSHA PEL (mg/m3)	Req. VGAC Efficiency	Discharge ug/m3	SGC ug/m3	AGC ug/m3	lb/hour
Organic									
Benzene	25000	0.027	2.26	3.25	98.7%	29.43	30.00	0.12	0.0028
Toluene	25000	0.015	1.26	375.00	0.0%	1,256.84	89,000.00	2,000.00	0.1179
Ethylbenzene	25000	0.001	0.07	435.00	0.0%	66.42	100,000.00	1,000.00	0.0062
Xylenes	25000	0.005	0.40	435.00	0.0%	398.83	100,000.00	700.00	0.0374
Naphthalene	25000	0.001	0.04	50.00	0.0%	44.77	12,000.00	120.00	0.0042
Exhaust*									
NO2	25000	0.613	51.89	9.00	0%	51,891.00	180.00	100.00	4.87
CO	25000	0.189	16.04	40.00	0%	16,043.85	4,000.00	69.00	1.50
SOx	25000	0.058	4.93	5.00	0%	4,929.65	1,400.00	80.00	0.46
CO2	25000	32.813	2779.88	18000.00	0%	2,779,875.00	2,100,000.00	21,000.00	250.76
NO	25000	0.263	22.24	30.00	0%	22,239.00	7,100.00	71.00	2.09

Notes: BOLD numbers are inputs
* Diesel emissions are from construction vehicles, not permitted combustion sources.
392 sq.ft. opening in wind speed iteration is total area of two equipment access openings.

Air Emission Formula
Organic Chemical Difusion and Volatilizaton", Dragun, 1988, p. 275

E = 2PvWa(LaDaV/(3.1416)f)^0.5(Wc/W)*Af

E = Emission Rate (cm3/sec)
Pv = equivalent vapor pressure (5), where Pv = [vapor pressure (mmHg)]/760
Wa = width of area occupied by the chemical /waste (cm)
La = Length of area occupied by the chemical /waste (cm)
Da = Diffusion coefficient of chemical in air (cm^2/sec), EPRI Guidance EA-5818,1998
= wind speed (cm/sec)
c/W = weight fraction of the chemical in contaminated soil/waste (gram/gram)
, = correction factor. where f = (0.985 - 0.00775 Pv) where the range of Pv is 0 to 80%.

Q = E (MW)/G

Q = mass emission rate (gram/sec)
E = volumetric emission rate (cm3/sec)
MW = molecular weight (gram/mole)
G = 24,860 cm3/mole

Af = agitation factor, EPA, Air Superfund National Technical Guidance Study Series
Volume III - Estimation of Air Emissions from Cleanup Activities at Superfund Sites
EPA-450/1-89-003, January 1989
Reduction factor through application of "Bio Solve" is per manufacturer

THE SOIL CHEMISTRY OF HAZARDOUS MATERIALS

James Dragun, Ph.D.

(1988)

Hazardous Materials Control Research Institute
Silver Spring, Maryland

can be used to obtain a gross estimate of how temperature affects D_A:

$$D_{A2} = D_{A1}(T_2/T_1)^{1/2} \quad (7.12)$$

where

D_{A1}, D_{A2} = diffusion coefficients

T_1, T_2 = temperature (°K)

In general, as soil temperature rises, air increases in pressure and flows to re-establish equilibrium. Temperature changes, whether diurnal or seasonal, are greatest at the soil surface and decrease exponentially with depth, so that the effects of significant daily temperature changes on gas exchange is limited to the upper few inches of soil[7]. Therefore, it is extremely unlikely that this mechanism will affect chemical movement at any significant soil depth.

If climatic conditions are favorable for the evaporation of soil water, chemical volatilization could be enhanced by the "wick" effect[4]. Soil water containing a dissolved chemical moves toward the soil surface by capillary action in response to water evaporation from the soil surface. The net result, known as the wick effect, is an enhancement of chemical movement to the soil surface for subsequent volatilization. The degree of enhancement is related to the water evaporation rate. In dry soils, water evaporation rates are very low, and the extremely slow water movement to the surface is primarily via vapor phase diffusion. In moist soils, the chemical volatilizes along with the water; the chemical:water ratio which volatilizes is generally the same as the chemical:water ratio present in soil water[17].

ESTIMATING DIFFUSION AND VOLATILIZATION RATES

A reasonable amount of research has been directed toward predicting the behavior of volatile chemicals. Addressing and correcting problems associated with the discharge of chemicals or hazardous materials may require the estimation of (a) the rate of volatilization of a pure chemical or hazardous materials in a pool of pure chemical at the soil surface, (b) the rate of volatilization of a chemical or hazardous materials dissolved in a pool of water at the soil surface, (c) the rate of volatilization of a chemical or hazardous material diffusing through soil to the soil surface, or (d) the migration rate of chemicals or hazardous materials through soil air. In cases where the chemical or waste has been discharged or placed on the soil surface, the rate of vapor generation of the pure chemical for steady state conditions can be estimated[18]:

From ALEX KONF @ USNT.

$$E = 2\,P_v W_A (L_A D_A V/(3.1416)f)^{1/2}(W_c/W) \quad (7.13)$$

where

E = emission rate (cm³/sec)

P_v = equivalent vapor pressure (%), where

P_v = [vapor pressure (mmHg)]/760

W_A = width of area occupied by the chemical/waste (cm)

L_A = length of area occupied by chemical/waste (cm)

D_A = diffusion coefficient of the chemical in air (cm²/sec)

V = wind speed (cm/sec)

W_c/W = weight fraction of the chemical in contaminated soil/waste (gram/gram)

f = correction factor, where

$f = (0.985 - 0.00775\,P_v)$ where the range of P_v is 0 - 80%.

The volumetric emission rate E can be converted into a mass emission rate:

$$Q = E\,(MW)/G \quad (7.14)$$

where

Q = mass emission rate (gram/sec)

E = volumetric emission rate (cm³/sec)

MW = molecular weight (gram/mole)

G = 24,860 cm³/mole

An approach to estimating emissions from the landspreading of a chemical involves the use of the evaporation rate of a model compound to predict the unknown evaporation rate of the chemical in question[19]:

$$E_a = E_b\,[P_{va}(MW_a)^{1/2}]/[P_{vb}(MW_b)^{1/2}] \quad (7.15)$$

where

E_a, E_b = emission rates of chemicals a and b (gram/cm²·month)

EPRI
Electric Power
Research Institute

Topics:
Groundwater
Organic compounds
Solid wastes
Microbial transformation
Chemical degradation
Manufactured-gas plant wastes

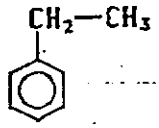
EPRI EA-581
Volume 2
Project 2879-
Final Report
October 1988

Chemical Data for Predicting the Fate of Organic Compounds in Water

Volume 2: Database

Prepared by
Tetra Tech, Inc.
Lafayette, California

THERMODYNAMIC DATA



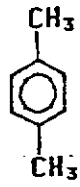
ETHYL BENZENE

COMPOUND: ETHYLBENZENE
EMPIRICAL FORMULA: C8H10
CAS NO. : 100-41-4

PARAMETER (UNITS)	VALUE	RANGE (min-max)	REFERENCES (val,min,max)	UNC
Molecular Mass: (g/mole)	106.17	***	236 *** ***	1
MS Molecular Mass: (g/mole)	106.0783	***	68 *** ***	1
Specific Gravity: (20 deg C/4 deg C)	0.8670	***	68 *** ***	1
Vapor Press. (torr):	9.508	9.508-9.571 at 20 C	69 69 89	1
Viscosity (g/cm sec):	0.0064	at 25 C	232 *** ***	2
Melting Pt. (deg C):	-94.97	-95.01-(-94.97)	96 67 96	1
Boiling Pt. (deg C):	136.2	136.2-136.25	96 96 67	1
Henry's Law Constant: (dimensionless)	0.37	0.263-0.37	36 73 36	3
Diff. Coef., Air: (sq.cm/sec)	0.076	***	243 *** ***	2
Diff. Coef., Water: (sq.cm/sec)	0.0000090	***	244 *** ***	2
Gibb's Free Energy: (kcal/mole)	31.21	***	115 *** ***	2
Log Octanol-Water Part. Coef.:	3.15	3.13-3.15	80 114 80	1
Acid Dissociation Constant (pKa):	>15	***	172 *** ***	3
Solubility in Water: (mg/l)	110	110-152 at 20 C	104 104 122	2

Notes:
- na not appropriate
- nd no data found
- ns not specified
- *** appears in the range field and reference fields when only one value was found or when all references cited the same value
- UNC Estimate of Uncertainty (Scale is from 1 to 5; most certain is 1)

THERMODYNAMIC DATA



P-XYLENE

COMPOUND: P-XYLENE
EMPIRICAL FORMULA: C8H10
CAS NO. : 106-42-3

PARAMETER (UNITS)	VALUE	RANGE (min-max)	REFERENCES (val,min,max)	UNC
Molecular Mass: (g/mole)	106.17	***	236 *** ***	1
MS Molecular Mass: (g/mole)	106.0783	***	68 *** ***	1
Specific Gravity: (20 deg C/4 deg C)	0.8611	0.8611-0.8801	68 68 67	2
Vapor Press. (torr):	8.70	*** at 20 C	69 *** ***	2
Viscosity (g/cm sec):	0.0060	*** at 25 C	232 *** ***	2
Melting Pt. (deg C):	13.26	13.0-14.0	96 67 67	1
Boiling Pt. (deg C):	138.35	137.138-138.35	96 67 96	1
Henry's Law Constant: (dimensionless)	0.314	calc.	104 *** ***	2
Diff. Coef., Air: (sq.cm/sec)	0.067	*** at 25 C	243 *** ***	2
Diff. Coef., Water: (sq.cm/sec)	0.0000071	calc.	38 *** ***	4
Gibb's Free Energy: (kcal/mole)	26.28	***	115 *** ***	2
Log Octanol-Water Part. Coef.:	3.15	***	75 *** ***	2
Acid Dissociation Constant (pKa):	>15	***	172 *** ***	3
Solubility in Water: (mg/l)	185	*** at 20 C	116 *** ***	2

Notes:
- na not appropriate
- nd no data found
- ns not specified
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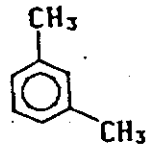
THERMODYNAMIC DATA



COMPOUND: M-XYLENE
EMPIRICAL FORMULA: C8H10
CAS NO. : 108-38-3

M-XYLENE

PARAMETER (UNITS)	VALUE	RANGE (min-max)	REFERENCES (val,min,max)	UNC
Molecular Mass: (g/mole)	106.17	***	236 *** ***	1
MS Molecular Mass: (g/mole)	106.0783	***	68 *** ***	1
Specific Gravity: (20 deg C/4 deg C)	0.8642	***	68 *** ***	1
Vapor Press. (torr):	8.3	8.30-8.363 at 25 C	69 69 89	1
Viscosity (g/cm sec):	0.0058	*** at 25 C	232 *** ***	2
Melting Pt. (deg C):	-47.9	-47.9-(-47.4)	68 67 68	1
Boiling Pt. (deg C):	139.1	139.1-139.3	68 68 67	1
Henry's Law Constant: (dimensionless)	0.314	calc.	104 *** ***	2
Diff. Coef., Air: (sq.cm/sec)	0.069	***	243 *** ***	2
Diff. Coef., Water: (sq.cm/sec)	0.0000071	calc.	38 *** ***	4
Gibb's Free Energy: (kcal/mole)	25.73	***	115 *** ***	2
Log Octanol-Water Part. Coef.:	3.20	***	80 *** ***	2
Acid Dissociation Constant (pKa):	>15	***	172 *** ***	3
Solubility in Water: (mg/l)	146.0	146.0-160 at 20 C	104 104 112	2

Notes:
- na not appropriate
- nd no data found
- ns not specified
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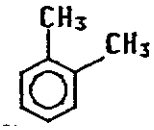
THERMODYNAMIC DATA



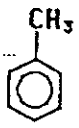
COMPOUND: O-XYLENE
EMPIRICAL FORMULA: C8H10
CAS NO. : 95-47-6

O-XYLENE

PARAMETER (UNITS)	VALUE	RANGE (min-max)	REFERENCES (val,min,max)	UNC
Molecular Mass: (g/mole)	106.17	***	236 *** ***	1
MS Molecular Mass: (g/mole)	106.0783	***	68 *** ***	1
Specific Gravity: (20 deg C/4 deg C)	0.8801	***	67 *** ***	1
Vapor Press. (torr):	6.62	6.62-6.688 at 25 C	69 69 89	1
Viscosity (g/cm sec):	0.0075	*** at 25 C	232 *** **	2
Melting Pt. (deg C):	-25.18	-25.2-(-25)	96 68 67	1
Boiling Pt. (deg C):	144.4	144-144.4	96 67 68	1
Henry's Law Constant: (dimensionless)	0.216	0.216-0.219	33 33 104	2
Diff. Coef., Air: (sq.cm/sec)	0.073	***	243 *** ***	2
Diff. Coef., Water: (sq.cm/sec)	0.0000071	calc.	38 *** ***	4
Gibb's Free Energy: (kcal/mole)	26.40	***	115 *** ***	2
Log Octanol-Water Part. Coef.:	3.12	2.77-3.13	83 113 114	2
Acid Dissociation Constant (pKa):	>15	***	172 *** ***	3
Solubility in Water: (mg/l)	213	calc. at 25 C	116 *** ***	2

Notes:
- na not appropriate
- nd no data found
- ns not specified
- *** appears in the range field and reference fields when only one value was found or when all references cited the same value
- UNC Estimate of Uncertainty (Scale is from 1 to 5; most certain is 1)

THERMODYNAMIC DATA



TOLUENE

COMPOUND: TOLUENE
EMPIRICAL FORMULA: C7H8
CAS NO. : 108-88-3

PARAMETER (UNITS)	VALUE	RANGE (min-max)	REFERENCES (val,min,max)	UNC
Molecular Mass: (g/mole)	92.14	***	236 *** ***	1
MS Molecular Mass: (g/mole)	92.0626	***	68 *** ***	1
Specific Gravity: (20 deg C/4 deg C)	0.8669	0.866-0.8669	68 67 68	1
Vapor Press. (torr):	28.437	28.4-28.437 at 25 C	89 104 89	1
Viscosity (g/cm sec):	0.0055	*** at 25 C	232 *** ***	2
Melting Pt. (deg C):	-95	***	96 *** ***	1
Boiling Pt. (deg C):	110.6	***	96 *** ***	1
Henry's Law Constant: (dimensionless)	0.243	0.243-0.28	73 73 36	2
Diff. Coef., Air: (sq.cm/sec)	0.085	*** at 25 C	243 *** ***	2
Diff. Coef., Water: (sq.cm/sec)	0.0000095	*** at 25 C	244 *** ***	2
Gibb's Free Energy: (kcal/mole)	-27.19	***	115 *** ***	2
Log Octanol-Water Part. Coef.:	2.73	2.11-3.41	105 21 74	2
Acid Dissociation Constant (pKa):	>15	***	172 *** ***	3
Solubility in Water: (mg/l)	515	220-534.8 at 25 C	107 78 104	2

Notes:
- na not appropriate
- nd no data found
- ns not specified
- *** appears in the range field and reference fields when only one value was found or when all references cited the same value
- UNC Estimate of Uncertainty (Scale is from 1 to 5; most certain is 1)

THERMODYNAMIC DATA

BENZENE

COMPOUND: BENZENE
EMPIRICAL FORMULA: C6H6
CAS NO. : 71-43-2

PARAMETER (UNITS)	VALUE	RANGE (min-max)	REFERENCES (val,min,max)	UNC
Molecular Mass: (g/mole)	78.11	***	236 *** ***	1
MS Molecular Mass: (g/mole)	78.0470	***	68 *** ***	1
Specific Gravity: (20 deg C/4 deg C)	0.8765	***	68 *** ***	1
Vapor Press. (torr):	95	95.-95.18 at 25 C	69 70 69	1
Viscosity (g/cm sec):	0.0082	***	200 *** ***	2
Melting Pt. (deg C):	5.5	***	68 *** ***	1
Boiling Pt. (deg C):	80.1	***	68 *** ***	1
Henry's Law Constant: (dimensionless)	0.227	0.223-0.230	72 71 73	2
Diff. Coef., Air: (sq.cm/sec)	0.077	0.077-0.088	223 223 70	2
Diff. Coef., Water: (sq.cm/sec)	0.0000109	*** at 25 C	244 *** ***	2
Gibb's Free Energy: (kcal/mole)	29.72	***	115 *** ***	2
Log Octanol-Water Part. Coef.:	2.13	1.56-2.80	75 76 74	2
Acid Dissociation Constant (pKa):	>15	***	172 *** ***	3
Solubility in Water: (mg/l)	1787	1000-1787 at 25 C	77 78 77	2

Notes:
- na not appropriate
- nd no data found
- ns not specified
- *** appears in the range field and reference fields when only one value was found or when all references cited the same value
- UNC Estimate of Uncertainty (Scale is from 1 to 5; most certain is 1)

THERMODYNAMIC DATA

NAPHTHALENE

COMPOUND: NAPHTHALENE
EMPIRICAL FORMULA: C10H8
CAS NO. : 91-20-3

PARAMETER (UNITS)	VALUE	RANGE (min-max)	REFERENCES (val,min,max)	UNC
Molecular Mass: (g/mole)	128.17	***	236 *** ***	1
MS Molecular Mass: (g/mole)	128.0626	***	68 *** ***	1
Specific Gravity: (20 deg C/4 deg C)	1.162	***	67 *** ***	1
Vapor Press. (torr):	0.2336	0.213-0.2336 at 25 C	69 89 69	1
Viscosity (g/cm sec):	0.003	calc. at 218 C	24 *** ***	5
Melting Pt. (deg C):	80.5	80.2-80.5	68 67 68	1
Boiling Pt. (deg C):	218	217.9-218	68 67 68	1
Henry's Law Constant: (dimensionless)	0.0198	0.0198-0.0226	71 71 46	2
Diff. Coef., Air: (sq.cm/sec)	0.051	***	223 *** ***	2
Diff. Coef., Water: (sq.cm/sec)	0.0000069	calc.	38 *** ***	4
Gibb's Free Energy: (kcal/mole)	48.05	***	115 *** ***	2
Log Octanol-Water Part. Coef.:	3.30	3.28-3.59	93 94 95	2
Acid Dissociation Constant (pKa):	>15	***	172 *** ***	3
Solubility in Water: (mg/l)	31	30-31.7 at 25 C	82 91 92	2

Notes:
- na not appropriate
- nd no data found
- ns not specified
- *** appears in the range field and reference fields when only one value was found or when all references cited the same value
- UNC Estimate of Uncertainty (Scale is from 1 to 5; most certain is 1)

TABLE 3.3-1. (ENGLISH UNITS) EMISSION FACTORS FOR UNCONTROLLED GASOLINE AND DIESEL INDUSTRIAL ENGINES[a]

Pollutant (Rating)[b]	Gasoline Fuel SCC 20200301, 20300301		Diesel Fuel SCC 20200102, 20300101	
	(grams/hp-hr) (power output)	(lb/MMBtu) (fuel input)	(grams/hp-hr) (power output)	(lb/MMBtu) (fuel input)
NO_x [D]	5.16	1.63	14.0	4.41
CO [D]	199	62.7	3.03	0.95
SO_x [D]	0.268	0.084	0.931	0.29
Particulate [D]	0.327	0.10	1.00	0.31
CO_2 [B][c]	493	155	525	165
Aldehydes [D]	0.22	0.07	0.21	0.07
Hydrocarbons				
Exhaust [D]	6.68	2.10	1.12	0.35
Evaporative [E]	0.30	0.09	0.00	0.00
Crankcase [E]	2.20	0.69	0.02	0.01
Refueling [E]	0.49	0.15	0.00	0.00

a. Data based on uncontrolled levels for each fuel from references 1, 3 and 6. When necessary, the average brake specific fuel consumption (BSFC) value was used to convert from g/hp-hr to lb/MMBtu was 7000 Btu/hp-hr.

b. "D" and "E" rated emission factors are most appropriate when applied to a population of industrial engines rather than to an individual power plant, due to the aggregate nature of the emissions data.

c. Based on assumed 100 percent conversion of carbon in fuel to CO_2 with 87 weight percent carbon in diesel, 86 weight percent carbon in gasoline, average brake specific fuel consumption of 7000 Btu/hp-hr, diesel heating value of 19300 Btu/lb, and gasoline heating value of 20300 Btu/lb.

NOx Equilibrium as f(T)

T (deg F)	T deg C	T deg K	Kp NO2	Kp % NO
77	25	298	1600474	6.2E−07
100	37.77778	310.7778	620753.7	1.6E−06
200	93.33333	386.3333	21783.36	0.000046
300	148.8889	421.8889	1847.029	0.000541
400	204.4444	477.4444	278.1106	0.003583
500	260	533	62.14011	0.015838
600	315.5556	588.5556	18.42455	0.051481
700	371.1111	644.1111	6.737508	0.129241
720 → 50% load	382.2222	655.2222	5.623547	0.150977
740	393.3333	666.3333	4.722141	0.17476
800	426.6667	699.6667	2.89057	0.257032
810 → 100% load	432.2222	705.2222	2.675572	0.272067
900	482.2222	755.2222	1.404552	0.415878
1000	537.7778	810.7778	0.753439	0.570308
1100	593.3333	866.3333	0.437773	0.69552
1200	648.8889	921.8889	0.271563	0.786434
1300	704.4444	977.4444	0.177855	0.849001
1500	815.5556	1088.556	0.086844	0.920095
2000	1093.333	1366.333	0.024098	0.976471

TABLE 3.3-3. (ENGLISH AND METRIC UNITS) SPECIATED ORGANIC COMPOUNDS AND AIR TOXIC EMISSION FACTORS FOR UNCONTROLLED DIESEL ENGINES[a]
(All Emission Factors are Rated: E)[b]

Pollutant	[lb/MMBtu] (fuel input)	[ng/J] (fuel input)
Benzene	9.33 E-04	0.401
Toluene	4.09 E-04	0.176
Xylenes	2.85 E-04	0.122
Propylene	2.58 E-03	1.109
1,3 Butadiene[c]	< 3.91 E-05	< 0.017
Formaldehyde	1.18 E-03	0.509
Acetaldehyde	7.67 E-04	0.330
Acrolein	< 9.25 E-05	< 0.040
Polycyclic Aromatic Hydrocarbons (PAH)		
Naphthalene	8.48 E-05	3.64 E-02
Acenaphthylene	< 5.06 E-06	< 2.17 E-03
Acenaphthene	< 1.42 E-06	< 6.11 E-04
Fluorene	2.92 E-05	1.26 E-02
Phenanthrene	2.94 E-05	1.26 E-02
Anthracene	1.87 E-06	8.02 0E-04
Fluoranthene	7.61 E-06	3.27 E-03
Pyrene	4.78 E-06	2.06 E-03
Benz(a)anthracene	1.68 E-06	7.21 E-04
Chrysene	3.53 E-07	1.52 E-04
Benzo(b)fluoranthene	< 9.91 E-08	< 4.26 E-05
Benzo(k)fluoranthene	< 1.55 E-07	< 6.67 E-05
Benzo(a)pyrene	< 1.88 E-07	< 8.07 E-05
Indeno(1,2,3-cd)pyrene	< 3.75 E-07	< 1.61 E-04
Dibenz(a,h)anthracene	< 5.83 E-07	< 2.50 E-04
Benzo(g,h,I)perylene	< 4.89 E-07	< 2.10 E-04
Total PAH	1.68 E-04	7.22 E-02

a. Data are based on the uncontrolled levels of two diesel engines from references 6 and 7.
b. "E" rated emission factors are due to limited data sets, inherent variability in the population and/or a lack of documentation of test results. "E" rated emission factors may not be suitable for specific facilities or populations and should be used with care.
c. Data are based on one engine.

United States Environmental Protection Agency
Office of Air Quality Planning and Standards Research Triangle Park NC 27711
EPA - 450/1-89-0
January 1989
Air/Superfund

EPA

AIR / SUPERFUND NATIONAL TECHNICAL GUIDANCE STUDY SERIES

Volume III - Estimation of Air Emissions from Cleanup Activities at Superfund Sites

Interim Final

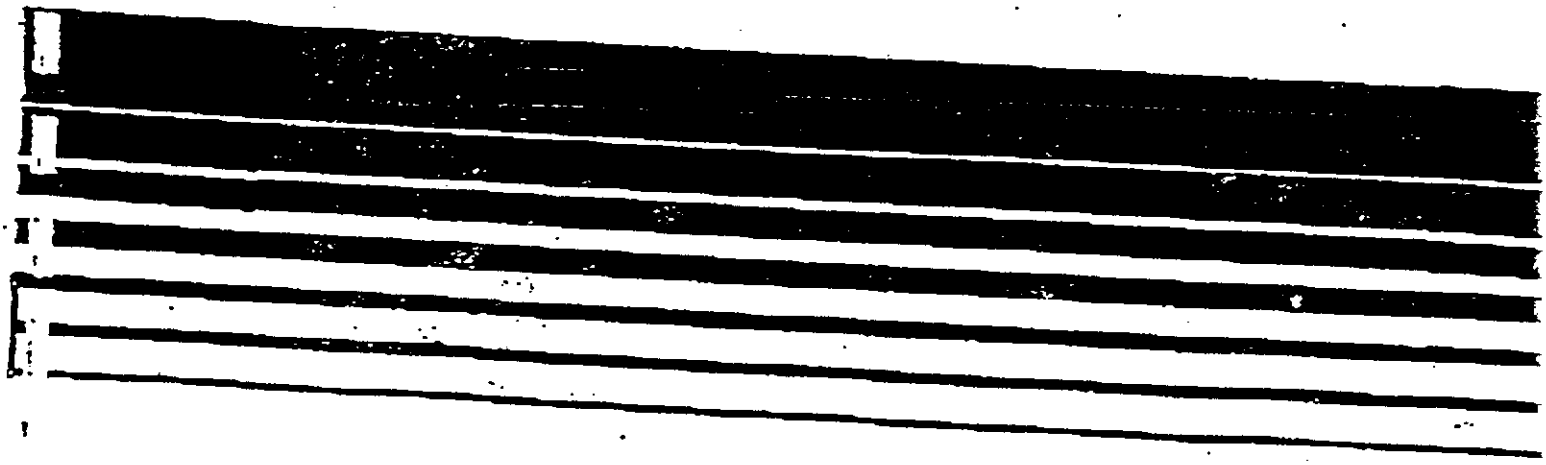


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TABLE 27. INCREASE IN EMISSIONS DUE TO SOILS HANDLING

Soils Handling Category	Agitation Factor[a]	Reference
Excavation		
Backhoe	2.5-28	50
Dragline	-	
Scraper	-	
Bulldozer	36-63	51
Transport		
Conveyor Belt	36	51
Truck	-	
Dumping[b]	42-72	51
Storage		
Short-term[c]	10	51
Long-term	1	Assumed
Stabilization	-	
Grading[d]	4 (2-9)	52
	2.5-38	53

[a] Multiply agitation factor by baseline emissions estimate (BEE) to calculate VOC emission factor.

[b] Values from crushing of ore.

[c] <4 days.

[d] Values from tilling of waste.

- = No data available

GAC-USE

A PROGRAM FOR ESTIMATION OF GRANULAR ACTIVATE CARBON CONSUMPTION RATES

SUMMARY OF VAPOR PHASE GAC CONSUMPTION ANALYSIS

NYSEG Phase III IRM site in Norwich, NY

Air flow rate	= 25000 cfm
Influent air temperature	= 70 deg F
Temperature increase across blower	= 60 deg F

Influent vapor phase contaminant concentrations:

Benzene = 2 ppmv

VAPOR PHASE CARBON CONSUMPTION = 75382 lb/year

SOIL VAPOR SUPPRESSION

The enclosed information offers independent lab results demonstrating BioSolve's effectiveness to suppress vapor, and BioSolve's abillty not to mask hydrocarbon contamination

BioSolve offers a relatively simple and cost effective method of suppressing VOC vapor release from soils during excavation, loading, stockpiling, etc.. The following guidelines will apply to the most common situations encountered on site.

In most cases a 3% solution of BioSolve will be adequate to keep vapor emissions within acceptable limits. Dilute BioSolve concentrate with water at the ratio of 1 part BioSolve to 33 parts water to make a 3% solution.

The BioSolve solution should be applied evenly to the soil surface in sufficient quantity to dampen the surface well, (as a general rule, 1 gallon of BioSolve solution will cover approximately 4 sq. yd. of soil surface area). BioSolve is not a foam, it is a surfactant based product that will apply like water. Solution may be applied with a hand sprayer, high pressure power sprayer, water truck, etc., whichever method best suits the site and/or conditions.

NOTE: In the case of extremely high emission levels and/or very porous soil it may be necessary to increase the strength of the BioSolve solution (6%) or apply more per sq. yd. to reduce emissions adequately.

On stockpiled soil or other soil that will be undisturbed, a single application of BioSolve to the exposed surfaces may last 10-14 days or more. During excavation, loading, or other movement of soil it may be necessary or required to spray each freshly exposed surface to keep emissions below acceptable levels.

It is important that the site be monitored regularly and BioSolve solution be reapplied if/when necessary to insure that vapor emissions remain at or below acceptable levels.

For more information contact your local BioSolve distributor

BioSolve should only be used in accordance with all state and local rules and regulations

INTRODUCTION

Southwest Soil Remediation (SWSR), contracted with Energy & Environmental Measurement Corporation (EEMC) to conduct a series of tests illustrating the effectiveness of Biosolve and plastic sheeting to diminish petroleum vapor losses from soil storage 'piles'. This is a report of the testing.

TEST PROCEDURES

Sixteen kilograms (kg) of clean soil (silty sand) was mixed with 0.8 liters of water to achieve a soil moisture content of ~10% Moisture v/v (assuming a 5% v/v starting moisture content). This soil was then quickly mixed with 80 g of gasoline. The contaminated soil was then immediately placed in the storage cell on top of a plastic liner. Note diagram of the storage cell.

The VOC emissions (Volatile Organic Carbon) or vapors were measured utilizing EPA Method #25A [1]. (Note description of VOC measurement procedures later in this outline.) The uncontrolled vapor losses were measured for a period of approximately five minutes.

A Biosolve solution (6% or 120 ml of Biosolve in 1880 ml of water) was then applied via pressure spray to the surface of the soil pile. The application was continued until the surface appeared wet. (A total of 339.5 ml was utilized/test)

VOC and ambient air measurements were then taken until vapor reduction achieved 95% reduction (~16 minutes). The VOC readings were then continued for approximately three more minutes (full control period). Two more identical runs were conducted for a total of three Biosolve tests.

A fourth test was conducted utilizing 10 mil. plastic sheeting (Polyethylene) in lieu of Biosolve. The test did not include a 16 minute reduction period, since the effect on VOC suppression was immediate.

Volatile Organic Carbon (VOC)

EPA Method #25A [1] was utilized for determination of VOC concentration (propane equivalent).

The sample train consisted of a stainless steel sample probe followed by a heated teflon sample line. The gases were pushed into a TECO-51-HT FID VOC monitor. The monitor was calibrated with protocol propane in N2 as per Method #25A. VOC was digitally logged and integrated on a five second basis over a two-day period.

The sample and temperature probe (Type K Thermocouple) was located approximately 3-6 inches over the soil.

The data was reported as VOC, propane equivalent, parts per million, on a volume - actual basis.

Reduction efficiency was calculated as follows:

$$\frac{(\text{ppm v/v uncontrolled} - \text{ppm v/v controlled})(100)}{\text{ppm v/v uncontrolled}}$$

RESULTS

An outline of the results is included in the summary section. All field and calibration data is included as tabulated.

REFERENCES

[1] Federal Register, 40 CFR, Pt. 60, App. A, Method #25A

SUMMARY OF S.W.S.R. SOIL STORAGE VAPOR EMISSION STUDY
3/13/96

TIME	RUN #	TEST DESCRIPTION	VOC PPM V/V ACTUAL	%REDUCTION - VOC
0856:19-0858:59	1	[1]	113.7	
[1] Gasoline spiked soil (no biosolve)				
0900:04-0915:59	1	[2]	14.9	
[2] Biosolve stabilization period				
0916:04-0920:59	1	[3]	2.7	97.6%
[3] Biosolve - full control period				
0930:34-0934:44	2	[1]	243.8	
[1] Gasoline spiked soil (no biosolve)				
0936:04-0951:59	2	[2]	20.3	
[2] Biosolve stabilization period				
0952:04-0956:54	2	[3]	4.6	98.1%
[3] Biosolve - full control period				

BioSolve Vapor Suppression

While BioSolve's ability to suppress vapor is well documented, the enclosed tests demonstrate BioSolve's ability NOT to mask the BETX or TVH from lab analyticals.

The test was conducted on 4 samples of soils. The samples included a

Clean blank. (MB031794)

1. (S-1) Soil only
2. (SBIO-3) Soil & a 5% solution of BioSolve
3. (STAP-2) Soil & Gas
4. (STPHB-IO-4) Soil, BioSolve, and Gas

And a Total Volatile Hydrocarbon (TVH) was run on the four samples

BTEX DATA REPORT

BLANK	S-1	SBIO-3	STAP-2	STPHB-10-4
B 0 ppb	B 1.8 ppb	B 2 ppb	B 31,000 ppb	B 22,000 ppb
T 1.3 ppb	T 6.7 ppb	T 6.7 ppb	T 170,000 ppb	T 140,000 ppb
E 0 ppb	E 0.9 ppb	E 1.1 ppb	E 73,000 ppb	E 68,000 ppb
X 2.3 ppb	X 5.2 ppb	X 6.7 ppb	X 370,000 ppb	X 350,000 ppb

Total Volatile Hydrocarbons (TVH)

S-1 .....0.2 ppm
SBIO .....0.2 ppm

STAP-2 .....1,800 ppm
STPHB-IO-4 ... 2,300 ppm

NOTE: On the TVH (STPHB-IO-4) there is an INCREASE in Total Recoverable Hydrocarbons. This increase is normal since BioSolve desorbes the hydrocarbon from the soil particles creating a larger interfacial surface exposure for degradation or allows for an increase in recovery efficiency

BIO TECH

Date: 03-07-94

Biosolve soil test Per C.D.H.

Procedure:
1-soil jar
2-soil jar with 2 mil. tph regular gasoline
3-soil jar with 2 mil. Biosolve
4-soil jar with 2 mil. Biosolve
2 mil. tph regular gasoline

Soil was placed in sample container. 2 mil. of tph was added to sample jar. Then 2 mil. of Biosolve was then added to the soil and tph.

Test required btex 8260
tvh/teh 8260

Bicsolve was mixed with H_2O at a 5% ratio

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4036 Youngfield St. Wheat Ridge, CO 80033
(303) 425-6021

BTEX Data Report

Client Sample Number	: S-1	Client Project No.	: CDH-Test
Lab Sample Number	: X84750	Lab Project No.	: 94-0879
Date Sampled	: 3/12/94	Dilution Factor	: 1.00
Date Received	: 3/16/94	Method	: 8020
Date Extracted/Prepared	: 3/17/94	Matrix	: Soil
Date Analyzed	: 3/18/94	Lab File No.	: BX2031729
Methanol Extract?	: No	Method Blank No.	: MB031794

Compound Name	Cas Number	Sample Concentration ug/kg		PQL ug/kg
Benzene	71-43-2	1.8	J	4
Toluene	108-88-3	6.7	B	4
Ethyl Benzene	100-41-4	0.9	J	4
Total Xylene (m/p + o)	1330-20-7	5.2	B	4

Note: Total Xylene consist of three isomers, two of which co-elute.
The Xylene PQL is for a single peak.

Surrogate Recovery:
a,a,a.-Trifluorotoluene : 68%
QC Reporting Limits : 55%-127%

QUALIFIERS:
E = Extrapolated value
U = Compound analyzed for, but not detected.
B = Compound found in blank and sample. Compare blank and sample data.
J = Indicates an estimated value when the compound is detected, but is below the Practical Quantitation Limit (PQL).
PQL = Practical Quantitation Limit. The PQL is equal to the dilution factor multiplied by ten times the Method Detection Limit as determined by EPA SW846, Vol. 1B, Part II, pg. 8000-14.
NA = Not available.

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BTEX Data Report

Client Sample Number	: SBIO-3	Client Project No.	: CDH-Test
Lab Sample Number	: X84752	Lab Project No.	: 94-0879
Date Sampled	: 3/12/94	Dilution Factor	: 1.00
Date Received	: 3/16/94	Method	: 8020
Date Extracted/Prepared	: 3/17/94	Matrix	: Soil
Date Analyzed	: 3/18/94	Lab File No.	: BX2031730
Methanol Extract?	: No	Method Blank No.	: MB031794

Compound Name	Cas Number	Sample Concentration ug/kg		PQL ug/kg
Benzene	71-43-2	2	J	4
Toluene	108-88-3	6.7	B	4
Ethyl Benzene	100-41-4	1.1	J	4
Total Xylene (m/p + o)	1330-20-7	6.7	B	4

Note: Total Xylene consist of three isomers, two of which co-elute.
The Xylene PQL is for a single peak.

Surrogate Recovery:
a,a,a,-Trifluorotoluene : 67%
QC Reporting Limits : 55%-127%

QUALIFIERS:
E = Extrapolated value
U = Compound analyzed for, but not detected.
B = Compound found in blank and sample. Compare blank and sample data.
J = Indicates an estimated value when the compound is detected, but is below the Practical Quantitation Limit (PQL).
PQL = Practical Quantitation Limit. The PQL is equal to the dilution factor multiplied by ten times the Method Detection Limit as determined by EPA SW846, Vol. 1B, Part II, pa. 8000-14.
NA = Not available.

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BTEX Data Report

Client Sample Number	: STAP-2	Client Project No.	: CDH-Test
Lab Sample Number	: X94751	Lab Project No.	: 94-0879
Date Sampled	: 3/12/94	Dilution Factor	: 1250.00
Date Received	: 3/16/94	Method	: 8020
Date Extracted/Prepared	: 3/20/94	Matrix	: Soil
Date Analyzed	: 3/21/94	Lab File No.	: BX1032003
Methanol Extract?	: Yes	Method Blank No.	: MB032094

Compound Name	Cas Number	Sample Concentration ug/kg		PQL ug/kg
Benzene	71-43-2	31000		5000
Toluene	108-88-3	170000		5000
Ethyl Benzene	100-41-4	73000	J	5000
Total Xylene (m/p + o)	1330-20-7	370000	B	5000

Note: Total Xylene consist of three isomers, two of which co-elute.
The Xylene PQL is for a single peak.

Surrogate Recovery:
a,a,a,-Trifluorotoluene : 128% Co-eluting peaks.
QC Reporting Limits : 55%-127%

QUALIFIERS:
E = Extrapolated value
U = Compound analyzed for, but not detected.
B = Compound found in blank and sample. Compare blank and sample data.
J = Indicates an estimated value when the compound is detected, but is below the Practical Quantitation Limit (PQL).
PQL = Practical Quantitation Limit. The PQL is equal to the dilution factor multiplied by ten times the Method Detection Limit as determined by EPA SW846, Vol. 1B, Part II, pa. 9000-14.
NA = Not available.

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BTEX Data Report

Client Sample Number	: STPHB-10-4	Client Project No.	: CDH-Test
Lab Sample Number	: X84753	Lab Project No.	: 94-0879
Date Sampled	: 3/12/94	Dilution Factor	: 1250.00
Date Received	: 3/16/94	Method	: 8020
Date Extracted/Prepared	: 3/20/94	Matrix	: Soil
Date Analyzed	: 3/21/94	Lab File No.	: BX1032009
Methanol Extract?	: Yes	Method Blank No.	: MEB032094

Compound Name	Cas Number	Sample Concentration ug/kg	PQL ug/kg
Benzene	71-43-2	22000	5000
Toluene	108-88-3	140000	5000
Ethyl Benzene	100-41-4	68000	5000
Total Xylene (m/p + o)	1330-20-7	350000 B	5000

Note: Total Xylene consist of three isomers, two of which co-elute.
The Xylene PQL is for a single peak.

Surrogate Recovery:
a,a,a,-Trifluorotoluene : 124%
QC Reporting Limits : 55%-127%

QUALIFIERS:
E = Extrapolated value
U = Compound analyzed for, but not detected.
B = Compound found in blank and sample. Compare blank and sample data.
J = Indicates an estimated value when the compound is detected, but is below the Practical Quantitation Limit (PQL).
PQL = Practical Quantitation Limit. The PQL is equal to the dilution factor multiplied by ten times the Method Detection Limit as determined by EPA SW846, Vol. 1B, Part II, pg. 8000-14.
NA = Not available.

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TOTAL VOLATILE HYDROCARBONS (TVH)

Date Sampled	: 3/12/94	Client Project Number	: CDH-TEST
Date Received	: 3/16/94	Lab Project Number	: 94-0879
Date Prepared	: 3/18/94	Matrix	: Soil
Date Analyzed	: 3/18/94	Method Number	: 5030/Mod.8015

Evergreen Sample #	Client Sample #	Surrogate Recovery	TVH mg/Kg	MDL mg/Kg
X84750	S-1	94%	0.2	0.1
X84751	STAP2	89%	1,800	5.0
X84752	SBIO-3	100%	0.2	0.1
X84753	STPHB-10-4	89%	2,300	5.0

QUALIFIERS
U = TVH analyzed for but not detected.
B = TVH found in blank as well as sample (blank data should be compared).
E = Extrapolated value.
MDL = Method Detection Limit

Analyst

Approved

MATERIAL SAFETY DATA SHEET

THE WESTFORD CHEMICAL CORPORATION
P.O. Box 798
Westford, Massachusetts 01886 USA
Phone: (508) 392-0689
Fax: (508) 692-3487
Emergency Phone: 1-800-225-3909

Ref. No.: 2001
Date: 1-3-96

SECTION I - IDENTITY

Name:	BIO SOLVE
D.O.T. Class:	Not regulated
Formula:	Proprietary
Chemical Family:	Bio/Surfactant/ Biodegradable

SECTION II - PHYSICAL & CHEMICAL CHARACTERISTICS

Fire and Explosion Data

Boiling Point	: 265° F	Melting Point	: 32°F
Specific Gravity	: 1.00 +/-.01	Vapor Pressure mm/Hg	: NA
Percent Volatile by Vol.	: NA	Vapor Density Air = 1	: NA
Flammable Limit	: NA	Solubility in Water	: Complete
Reactivity with Water	: No	Flash Point	: NA
Auto-Ignite Temperature	: NA	Freeze Temperature	: 28° F
Evaporation Rate	: >1 as compared to Water	Storage	: 35° - 120°
Appearance	: Clear Liquid unless Dyed	Freeze Harm:	: None
Odor	: Perfumed Fragrance	Shelf Life	: Unlimited-Unopened
Fire Extinguisher Media	: NA	pH: 8.8	
		Pounds per Gallon	: 8.33

Special Fire Fighting Procedures:

Special Fire Fighting Procedures	: NA
Unusual Fire and Explosion Hazards	: None
Solvent for Clean-Up	: Water

SECTION III - PHYSICAL HAZARDS

Stability	: Stable
Polymerization	: No
Incompatible Substances	: None Known
Hazardous Decomposition Products	: NA

Date: 1-3-96
MSDS Ref. No. 2001 Bio Solve

SECTION IV - HEALTH HAZARDS

Threshold Limit Values: NA
Signs and Symptoms of Over Exposure -
Acute : Moderate eye irritation. Skin: Causes redness, edema, drying of skin.
Chronic: Pre-existing skin and eye disorders may be aggravated by contact with this product.
Medical Conditions Generally Aggravated by Exposure: Unknown
Carcinogen: No
Emergency First Aid Procedures -
Eyes : Flush thoroughly with water for 15 minutes. Get medical attention.
Skin : Remove contaminated clothing. Wash exposed areas with soap and water. Wash clothing before reuse. Get medical attention if irritation develops.
Ingestion : Get medical attention.
Inhalation : None considered necessary.

SECTION V - SPECIAL PROTECTION INFORMATION

Respiratory Protection : Not necessary
Ventilation Required : Normal
Local Exhaust Required : No
Protective Clothing : Gloves, safety glasses, wash clothing before reuse.

SECTION IV - SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be taken in Handling and Storage: Use good normal hygiene.
Precautions to be taken in case of Spill or Leak -
Small spills, in an undiluted form, contain. Soak up with absorbent materials.
Large spills, in an undiluted form, dike and contain. Remove with vacuum truck or pump to storage/salvage vessel. Soak up residue with absorbent materials.
Waste Disposal Procedures -
Dispose in an approved disposal area or in a manner which complies with all local, state, and federal regulations.

The Information on this Material Safety Data Sheet reflects the latest information and data that we have on hazards, properties, and handling of this product under the recommended conditions of use. Any use of this product or method of application which is not described on the label or in the Product Data Sheet is the responsibility of the user.

This Material Safety Data Sheet was prepared to comply with the OSHA Hazardous Communication Regulation and Massachusetts Right to Know Law.

SECTION VII - HAZARDOUS INGREDIENTS

Massachusetts Right to Know Law or 29 C.F.R. (Code of Federal Regulations) 1910.1000 require listing of hazardous ingredients.

No hazardous ingredients listed as regulated by the Massachusetts Right to Know Law or 29 C.F.R. (Code of Federal Regulations) 1910.1000

OP LOCATION FACILITY EMISSION POINT

A ADD
C CHANGE
D DELETE

READ INSTRUCTIONS CONTAINED IN FORM 76-11-12 BEFORE ANSWERING ANY QUESTION

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROCESS, EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

COPIES
WHITE - ORIGINAL
GREEN - DIVISON OF AIR
WHITE - REGIONAL OFFICE
WHITE - FIELD REP.
YELLOW - APPLICANT

SECTION A

1. OWNER / FIRM: New York State Electric and Gas
2. NUMBER AND STREET ADDRESS: Corporate Drive, Kirkwood Industrial Park, Box 5224
3. CITY - TOWN - VILLAGE: Binghamton | 4. STATE: NY | 5. ZIP: 13902-5224
6. OWNER CLASSIFICATON: A. ☐ COMMERCIAL C. ☒ UTILITY E. ☐ STATE F. ☐ MUNICIPAL H. ☐ HOSPITAL I. ☐ RESIDENTIAL B. ☐ INDUSTRIAL D. ☐ FEDERAL G. ☐ EDUC. INST. J. ☐ OTHER
7. NAME & TITLE OF OWNERS REPRESENTATIVE | 8. TELEPHONE
9. NAME OF AUTHORIZED AGENT: GT Engineering, PC | 10. TELEPHONE: (518) 370-5631
11. NUMBER AND STREET ADDRESS: 1245 Kings Road
12. CITY - TOWN - VILLAGE: Schenectady | 13. STATE: NY | 14. ZIP: 12303
15. NAME OF P.E. OR ARCHITECT PREPARING APPLICATION: Gary Kerzic | 16. N.Y.S. P.E. OR ARCHITECT LICENSE NO. | 17. TELEPHONE: (518) 370-5631
18. SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT
19. FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM): Norwich MGP Site
20. FACILITY LOCATION (NUMBER AND STREET ADDRESS): Birdsall Street
21. CITY - TOWN - VILLAGE: Norwich, N.Y. | 22. ZIP: 13815
23. BUILDING NAME OR NUMBER: N/A | 24. FLOOR NAME OR NUMBER: N/A
25. START UP DATE: 1 / 97 (MO / YR) | 26. DRAWING NUMBERS OF PLANS SUBMITTED
27. PERMIT TO CONSTRUCT: A. ☒ NEW SOURCE B. ☐ MODIFICATION
28. CERTIFICATE TO OPERATE: A. ☐ NEW SOURCE C. ☐ EXISTING SOURCE B. ☐ MODIFICATION

SEC. B

29. EMISSION POINT ID.	30. GROUND ELEVATION (FT.)	31. HEIGHT ABOVE STRUCTURES (FT.)	32. STACK HEIGHT (FT.)	33. INSIDE DIMENSIONS (IN.)	34. EXIT TEMP.(°F)	35. EXIT VELOCITY (FT./SEC.)	36. EXIT FLOW RATE (ACFM)
01	1,000	N/A	20	30	Ambient	85	25,000

37. SOURCE CODE	38. HRS / DAY	39. DAYS / YR	40. % OPERATION BY SEASON Winter	Spring	Summer	Fall
	12	180	50	50	00	00

SEC. C

41. DESCRIBE PROCESS OR UNIT

1. Crushing and screening of coal tar soils
2.
3.
4.
5.
6.
7.
8.

SEC. D

42. EMISSION CONTROL EQUIPMENT I.D.	43. CONTROL TYPE	44. MANUFACTURER'S NAME AND MODEL NUMBER	45. DISPOSAL METHOD	46. DATE INSTALLED MONTH / YEAR	47. USEFUL LIFE
01	17		9	1 / 97	0.25
48.	49.	50.	51.	52. /	53.

SECTION E

CALCULATIONS

SEE ATTACHED SHEET

SECTION F

54. CONTAMINANT NAME	55. CAS NUMBER	56. INPUT OR PRODUCTION	57. UNIT	58. ENV. RATING	59. EMISSIONS ACTUAL	60. UNIT	61. HOW DET.	62. PERMISSIBLE	63. % CONTROL EFFIC'CY	64. HOURLY EMISSIONS (LBS/HR) ERP	65. ACTUAL	66. ANNUAL EMISSIONS (LBS/YR) ACTUAL	67. 10*	68. PERMISSIBLE
54. Benzene	55. 71-43-2	56.	57. 1	58.	59. 0.21	60. 1	61. 6	62.	63. 98.7	64. 0.003	65.	66.	67.	68.
69. Toluene	70. 108-88-3	71.	72. 1	73.	74. 0.12	75. 1	76. 6	77.	78. 90	79. 0.012	80.	81.	82.	83.
84. Ethylbenzene	85. 100-41-4	86.	87. 1	88.	89. 0.006	90. 1	91. 6	92.	93. 90	94. 0.001	95.	96.	97.	98.
99. Xylenes	100. 1330-20-7	101.	102. 1	103.	104. 0.04	105. 1	106. 6	107.	108. 90	109. 0.004	110.	111.	112.	113.
114. Naphthalene	115. 91-20-3	116.	117. 1	118.	119. 0.004	120. 1	121. 6	122.	123. 90	124. 0.0004 ~~0.004~~	125.	126.	127.	128.
129.	130. - -	131.	132.	133.	134.	135.	136.	137.	138.	139.	140.	141.	142.	143.

SEC. G

SOLID FUEL TYPE	SOLID FUEL TONS / YR	SOLID FUEL % S	LIQUID FUEL TYPE	LIQUID FUEL THOUSANDS OF GALLONS/YR	LIQUID FUEL % S	GAS TYPE	GAS THOUSANDS OF CF/YR	GAS BTU/CF
144.	145.	146.	147.	148.	149.	150.	151.	152.

APPLICABLE RULE	APPLICABLE RULE
153.	154.

Upon completion of construction sign the statement listed below and forward to the appropriate field representative

THE PROCESS, EXHAUST OR VENTILATION SYSTEM HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED SPECIFICATIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS.

155. SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

AGENCY USE ONLY

156. LOCATION CODE	157. FACILITY ID. NO.	158. U.T.M. (E)	159. U.T.M. (N)	160. SIC NUMBER	161. DATE APPL. RECEIVED	162. DATE APPL. REVIEWED	163. REVIEWED BY:
					/ /	/ /	

PERMIT TO CONSTRUCT

164. DATE ISSUED	165. EXPIRATION DATE	166. SIGNATURE OF APPROVAL	167. FEE
/ /	/ /		

168.
1. DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
2. THIS IS NOT A CERTIFICATE TO OPERATE
3. TESTS AND/OR ADDITIONAL EMISSION CONTROL EQUIPMENT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A CERTIFICATE TO OPERATE

CERTIFICATE TO OPERATE

169. DATE ISSUED	170. EXPIRATION DATE	171. SIGNATURE OF APPROVAL	172. FEE
/ /	/ /		

173.
1. ☐ INSPECTED BY _____ DATE _____
2. ☐ INSPECTION DISCLOSED DIFFERENCES AS BUILT VS. PERMIT, CHANGES INDICATED ON FORM
3. ☐ ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4. ☐ APPLICATION FOR C.O. DENIED _____ (DATE) _____ (INITIALED)

174. SPECIAL CONDITIONS:
1.
2.

AIR GUIDE 1 - WORKSHEET #1

NOTES:

SOIL VAPOR EXTRACTION PERMIT WORKSHEETS

DATE: 11/05/96
JOB NAME: NYSEG Norwich
JOB NUMBER: 01110-0180
LOCATION: Norwich, New York

SOIL VAPOR EXTRACTION SYSTEM OPERATING DA SOIL VAPOR EXTRACTION SYSTEM DISHARGE DATA

AIR FLOW:	25000	acfm
DISCHARGE TEMP.:	70	Degrees F
AMBIENT TEMP.:	60	Degrees F
BUILDING HEIGHT:	50	feet
MAX BUILDING WIDTH:	150	feet
PHYSICAL STACK HEIGH	20	feet
STACK DIAMETER:	30	inches
EXIT VELOCITY:	85	feet/sec
STACK / BUILDING RATIO	0.4	
STACK REDUCTION FAC	1.00	
DIST. TO PROP. LINE:	20	feet
EFFECTIVE STACK HEIG (FROM WORKSHEET #2)	**20.00**	**feet**

CONTAMINANT	MOL WEIGHT (g/mole)	CAS #	EFFLUENT (ppmV)	EFFLUENT (mg/m^3)	LOADING (lbs/hr)
BENZENE	78.11	71-43-2	0.0092	0.0293	0.003
TOLUENE	92.13	108-88-3	0.0334	0.1256	0.012
ETHYLBENZEN	106.16	100-41-4	0.00153	0.0066	0.001
XYLENES	106.16	1330-20-7	0.0092	0.0399	0.004
NAPHTHALENE	128	0091-20-3	0.00085	0.0044	0.00042
			0.05418		0.01927

POINT SOURCE DISCHARGE METHOD SUMMARY

CONTAMINANT	AGC LIMIT (ug/m^3)	DISCHARG (ug/m^3)	SGC LIMIT (ug/m^3)	DISCHARGE (ug/m^3)	PAGE #
BENZENE	1.20E-01	1.71E-01	3.00E+01	1.11E+01	3
TOLUENE	2.00E+03	7.31E-01	8.90E+04	3.07E+02	4
ETHYLBENZEN	1.00E+03	3.86E-02	1.00E+05	2.50E+00	5
XYLENES	3.00E+02	2.32E-01	1.00E+05	1.51E+01	6
NAPHTHALENE	1.20E+02	2.58E-02	1.20E+04	1.68E+00	7

File Name: \NYSEG\Norwich\AIR-GDE.WK4
Version: Update June 8, 1994 from NYSDEC Air Guide 1 Appendix B (April 4, 1994)

AIR GUIDE 1 - WORKSHEET #2

BASIC CAVITY IMPACT ANALYSIS

DATE: 11/05/96
JOB NAME: NYSEG Norwich
JOB NUMBER: 01110-0180
LOCATION: Norwich, New York

BASIC CAVITY IMPACT ANAYSYS INPUT DATA

DIST. TO PROP. LINE:	20	feet
note: If greater than 3 times building height ignore cavity im		
AIR FLOW:	25000	acfm
DISCHARGE TEMP.:	70	Degrees F
AMBIENT TEMP.:	60	Degrees F
BUILDING HEIGHT:	50	feet
MAX BUILDING WIDTH:	150	feet
PHYSICAL STACK HEIGH	20	feet
STACK DIAMETER:	30	inches
EXIT VELOCITY:	84.89	feet/sec
STACK / BUILDING RATIO	0.4	
STACK REDUCTION FAC	1	

BASIC CAVITY IMPACTS

CALCULATED BLDG. CAVITY H	**75**	feet
THE PHYSICAL STACK HEIGHT IS LESS THAN THE BLDG CAVITY HEIGH		
THEREFORE:		
CAVITY IMPACTS NEED TO BE CALCULATED		

MOMENTUM AND BUOYANCY FLUX

CALCULATED MOMENTUM FLU	**11046.15**	feet^4/sec^2
CALCULATED BUOYANCY FLU	**1.38**	feet^4/sec^2

MOMENTUM PLUME RISE CREDIT

NO PLUME RISE CREDIT BECAUSE Hs/Hb <1.5		
MOMENTUM PLUME RISE CRE	**0.00**	feet

BUOYANCY FINAL RISE CREDIT

THERE IS NO BUOYANCY CREDIT BECAUSE Hs/HB<2.5		
BOUANCY FINAL RISE CREDIT:	**0.00**	feet

EFFECTIVE STACK HEIGHT

EFFECTIVE STACK HEIGHT:	**20.00**	feet
(INCLUDING MOMENTUM AND BUOYANCY RISE CREDITS)		

AIR GUIDE 1 - WORKSHEET #3

STANDARD POINT SOURCE DISCHARGE EVALUATION 1991 EDITION

DATE: 11/05/96
JOB NAME: NYSEG Norwich
JOB NUMBER 01110-0180
LOCATION: Norwich, New York

Height above structure (ft):	-30
hs (physical stack height ft):	20.00
he (effective stack height ft):	20.00
Inside stack dimension (ft.):	2.5000
R Stack outlet area (ft^2):	4.91
Exit temperature (F):	70
T exit temperature (R):	530
V exit velocity (ft/sec):	85
Flowrate (ft^3/min):	25000
Ambient temperature (F):	60
hb (building height ft):	50

CONTAMINANT: BENZENE
CAS NUMBER: 71-43-2

Q Reported actual hourly emissions (lb/hr):	0.003
Qa Annual emission rate (lb/yr):	24.05
AGC Annual Guideline Concentration (ug/m3):	1.20E-01
SGC Short Term Guideline Concentration (ug/m3):	3.00E+01

STANDARD POINT SOURCE METHOD

maximum Actual Annual Impact
Ca (ug/m3)= 1.71E-01 > AGC=1.20-01

maximum Potential Annual Impact
Cp (ug/m3): 1.70E-01

STACK HEIGHT REDUCTION

maximum Actual Annual Impact with stack height reduction factor.
Ca (ug/m3)= **1.71E-01 > AGC=1.20-01**

maximum Potential Annual Impact with stack height reduction factor.
Cp (ug/m3)= **1.70E-01**

maximum Short Term Impact
Cst (ug/m3): **1.11E+01 < SGC=3.00+01**

File Name: \NYSEG\Norwich\AIR-GDE.WK4
Version: Update June 8, 1994 from NYSDEC Air Guide 1 Appendix B (April 4, 1994)

AIR GUIDE 1 - WORKSHEET #4

STANDARD POINT SOURCE DISCHARGE EVALUATION 1991 EDITION

DATE: 11/05/96
JOB NAME: NYSEG Norwich
JOB NUMBER 01110-0180
LOCATION: Norwich, New York

Height above structure (ft):	-30
hs (physical stack height ft):	20
he (effective stack height ft):	20.00
Inside stack dimension (ft.):	2.5000
R Stack outlet area (ft^2):	4.91
Exit temperature (F):	70
T exit temperature (R):	530
V exit velocity (ft/sec):	85
Flowrate (ft^3/min):	25000
Ambient temperature (F):	60
hb (building height ft):	50

CONTAMINANT: TOLUENE
CAS NUMBER: 108-88-3

Q Reported actual hourly emissions (lb/hr):	0.01
Qa Annual emission rate (lb/yr):	103.00
AGC Annual Guideline Concentration (ug/m3):	2.00E+03
SGC Short Term Guideline Concentration (ug/m3):	8.90E+04

STANDARD POINT SOURCE METHOD

maximum Actual Annual Impact
Ca (ug/m3)= **7.31E-01** < AGC=2.00+03

maximum Potential Annual Impact
Cp (ug/m3): **7.30E-01**

STACK HEIGHT REDUCTION

maximum Actual Annual Impact with stack height reduction factor.
Ca (ug/m3)= **7.31E-01 < AGC=2.00+03**

maximum Potential Annual Impact with stack height reduction factor.
Cp (ug/m3)= **7.30E-01**

maximum Short Term Impact
Cst (ug/m3): **3.07E+02 < SGC=8.90+04**

File Name: \NYSEG\Norwich\AIR-GDE.WK4
Version: Update June 8, 1994 from NYSDEC Air Guide 1 Appendix B (April 4, 1994)

AIR GUIDE 1 - WORKSHEET #5

STANDARD POINT SOURCE DISCHARGE EVALUATION 1991 EDITION

DATE: 11/05/96
JOB NAME: NYSEG Norwich
JOB NUMBER 01110-0180
LOCATION: Norwich, New York

Height above structure (ft):	-30
hs (physical stack height ft):	20
he (effective stack height ft):	20.00
Inside stack dimension (ft.):	2.5000
R Stack outlet area (ft^2):	4.91
Exit temperature (F):	70
T exit temperature (R):	530
V exit velocity (ft/sec):	85
Flowrate (ft^3/min):	25000
Ambient temperature (F):	60
hb (building height ft):	50

CONTAMINANT: ETHYLBENZENE
CAS NUMBER: 100-41-4

Q Reported actual hourly emissions (lb/hr):	0.00
Qa Annual emission rate (lb/yr):	5.44
AGC Annual Guideline Concentration (ug/m3):	1.00E+03
SGC Short Term Guideline Concentration (ug/m3):	1.00E+05

STANDARD POINT SOURCE METHOD

maximum Actual Annual Impact
Ca (ug/m3)= **3.86E-02** < AGC=1.00+03

maximum Potential Annual Impact
Cp (ug/m3): **3.85E-02**

STACK HEIGHT REDUCTION

maximum Actual Annual Impact with stack height reduction factor.
Ca (ug/m3)= **3.86E-02 < AGC=1.00+03**

maximum Potential Annual Impact with stack height reduction factor.
Cp (ug/m3)= **3.85E-02**

maximum Short Term Impact
Cst (ug/m3): **2.50E+00 < SGC=1.00+05**

File Name: \NYSEG\Norwich\AIR-GDE.WK4
Version: Update June 8, 1994 from NYSDEC Air Guide 1 Appendix B (April 4, 1994)

AIR GUIDE 1 - WORKSHEET #8

STANDARD POINT SOURCE DISCHARGE EVALUATION 1991 EDITION

DATE: 11/05/96
JOB NAME: NYSEG Norwich
JOB NUMBER 01110-0180
LOCATION: Norwich, New York

Height above structure (ft):	-30
hs (physical stack height ft):	20
he (effective stack height ft):	20
Inside stack dimension (ft.):	2.5000
R Stack outlet area (ft^2):	4.91
Exit temperature (F):	70
T exit temperature (R):	530
V exit velocity (ft/sec):	85
Flowrate (ft^3/min):	25000
Ambient temperature (F):	60
hb (building height ft):	50

CONTAMINANT: XYLENES
CAS NUMBER: 1330-20-7

Q Reported actual hourly emissions (lb/hr):	0.00
Qa Annual emission rate (lb/yr):	32.69
AGC Annual Guideline Concentration (ug/m3):	3.00E+02
SGC Short Term Guideline Concentration (ug/m3):	1.00E+05

STANDARD POINT SOURCE METHOD

maximum Actual Annual Impact
Ca (ug/m3)= **2.32E-01** < AGC=3.00+02

maximum Potential Annual Impact
Cp (ug/m3): **2.32E-01**

STACK HEIGHT REDUCTION

maximum Actual Annual Impact with stack height reduction factor.
Ca (ug/m3)= **2.32E-01 < AGC=3.00+02**

maximum Potential Annual Impact with stack height reduction factor.
Cp (ug/m3)= **2.32E-01**

maximum Short Term Impact
Cst (ug/m3): **1.51E+01 < SGC=1.00+05**

File Name: \NYSEG\Norwich\AIR-GDE.WK4
Version: Update June 8, 1994 from NYSDEC Air Guide 1 Appendix B (April 4, 1994)

AIR GUIDE 1 - WORKSHEET #7

STANDARD POINT SOURCE DISCHARGE EVALUATION 1991 EDITION

DATE: 11/05/96
JOB NAME: NYSEG Norwich
JOB NUMBER 01110-0180
LOCATION: Norwich, New York

Height above structure (ft):	-30
hs (physical stack height ft):	20
he (effective stack height ft):	20.00
Inside stack dimension (ft.):	2.5000
R Stack outlet area (ft^2):	4.91
Exit temperature (F):	70
T exit temperature (R):	530
V exit velocity (ft/sec):	85
Flowrate (ft^3/min):	25000
Ambient temperature (F):	60
hb (building height ft):	50

CONTAMINANT: NAPHTHALENE
CAS NUMBER: 0091-20-3

Q Reported actual hourly emissions (lb/hr):	0.00
Qa Annual emission rate (lb/yr):	3.64
AGC Annual Guideline Concentration (ug/m3):	1.20E+02
SGC Short Term Guideline Concentration (ug/m3):	1.20E+04

STANDARD POINT SOURCE METHOD

maximum Actual Annual Impact
Ca (ug/m3)= **2.58E-02** < AGC=4.00+00

maximum Potential Annual Impact
Cp (ug/m3): **2.58E-02**

STACK HEIGHT REDUCTION

maximum Actual Annual Impact with stack height reduction factor.
Ca (ug/m3)= **2.58E-02 < AGC=4.00+00**

maximum Potential Annual Impact with stack height reduction factor.
Cp (ug/m3)= **2.58E-02**

maximum Short Term Impact
Cst (ug/m3): **1.68E+00 SGC=--**

File Name: \NYSEG\Norwich\AIR-GDE.WK4
Version: Update June 8, 1994 from NYSDEC Air Guide 1 Appendix B (April 4, 1994)

APPENDIX F

NYSEG TRANSPORTATION SPECIFICATION

Exhibit III

NEW YORK STATE ELECTRIC & GAS CORPORATION

FORMER MANUFACTURED GAS PLANT SITES AND/OR DIVISION SERVICE CENTERS

TRANSPORTATION OF SOLID AND/OR LIQUID MATERIALS

SPECIFICATION NO. MGP-1295-1740

		DATE
PREPARED BY:	Bert W Finch	2/12/96
APPROVED BY:	Margaret C Hebdon	2/13/96

SPECIFICATION NO. MGP-1295-1740

NEW YORK STATE ELECTRIC & GAS CORPORATION

FORMER MANUFACTURED GAS PLANT SITES AND/OR DIVISION SERVICE CENTERS

TRANSPORTATION OF SOLID AND/OR LIQUID MATERIALS

TABLE OF CONTENTS

SPECIFICATION NO. MGP-1295-1740

A SCOPE OF WORK

This specification is for the transportation of solid and/or liquid nonhazardous and hazardous materials for various Former Manufactured Gas Plant (MGP) Sites and Division Service Centers as detailed herein and in the Order on Consent Index No. D0-0002-9309 with New York State Department of Environmental Conservation, and any other applicable Federal, State, and Local Laws.

B WORK BY CONTRACTOR

1.0 The transporter shall provide all supervision, training, permits, manifest, labor, tools, equipment, consumable materials, and expendable materials, to transport solid and/or liquid materials as detailed herein.

C GENERAL WORK CONDITIONS

1.0 The transporter shall comply with all applicable provisions of New York State Department of Environmental Conservation Regulation, 6 NYCRR Part 364 "Waste Transporters Permit", Title 6 of the Official Compilation of Codes, Rules and Regulations.

2.0 The transporter shall comply with all applicable provisions of New York State Department of Environmental Conservation Regulation 6 NYCRR Part 372 "Hazardous Waste Manifest System and Related standards for Generators, Transporters and Facilities", Title 6 of the Official Compilation of Codes, Rules and Regulations.

3.0 The transporter shall comply with all applicable provisions of New York State Department of Transportation (NYSDOT) , the New York State Department of Motor Vehicle, and/or any other applicable Federal, State, and Local Laws.

4.0 The transporter shall comply with applicable provisions of OSHA 29 CFR 1910.120 "40 hours Hazardous Waste Operations Health & Emergency Response".

5.0 The transporter shall develop and implement a written Health & Safety Plan for their drivers which addresses potential exposure to MGP residuals.

6.0 The transporter shall adhere to the following rules while working on an MGP Site and/or on an Owner's Property.

6.1 Any truck found unacceptable by the Owner's Field Representative and/or the MGP Site's Health & Safety Officer may be rejected. Any cost for rejected trucks shall be born by the transporter.

6.2 The truck drivers will report their arrival to the Owner's Field Representative and/or the MGP Site's Health & Safety Officer.

6.3 Truck drivers are generally restricted to their trucks and the designated waiting areas. Drivers are not permitted access to the Power Stations and/or the MGP Sites without express permission from a representative of the Owner.

6.4 Truck drivers will don hard hats, safety glasses, safety shoes/boots, and gloves, as a minimum for personal protection, when on Owner's MGP Sites and/or Owner's Power Station Sites.

6.5 Per Owner's Discretion trucks transporting Coal Tar or Petroleum Contaminated Nonhazardous Solid Material or Coal Tar Contaminated Hazardous Solid Material may have the driver line the entire box (to top of side boards) with three mils thick polyethylene sheets (poly sheets). All trucks will also have a gasket between the box and tailgate.

6.6 All trucks require working audible and visual Backup signals.

6.7 When loading or when directed by a representative of the Owner, the truck engine should be shut off. Each truck may be restarted and driven away only after receiving the "all clear" direction from the loader operator, or Owner's Field Representative.

6.8 Truck's engines are not allowed to idle in residential or other areas where the exhaust could be a nuisance.

6.9 No trucks will be loaded above the side boards and no material will be spilling out of the truck. The trucks' exteriors will be clean (by others) from material being loaded before they leave the loading area.

6.10 The drivers will cover trucks with tarps inside the loading area. Care should be taken to maintain stable footing when climbing on loads.

6.11 Obey traffic signs and notices (obey the posted speed limit).

6.12 Obey rules posted on the site and/or any site specific Health & Safety Plan for all employees.

6.13 Report any accidents to the Owner's Field Representative and/or the MGP Site's Health & Safety Officer and cooperate with any subsequent accident investigation.

6.14 No children less than 16 years are allowed on Owner's Power Station Sites and/or MGP Sites.

6.15 Slow down and be extra cautious during times of poor weather (rain, fog, and snow).

6.16 Take extra care around blind corners (watch for construction equipment and pedestrians).

6.17 Smoking, eating, and/or drinking is permitted only in designated areas.

6.18 The transporter is responsible for properly decontaminating their truck and/or equipment.

D DETAIL OF WORK

1.0 The transportation for Sites in New York State will be divided into three (3) areas as follows (see drawing GB038191):

1.1 Area I will be for Sites located west of NYS Interstate I81.

Cities or Towns with MGP Sites and/or Division Service Centers (*)

Albion	Geneva *	Owego
Auburn *	Hornell *	Penn Yan
Binghamton *	Ithaca	Seneca Falls
Cortland	Lancaster *	Warsaw
Clyde	Lockport *	Palmyra
Dansville	Lyons	Waterloo
Elmira *	Newark	

Cities or Towns with Power Stations as destination

E. Corning - Hickling Station

1.2 **Area II** will be for Sites located east of NYS Interstate I81 and north of NYS Thruway Route 90.

Cities or Towns with MGP Sites and/or Division Service Centers (*)

Granville
Mechanicville *
Plattsburgh *

1.3 **Area III** will be for Sites located east of NYS Interstate I81 and south of NYS Thruway Route 90.

Cities or Towns with MGP Sites and/or Division Service Centers (*)

Brewster *	Oneonta *
Goshen	Walton *
Liberty *	Waterville
Norwich *	

Cities of Towns with Power Stations as Destination

Bainbridge - Jennison Station

E ATTACHMENTS

1. New York State Department of Environmental Conservation Order on Consent Index No. D0-0002-9309
2. Drawing Number GB038191
3. Occupational Safety And Health Guideline for Benzene
4. Occupational Health Guideline for Coal Tar Pitch Volatiles
5. Occupational Health Guideline for Naphthalene
6. Occupational Health Guideline for Phenol

APPENDIX G

QUALITY ASSURANCE PROJECT PLAN

FLUOR DANIEL GTI

NORWICH SITE REMEDIATION

FORMER MANUFACTURED GAS PLANT

QUALITY ASSURANCE PROJECT PLAN

#106reports/nyseg/0604qapp.197

1245 Kings Road / Schenectady, NY 12303 USA (518) 370-5631 FAX (518) 370-5864

QUALITY ASSURANCE PROJECT PLAN

Section **Page**

Attachments

1. Chain of Custody
2. Sample Identification Naming Convention
3. Pile Identification Naming Convention
4. Description of Analytical Services Protocol (AASP) Category B

1. PROJECT DESCRIPTION

An interim remedial measure (IRM) has been proposed for the Norwich former manufactured gas plant (MGP) facility (Site) located in the City of Norwich, Chenango County, New York. The IRM will be undertaken by the New York State Electric and Gas Corporation (NYSEG), owner of the Site. The work to be performed during the IRM is described in the *Phase III Interim Measures Work Plan (Work Plan)*, prepared by Fluor Daniel GTI, Inc.

The Site is currently owned by NYSEG and is an irregularly shaped parcel of land located in the central portion of the Village of Norwich. The Site is bounded by the Victory Market warehouse facility to the north, a NYSEG electrical substation and residences to the east, residences and the former Norwich Aero Products facility to the south, and railroad tracks and a day care center adjacent to a freight station to the west. The Site was used to manufacture gas for approximately 66 years, from 1887 to 1953. The Site is currently being used by NYSEG gas services department as a regulator station and gas operations center.

Phase I of the IRM has been completed by Atlantic Environmental Services. The components of this work included excavation and stockpiling of soils from a former distribution holder at the site, backfilling, and site preparation activities (i.e., site security measures, erosion and sedimentation control, clearing, and grubbing). The details of Phase I are presented in the *Norwich IRM Phase I Work Plan* submitted by NYSEG to Mr. Eric Obrecht, PE of the New York State Department of Environmental Conservation (NYSDEC), dated November 7,1994.

During Phase II operations, completed by Fluor Daniel GTI, MGP residual impacted soil, stockpiled during Phase I, was transported to Border City for processing, and was then transported to the Hickling Station unit for thermal destruction. This was accomplished by September 1996.

The Phase III IRM to be completed at the site will include the removal by excavation of additional source areas (a former relief holder and tar well, and associated piping) and general excavation of soil site-wide to meet an approved clean-up goal. Excavated MGP residue and soils will be processed and transported as nonhazardous waste to a properly-permitted NYSEG utility boiler unit for thermal treatment. Phase III is scheduled to be initiated in the winter of 1996, and will be completed by July of 1997.

2. PROJECT OBJECTIVES

The objectives for the Phase III IRM are to remove MGP residues from source areas at the Site and to achieve a site-wide clean-up goal of .1 ppm benzene/500 ppm polycyclic aromatic hydrocarbons (PAHs). This will include the removal by excavation of additional source areas (a former relief holder, tar well, and associated piping) and general excavation of shallow soils site-wide to the approved clean-up

goal. These materials will be processed at Norwich and then transported to a properly-permitted NYSEG utility boiler for thermal treatment.

3. DATA QUALITY OBJECTIVES

Measures will be taken to ensure that samples collected are representative of the sample population. The detection limits for selected analytical methods will meet the established clean up levels or regulatory limits. Precision and accuracy will be measured and documented using procedures established by the laboratories, The New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) and U.S. Environmental Protection Agency (EPA) approved analytical methods. Samples for site final cleanup verification will be reported with NYSDEC ASP Category B deliverables.

4. PROJECT ORGANIZATION STRUCTURE

NYSEG, New York State regulatory agencies, and a site management consultant (Consultant) will participate jointly in the remedial action for the Norwich Site. NYSEG is the Site owner and has the ultimate authority for establishing the scope of work for the project, and will also implement the community air monitoring program during the project. Communication with regulatory agencies and with members of the surrounding community will be managed by NYSEG.

NYSDEC and NYSDOH personnel are anticipated to be on-site periodically for purposes of general program oversight.

The Consultant is responsible for all on-site construction operations during the IRM. The Consultant is also responsible for the maintenance of non-construction personnel health and safety; ensuring that the remedial program is implemented in accordance with the *Work Plan*; management of the soil sampling program associated with the remedial action; and documentation of the extent of the removal action.

Air quality analyses will be conducted by Friend Laboratory, located in Waverly, New York. Residue/soil samples for confirmation and disposal acceptance will be analyzed by Galson Labs, located in Syracuse, New York.

5. SAMPLE COLLECTION

5.1 Soils

Soil samples will be collected as described in the appropriate section of the *Work Plan*. All sampling equipment will be properly disposed or decontaminated before being reused.

Soils destined for thermal destruction at a properly-permitted NYSEG utility boiler will be sampled and analyzed for acceptance criteria in accordance with the Sampling and Analysis Protocol for Acceptance of Coal Tar Site Residues at NYSEG's Generation Stations in Appendix C of the *Work Plan* and the *Sampling and Analysis Plan* for the site detailed in section 6.0 of the *Work Plan.*

Confirmation soil samples will be collected during excavation to ensure that soils and materials left onsite have met the established clean up levels of 500 parts per million (ppm) for total PAH and 0.1 ppm for total benzene. Sampling frequency will be in accordance with section 6.0 of the *Work Plan.*

5.1.1 Sampling Methodology

Soil samples will be collected in accordance with section 6.0 of the *Work Plan*. This section describes the sampling equipment and frequency. Samples will be collected and placed in pre-cleaned sample containers provided by the laboratory performing the analyses. All necessary preservatives will be added to the sample containers at the laboratory prior to being shipped to the site. Samples will be stored at 4 degrees Centigrade until delivery to, and analysis by the laboratory. This will be accomplished by utilization of an on-site refrigerator and/or coolers with ice.

5.2 Wastewater

Wastewater from site activities will be stored onsite win accordance with section 4.5 of the *Work Plan.* Samples of the wastewater will be analyzed to verify it is nonhazardous before being transported to the permitted NYSEG utility boiler selected to accept the wastewater for use as tempering water, or to another permitted facility for proper treatment and disposal.

5.2.1 Sampling Methodology

Wastewater will be collected from the "Frac" tank using a clean bailer or similar device. Samples will be transferred directly into collection containers supplied by the analytical laboratory. Samples will be stored at 4 degrees Centigrade until delivery to, and analysis by the laboratory. This will be accomplished by utilization of an on site refrigerator and/or coolers with ice.

5.3 Air Sampling

Air sampling will be conducted to measure time weighted averages for VOCs, PAH, and respirable particulates (PM_{10}). Samples will be collected for two days prior to construction activities as a baseline and each day of construction activity. A minimum of one set of air samples from a down wind sampling station will be analyzed per week.

5.3.1 Sampling Methodology

Samples for time weighted averaged air samples will be collected in accordance with section 5.3.5 of the *Work Plan.* An Anderson PM-10 High Volume sampler will be used to collect respirable particulates

samples on a 5um polyvinyl chloride. VOCs will be colleted on Carbotrap 300 multi-bed tube using a personal air sampler. Semivolatile samples will be collected using a personal air sampler. Semivolatile samples will be collected using a General Metal Works GPS1 PUF sampler, or equivalent, on cleaned quart fiber filters in combination with a PUF/XAD-2 sampling cartridge. All air pumps will be calibrated daily to ensure that the flow rates are within acceptable limits prescribed by the applicable platforms approximately 5 feet from the ground. Sampling locations are shown in Figure 5-1 of the *Work Plan*. These locations will be adjusted based on meteorological data collected at the site. Air samples will be stored four degrees Centigrade until they are delivered to the laboratory for analysis.

5.4 Sample Containers and Preservatives

Sample containers and preservatives will be provided by the contracted laboratories and stored on site in the construction headquarters. Sample containers and preservatives by matrix and analysis are listed in the table below.

Analysis	Matrix	Container	Preservative
TCLP Semivolatiles	Soil	500 ml glass*	4 degrees C
TCLP Metals	Soil	500 ml glass*	4 degrees C
TCLP Pesticides/Herbicides	Soil	500 ml glass*	4 degrees C
Reactive Cyanide	Soil	500 ml glass*	4 degrees C
TCLP Volatiles	Soil	20 ml glass	4 degrees C
Total PAHs	Soil	250 ml glass	4 degrees C
Total Benzene	Soil	20 ml glass	4 degrees C
Total Metals	Soil	250 ml glass	4 degrees C
Total Metals	Water	500 ml plastic	HNO_3 to pH < 2
Semivolatiles	Water	1000 ml amber glass	4 degrees C
Pesticides/Herbicides	Water	1000 ml amber glass	4 degrees C
Volatiles	Water	40 ml glass	4 degrees C
BTU/lb	Soil	250 ml glass**	4 degrees C
Percent Sulfur	Soil	250 ml glass**	4 degrees C

* May be analyzed from same sample container and/or extract.
** May be analyzed from same sample container.
Note: All glass containers will be sealed with Teflon lined caps. All water samples for organic fractions will be collected in duplicate.

5.5 Sampling Protocols and Quality Control

The following identifies estimated number of samples by type and matrix, holding times, analytical protocols, and the number of Quality Control (QC) samples that will be collected for each sample group.

Acceptable Soil Samples

Sample Type	Estimated Samples	Matrix	Holding Time*	Analytical Protocol	QC Samples
TCLP Pest./Herb.	4	soil	14 days	***	**
TCLP Semivolatiles	5	soil	14 days	***	**
TCLP Mercury	9	soil	28 days	***	**
TCLP Metals	9	soil	180 days	***	**
TCLP Volatiles	5	soil	14 days	***	**
Reactive Sulfide	5	soil	7 days	***	**
Reactive Cyanide	5	soil	28 days	***	**
Total Benzene	30	soil	7 days	***	**
Total Metals	30	soil	180 days	***	**
Percent Sulfur	5	soil	28 days	***	**
BTU/Lb.	5	soil	28 days	***	**

* Samples will be analyzed and reported within 48 to 72 hours during excavation. Preremediation samples will be analyzed and reported within 14 days.

** All sample groups will be accompanied by a trip blank. Matrix spike and matrix spike duplicate samples will be analyzed in accordance with ELAP protocols.

*** See Chart in Section 8.1

Wastewater Samples

Sample Type	Estimated Samples	Matrix	Holding Time*	Analytical Protocol	QC Samples
TCLP Semivolatiles	2	water	7 days	***	**
TCLP Mercury	2	water	28 days	***	**
TCLP Metals	2	water	180 days	***	**
TCLP Volatiles	2	water	14 days	***	**

* Samples will be analyzed and reported within 48 to 72 hours during excavation. Preremediation samples will be analyzed and reported within 14 days.

** All sample groups will be accompanied by a trip blank. Matrix spike and matrix spike duplicate samples will be analyzed in accordance with ELAP protocols.

*** See Chart in Section 8.1

Confirmatory Samples

Sample Type	Estimated Samples	Matrix	Holding Time*	Analytical Protocol	QC Samples
PAHs	14	soil	7 days	***	4**
Total Benzene	14	soil	7 days	***	4**

* Samples will be analyzed and reported within 48 to 72 hours during excavation. Preremediation samples will be analyzed and reported within 14 days.

** Duplicates, matrix spike and matrix spike duplicate samples will be collected at a rate of four for the first fourteen confirmatory samples then ten percent for additional samples.

*** See Chart in Section 8.1

6. CHAIN OF CUSTODY

6.1 Holding Times

Since the samples will be analyzed at priority turn around, no exceedances of holding time are expected. Holding times will be calculated from the time the sample is collected to the subsequent extraction, if necessary, or analysis. All samples will be delivered to the laboratory by same day carrier or overnight delivery in sealed coolers.

6.2 Chain of Custody

All samples will be accompanied by a chain of custody from the point of sampling to delivery of the samples to the laboratory. The Chain of Custody will be a record of the location where the sample was collected, the date and time collected, number of containers collected, type(s) of analyses requested, special remarks, and the signature of each custodian of the samples. The completed chain of custody will be included in all hard copies of reports. See Attachment 1 for a sample of a typical Chain of Custody Form.

6.2.1 Sample Identification

Each sample collected during the project will have a unique identification number. This number, date of collection and type of analysis will be placed on each sample container after the sample is collected. See Attachment 2 for sample identification naming convention for air, water and confirmatory samples. A Site map will be used throughout the project to denote the area / point that the sample represents. Attachment 3 is the Pile identification numbering convention for acceptance sampling. Each confirmatory sample will be assigned a sample point number which will appear as characters 9 & 10.

6.3 Laboratory Sample Tracking

Each laboratory has an internal tracking mechanism to ensure that each sample received has a unique identification number and that results generated and reported for each sample correspond to the identification number assigned at the laboratory.

7. CALIBRATION PROCEDURES

Each analysis will be performed in accordance with U.S. EPA analytical procedures. Each procedure specifies the method and frequency of calibration necessary to perform accurate and precise analyses. Each analytical instrument verifies the Minimum Detection Limit at least every six months as prescribed by the NYSDOH Environmental Laboratory Approval Program (ELAP). The calibration of the instruments are verified at the beginning and end of each auto sampler run. Gas Chromatograph/Mass Spectrometers are tuned and calibrated every 12 hours, at a minimum.

All field equipment, for real time air analyses will be calibrated daily, in accordance with manufacturer's recommendations. All equipment will be calibrated more frequently if conditions warrant. The HNu meter used to measure Volatile Organic Vapors will be calibrated to a benzene standard. The Mini Ram used to measure particulates will be calibrated to zero with filtered air. Equipment used for time weighted air monitoring will be calibrated at the beginning of each sampling event. The calibration will be verified at the conclusion of each sampling run.

8. ANALYTICAL PROCEDURES

8.1 Laboratory Analyses

The following chart shows the analytical method to be used for each analyte or group of analytes for the IRM Project:

Analyte	Analytical Method
PAH in air	TO-13
VOCs in air	TO-2
Respirable Particulates	PM_{10}
TCLP Extractions	SW 846 Method 1311
Volatile Organic Compound	SW 846 Method 8240A

Analyte	Analytical Method
Polycyclic Aromatic Hydrocarbons	SW 846 Method 8270A
Metals	SW 846 Method 6000/7000 Series
TCLP Pesticides/Herbicides	SW 846 Method 8080/8150
BTU/pound	ASTM D-215-77
Percent Sulfur	ASTM D-1552-64
Reactive Sulfide	SW 846 Chapter 7.3.4.2
Reactive Cyanide	SW 846 Section 7.3.3.2
TCLP Semivolatiles	SW 846 Method 8270A
TCLP Volatiles	SW 846 Method 8240A

8.2 Laboratory Selection

Laboratories that will provide analytical services for this project where selected through a competitive bidding process. Only laboratories that have experience in coal tar projects or similar projects where sent Requests for Proposals. Laboratories were further evaluated on their geographic location in respect to the Norwich Site, due to the important nature of rapid turnaround of analytical results. Friend Laboratory was selected to do the time weighted average air analyses. Galson Laboratory was selected to do the balance of analyses for this project. Before awarding contracts, both laboratories were visited by a NYSEG employee, knowledgeable about analytical chemistry and laboratory management, to ensure that the laboratories had internal mechanisms, protocols, sample tracking capabilities, quality assurance/quality control, analytical instrumentation, and personnel capable performing the scope of work necessary for a successful project.

9. DATA REDUCTION VALIDATION AND REPORTING

9.1 Data Reduction

9.1.1 Field Data Collection and Reduction

Real time field data collected during sampling events will include qualitative information regarding the texture, appearance, odors, and any other observations made while samples are being collected and

stored for transport to the analytical laboratory. These observations will be recorded in the field log book.

9.1.2 Laboratory Data Collection and Reduction

The nature of the analyses being performed for this project, with the exception of reactive cyanide and respirable particulates, require the use of automated instrumentation. Raw data collected from the instruments detectors will be converted to standard units of mg/Kg for solid matrices, mg/L for water, and mg/m^3 air matrices. All raw data will be stored in electronic form and in laboratory notebooks, in case the analysis needs to be recreated. Raw data for all analyses will be archived for a minimum of four years.

9.2 Data Validation

All analytical data will be verified for precision and accuracy utilizing the laboratory's in house Quality Assurance/Quality Control programs. In addition, all data packages will be reviewed by NYSEG's Quality Assurance Officer for acceptability. The project quality assurance officer will evaluate the laboratory data and prepare a Data Usability Summary Report (DUSR) according to NYSDEC guidelines. Acceptance data for the permitted NYSEG utility boiler, selected to accept waste shipments, will be certified by a Professional Engineer licensed to practice in the State of New York.

9.3 Reporting

Final reports for analytical data will be reviewed and accepted by the Consultant and NYSEG prior to submission to the NYSDEC. Reports for analyses performed under the ELAP protocol will contain relevant information including:

- Results sheet for each sample analyzed which must include as a minimum:
- Sample ID number
- Analytical method
- Extraction or digestion date (if applicable)
- Date Analyzed
- Analytical results
- Results of laboratory blank and field blanks
- Percent recoveries of matrix spike, matrix spike duplicates, and matrix spike blank samples
- Completed Chain of Custody forms
- Field log sheets

A validation report will be prepared for confirmatory sample results. A useability report will be prepared for all sample results. These reports will identify deviations from the appropriate sampling, analytical, and reporting protocols.

10. INTERNAL QUALITY CONTROL CHECKS

10.1 Field Quality Control

To ensure that volatile contaminants are not introduced into samples as a result of field activities and shipping, a trip blank, consisting of deionized water in a sealed sample container will accompany air sample groups to the laboratory. Sampling equipment rinsate using deionized water will be submitted for each sampling day. Soil samples, suspected to be contaminated which are left on site, will be collected and analyzed in accordance with ASP Category B protocol.

10.2 Laboratory Quality Control

Each laboratory is ELAP Certified for the analyses they will perform. Each analyst must complete a start-up proficiency procedure to demonstrate their capability to perform accurate and precise analyses on each type of instrument they operate. In addition each laboratory must accurately analyze samples provided by NYSDOH on a semi annual basis to remain certified. The laboratories have internal Quality Control Officers that review all methodologies and implement corrective action, including reanalyzing samples which do not pass established Quality Control/ Quality Assurance criteria. Matrix spike samples, matrix spike duplicate samples are analyzed with each analytical group.

11. PREVENTATIVE MAINTENANCE

11.1 Laboratory Maintenance

Each laboratory has a maintenance protocol which includes procedures for daily, weekly, and monthly routine maintenance. In addition, maintenance is performed if the accuracy and/or precision of the instrument is in question.

12 DECONTAMINATION PROCEDURES

12.1 Confirmation Sampling

The following decontamination procedure will be followed for all non-disposable sampling equipment before being reused.

- Equipment will be wash thoroughly with a non-phosphate detergent.
- The equipment will then be rinsed with deionized (DI) water.
- The equipment will be rinsed with a pesticide-grade methanol solution diluted with deionized water.
- If the equipment is being used for the collection of samples for metals analyses it will then be rinsed with a 10% ultra-pure grade nitric acid solution.
- The equipment will be rinsed with DI water.

After decontamination equipment will be carefully stored to avoid contamination between sampling events.

12.2 Acceptance Sampling

Sampling equipment for confirmatory sampling will undergo the decontamination procedure detailed above between piles.

ATTACHMENT 1

CHAIN OF CUSTODY

ATTACHMENT 2

SAMPLE IDENTIFICATION NAMING CONVENTION

ATTACHMENT 3

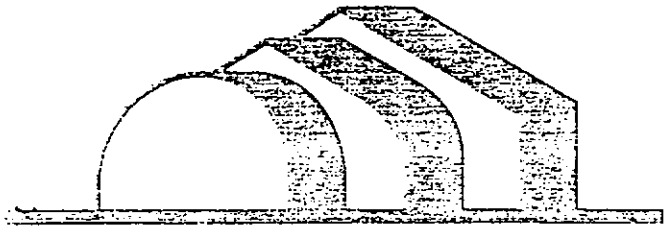
PILE IDENTIFICATION NAMING CONVENTION

ATTACHMENT 4

DESCRIPTION OF ASP CATEGORY B

APPENDIX H

CATALOG CUTS



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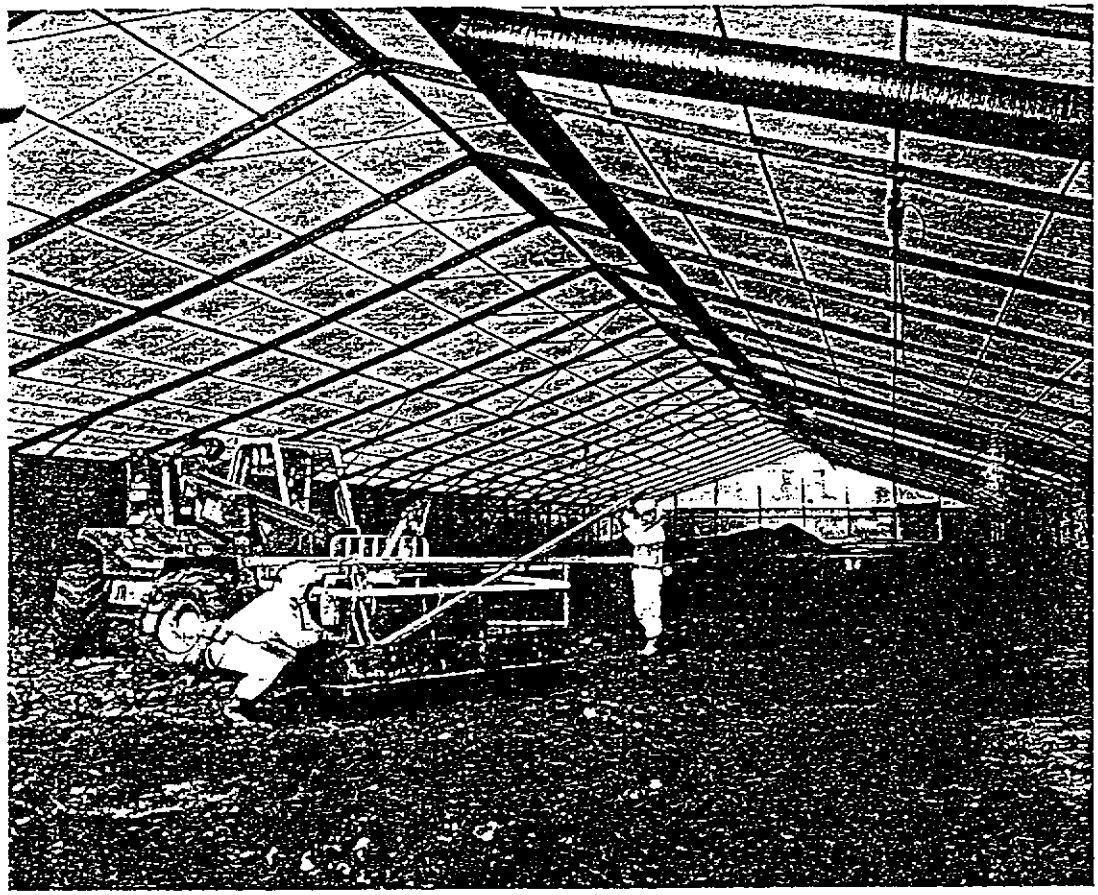
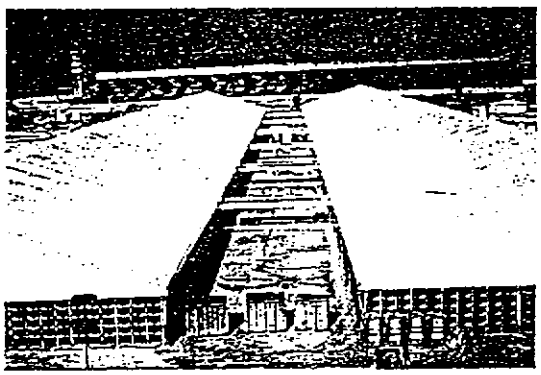
THE UNIVERSAL ENVIRONMENTAL ADVANTAGE



Universal's Series of relocatable structures are designed and engineered to meet the most stringent requirements of the hazardous waste, remediation and storage industries.

Universal Fabric Structure, Inc.'s state-of-the-art, semi-permanent structures have been in place, field tested and proven for many years at locations in over 35 countries. Because we offer structures in a variety of widths, lengths and designs, we are able to service a wide variety of environmental and industrial applications and to meet the rugged requirements of remediation companies worldwide.

The Universal structure features an aluminum and/or composite metal framework which supports a durable all- weather PVC membrane designed to keep the weather out and the contaminants in. Its unique design is virtually maintenance-free and modular, allowing easy re-configuration and meeting building and fire codes worldwide.



Two 132' x 600' storage structures

At an installation rate of 5,000 to 15,000 square feet per day, and with most sizes available from inventory, Universal shelters can be up and operational in a matter of days from order.

Other features include:

- one or two full width mechanically operated equipment doors
- the ability to withstand hurricane strength winds, heavy snow loads and desert or arctic climates
- adherence to ISO9000 and/or MIL-I 45208A Quality Standards
- an optional inner liner which is easily decontaminated or discarded
- no footings or foundations required

Universal's commitment to continued research and development, coupled with a computer aided manufacturing process, assure all clients that every Universal shelter will be of consistent quality at a competitive price.

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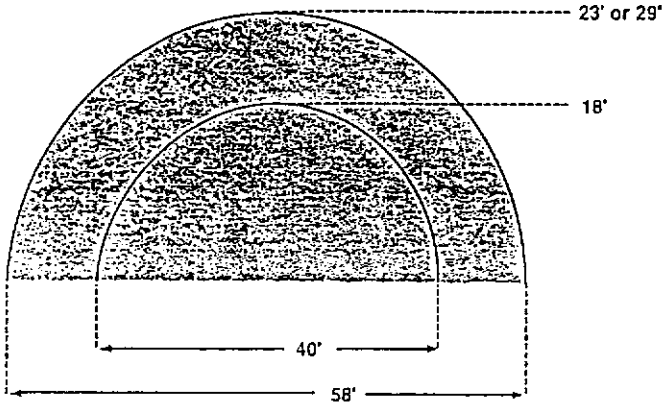
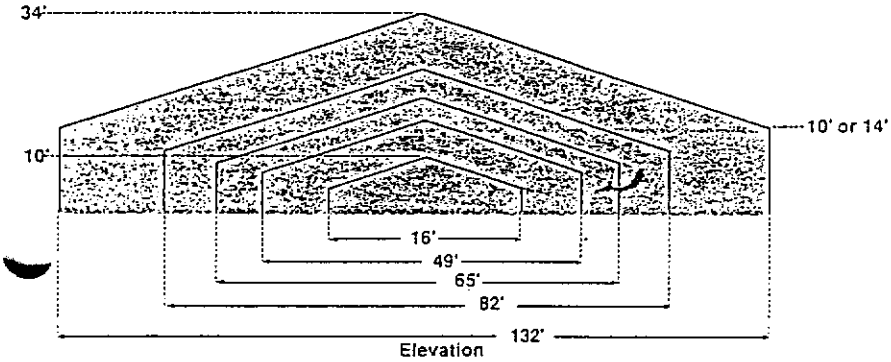
Enclosures

RS Series



Elevation

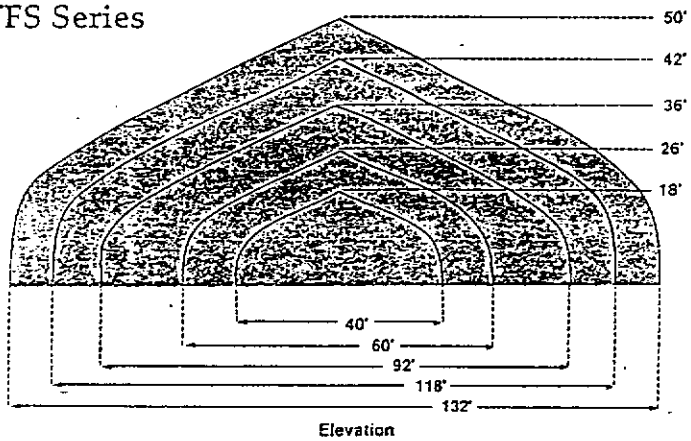
AH Series



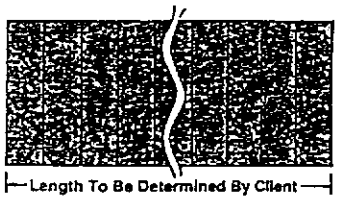
Elevation

Widths also available in 32',98' and 200'

TFS Series



Elevation



Length To Be Determined By Client

Consider The Universal Advantages:

COST

- Less expensive than conventional buildings
- Lower operating costs-
- The lowest installation and transportation costs of any shelter
- Lease or purchase options available

SAFETY

- Engineered to meet building codes
- Meets California Fire Marshall, NFPA 701 & UL214 Fire Safety

SIZES

- Available in any length by adding modules
- Custom widths from 16' to 200' (5M to 60M)
- Interchangeability of components
- Eave and peak height to suit client.

OPTIONS

- Equipment, cargo, and personnel door available in many sizes
- Complete electrical & lighting packages
- Complete HVAC packages
- Insulation and decontamination liners
- Flat gable ends
- Rail and aerial lift systems to cover larger areas
- Length expansion kits
- One-use disposable PVC membrane panels
- Translucent fabric for working daylight

AVAILABILITY

- Most sizes available from inventory
- Installation rates from 5,000 to 15,000 sq. ft. (46 M^2 to 1,395 M^2) per day

Quality shelter solutions. . .*worldwide!*

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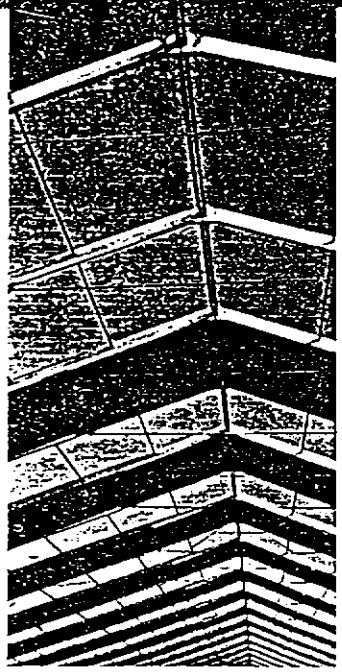
THE UNIVERSAL ADVANTAGE

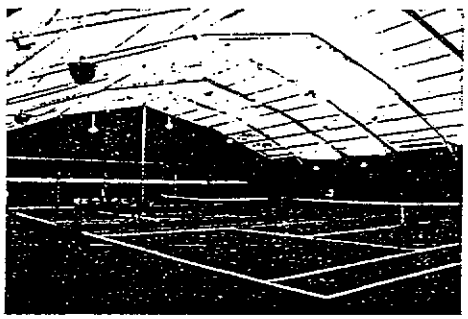


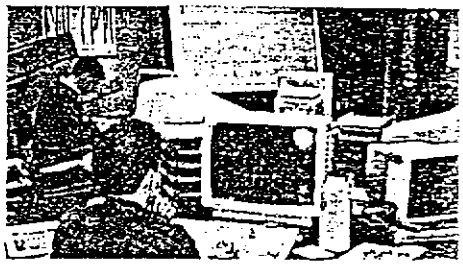
Through quality and service we are building our future.

Since the beginning of civilization, mankind had used the tent for every conceivable shelter need and through time, little has changed in its design or function. Today a new concept in shelter is evolving – Pre-Engineered Fabric Structures. Designed to quickly and economically provide shelter on a temporary or permanent basis, these innovative, relocatable fabric structures are the world's newest shelter alternative.

Established in 1983, Universal Fabric Structures, Inc. was one of the first US firms to market these new building systems, and over the past decade the company has played a major role in developing this new technology.

Today, Universal is proud to offer the most complete line of fabric structures available in North America. Through our *Advantage Universal Program*, pre-engineered, relocatable, clear span fabric structures are now available from inventory to satisfy any shelter requirement.





In co-operation with Europe's premier fabric structure company, Georges Veldeman, NV, Universal has consolidated its research and development, engineering, and fabrication processes to offer our clientele the following key competitive benefits:

1. The most *technically advanced pre-engineered fabric structures* available, designed in adherence to strict international engineering standards and codes.
2. The most *competitive pricing*.
3. An industry-leading *quality assurance program* combined with state-of-the-art *computer aided design and manufacturing (CAD/CAM)*, ensuring the industry's highest standards of excellence.
4. Unparalleled *worldwide service and support* throughout Europe, North America, Australia and the Far East.

In conjunction with our network partners, the *Advantage Universal Program* also offers:

- Over 10 different styles of fabric structures from 5' to 132' wide.
- Modular designs for easy extensions.
- Rental or lease plans.
- Full engineering services.
- Complete project management from inception and design to fabrication, installation and service.
- Extended warranties.
- Worldwide service.

To rent, lease or purchase a temporary or semi-permanent shelter, call us about our *Advantage Universal Program*. We guarantee the solutions you are looking for.

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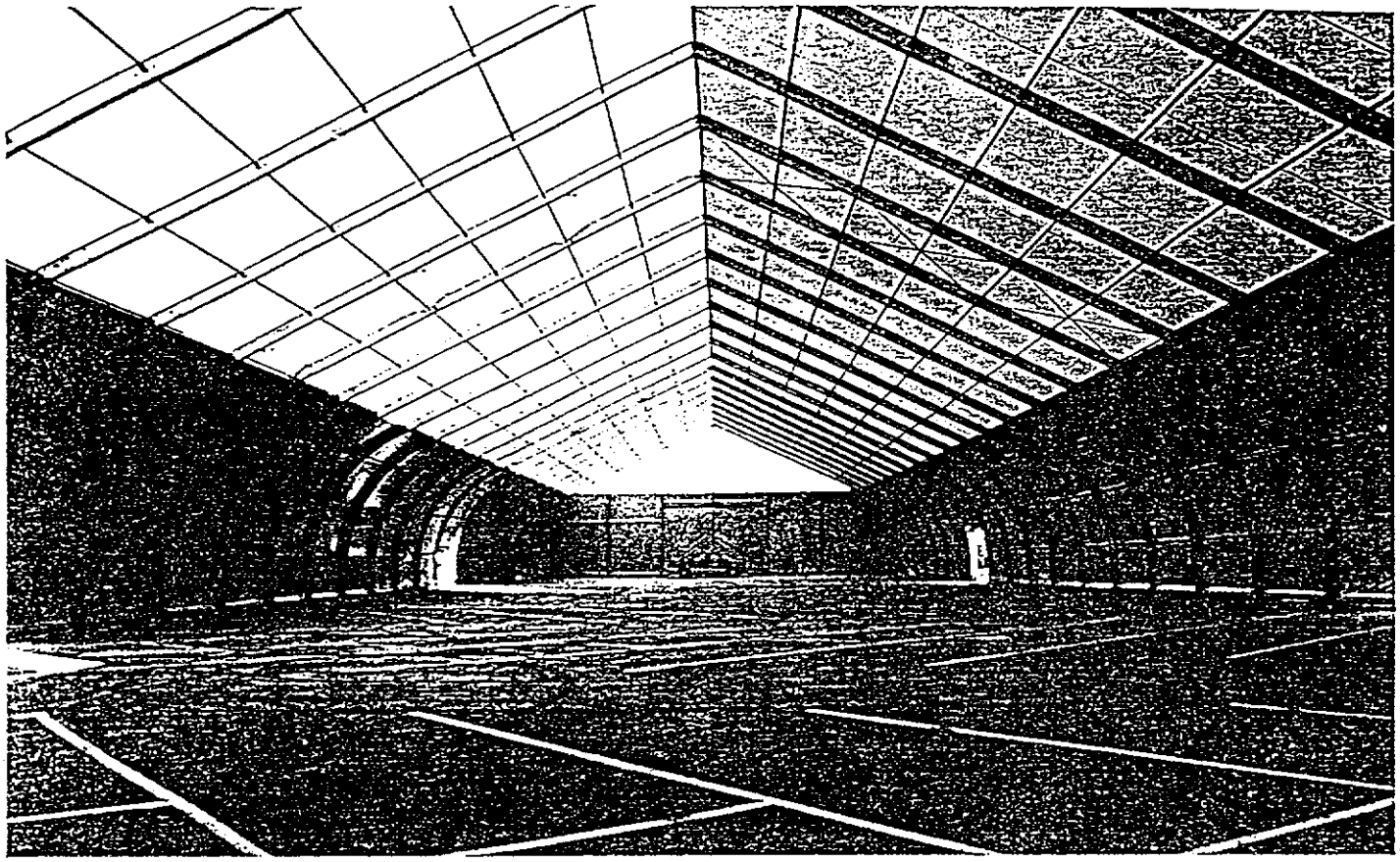
TFS SERIES



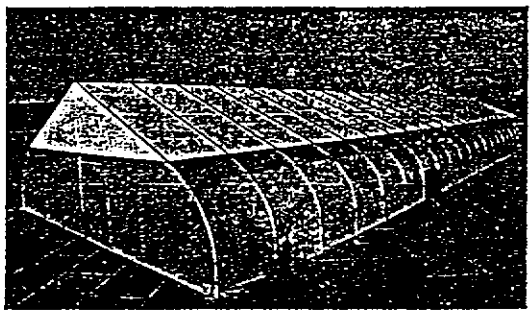
The TFS Series of structures is Universal's elite product line – designed primarily for use in extreme climates as well as most semi-permanent applications.

Universal is proud to present the TFS System, the newest design in the growing list of pre-engineered fabric structures available from Universal Fabric Structures, Inc.

Having proved its viability under the most severe conditions, the TFS Series has been designed and engineered using the principle of the peaked Arch profile.

To improve on this existing frame technology, the TFS Series incorporates a unique aluminum truss. This box style extrusion with curved wall provides the TFS beam with more strength than standard box extrusions or I-beams, and allows for internal frame supports to be inserted inside any section of the beam for added strength. The skin of the structure is tensioned in both horizontal and vertical directions to create a clean, taut finish, and the inner fabric channel readily accepts liners and insulation packages.

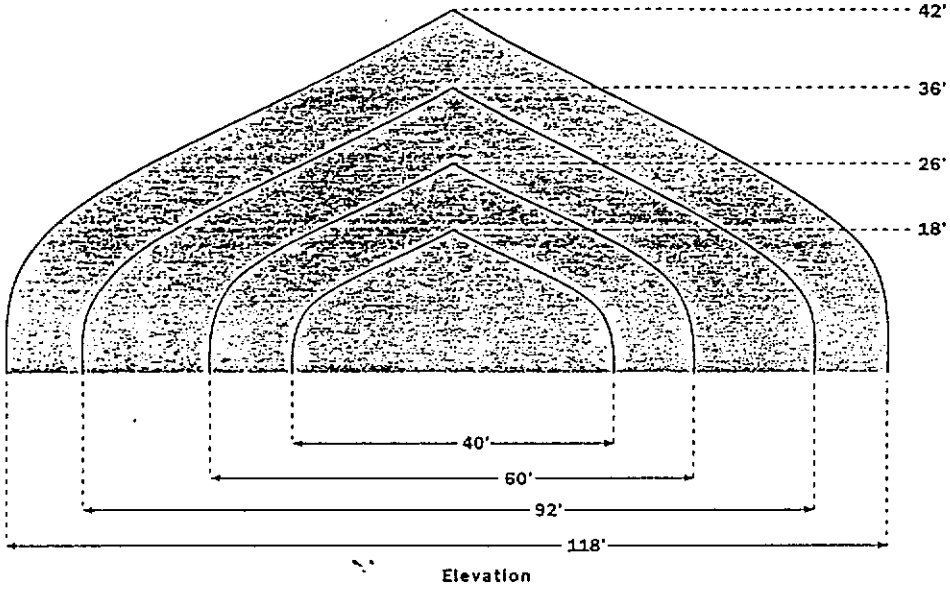
The TFS Series comes in standard widths of 40', 60', 92' and 118', and custom widths are available on request. Snow loading is standard at 35 lbs per square foot (GSL) and windloading meets with most codes. The superior design of the TFS lends itself to a multitude of uses, ranging from military and hazardous waste to exhibition and recreational applications. For quality, value and strength, the TFS meets every need.



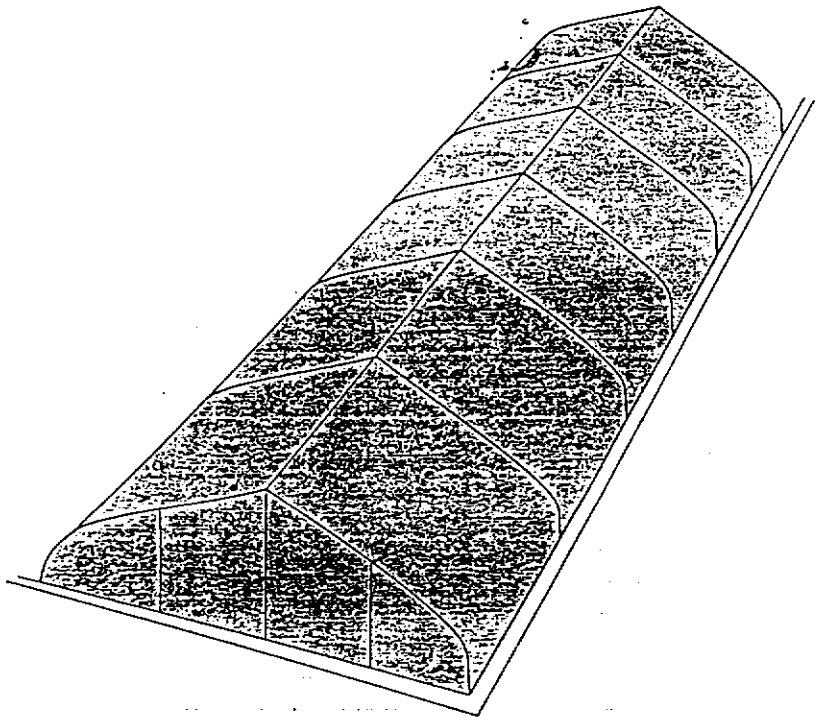
The TFS Series is quickly erected and dismantled, and can meet any temporary or permanent shelter need.

UNIVERSAL
FABRIC STRUCTURES

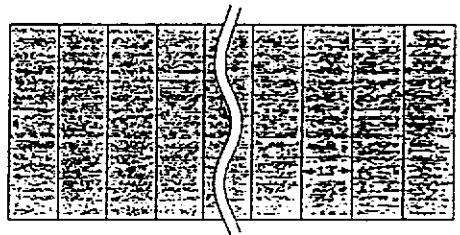
TFS SERIES



Elevation


Isometric View

- Rent or purchase...*worldwide!*
- Width – 40'-118'
- Length – Indefinite (13' modules)
- Height – Approximately 45% of width
- 100% relocatable
- Unobstructed freespan space
- Flat or round ends
- Snow load 35 lbs. per square foot (GSL)
- Wind loads 90 miles per hour
- No footings required for 60' width or less
- Installation rate of 5,000 square feet per day. Faster if required
- Aluminum frame
- 10-12 Year fabric life
- Flame retardant
- Maintenance free
- Can be environmentally controlled in any climate
- Available from inventory
- 15,000 square feet in a single container
- Five year warranty



Quality shelter solutions...*worldwide!*

UNIVERSAL
FABRIC STRUCTURES

1-800-634-8368

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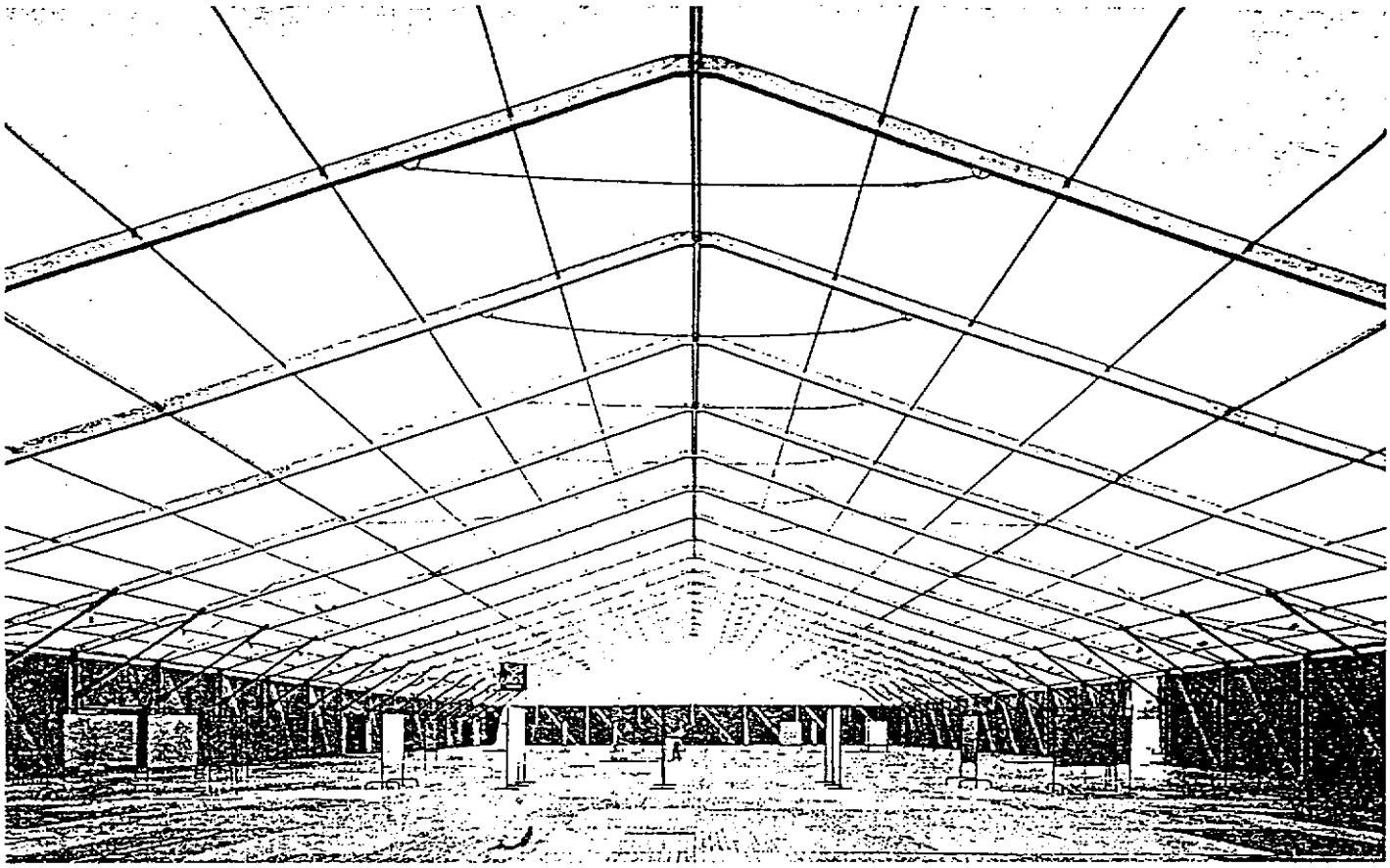
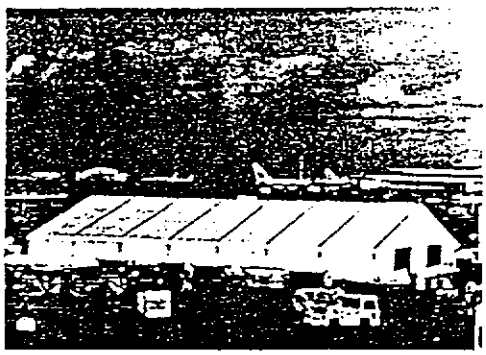
SERIES



The AH Series of structures, more commonly referred to as Aluminum Halls, are the work horse of the Universal line.



This 10,000 sq. ft. AH Warehouse was installed in a single day and functions as an integral part of the United Airlines Cargo expansion at San Francisco International Airport.

Engineered and fabricated in Europe by Georges Veldeman NV, the AH Series has been designed to provide industry with a durable, safe and economical solution to temporary shelter needs.

The AH Series is constructed from anodized aluminum beams integrally connected to a PVC coated polyester membrane roof. Built in modules of 16' (5m) the structure can be of any length based on a series of widths ranging from 15' to 132'. Eave heights are either 10' or 14' and the walls can be constructed of fabric or fiberglass hard panels.

Originally conceived for use in the Tent Rental Industry, these structures can be installed faster than any other building system available. With erection speeds of up to 10,000 square feet per day with only a five man crew, no other system comes close. In addition, most sizes do not need cranes, reducing the installation costs even further and none of the structures require footings or foundations.

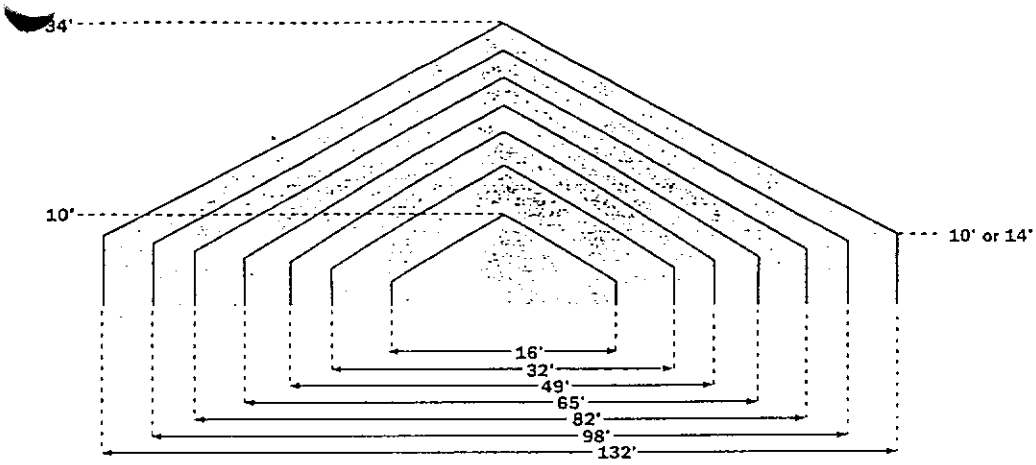
To complete the project, the AH Series offers a host of accessory options. From hardwall panels, two story structures and cargo doors, to glass walls and subfloors—nothing can compare.

Ideal for temporary or semi-permanent shelter needs where speed of installation or relocation is essential this high quality building system meets any need.

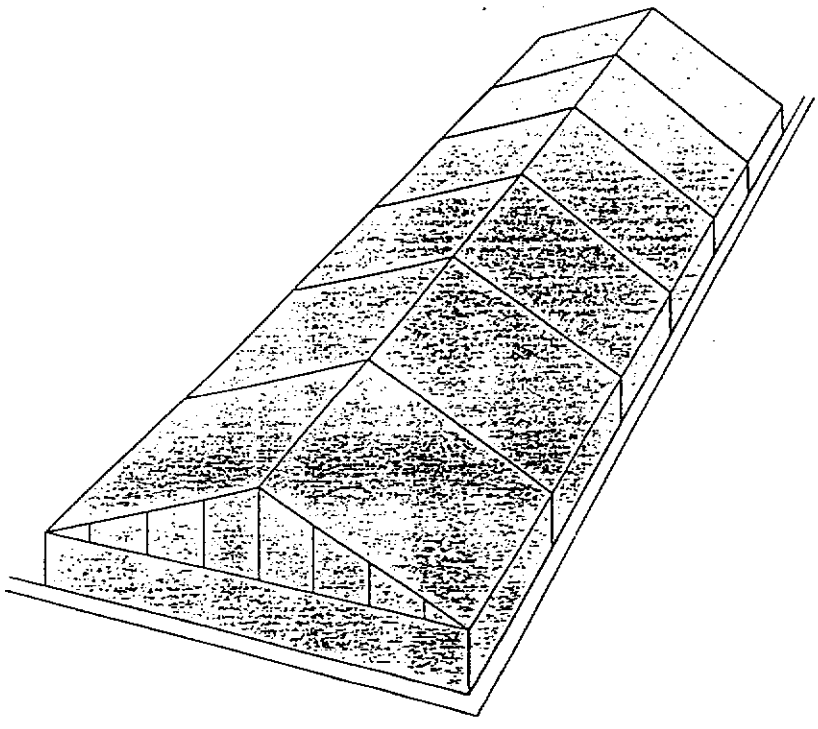
UNIVERSAL
FABRIC STRUCTURES

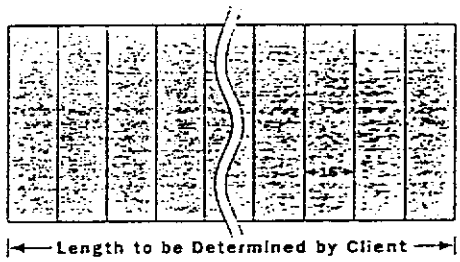
AHS-
ALUMINUM HALL SERIES

- Rent or Purchase...*worldwide!*
- Width – 16'-132'
- Length – Indefinite (16' modules)
- 100% relocatable
- Unobstructed freespan space
- Rectangular floor plan for optimum usable space
- Snow load 10 lbs. per Sq. Ft.(GSL)
- Wind loads 70 MPH
- No footings required
- Installation Rate – 10,000 Sq. Ft. per day. Faster if required
- Anodized Aluminum components
- Flame retardant fabric
- Maintenance free
- Can be environmentally controlled in any climate
- Most sizes available from inventory
- Thermal insulation liners available
- 15,000 square feet in a single container
- Box beam construction
- Five year warranty



Elevation


Isometric View



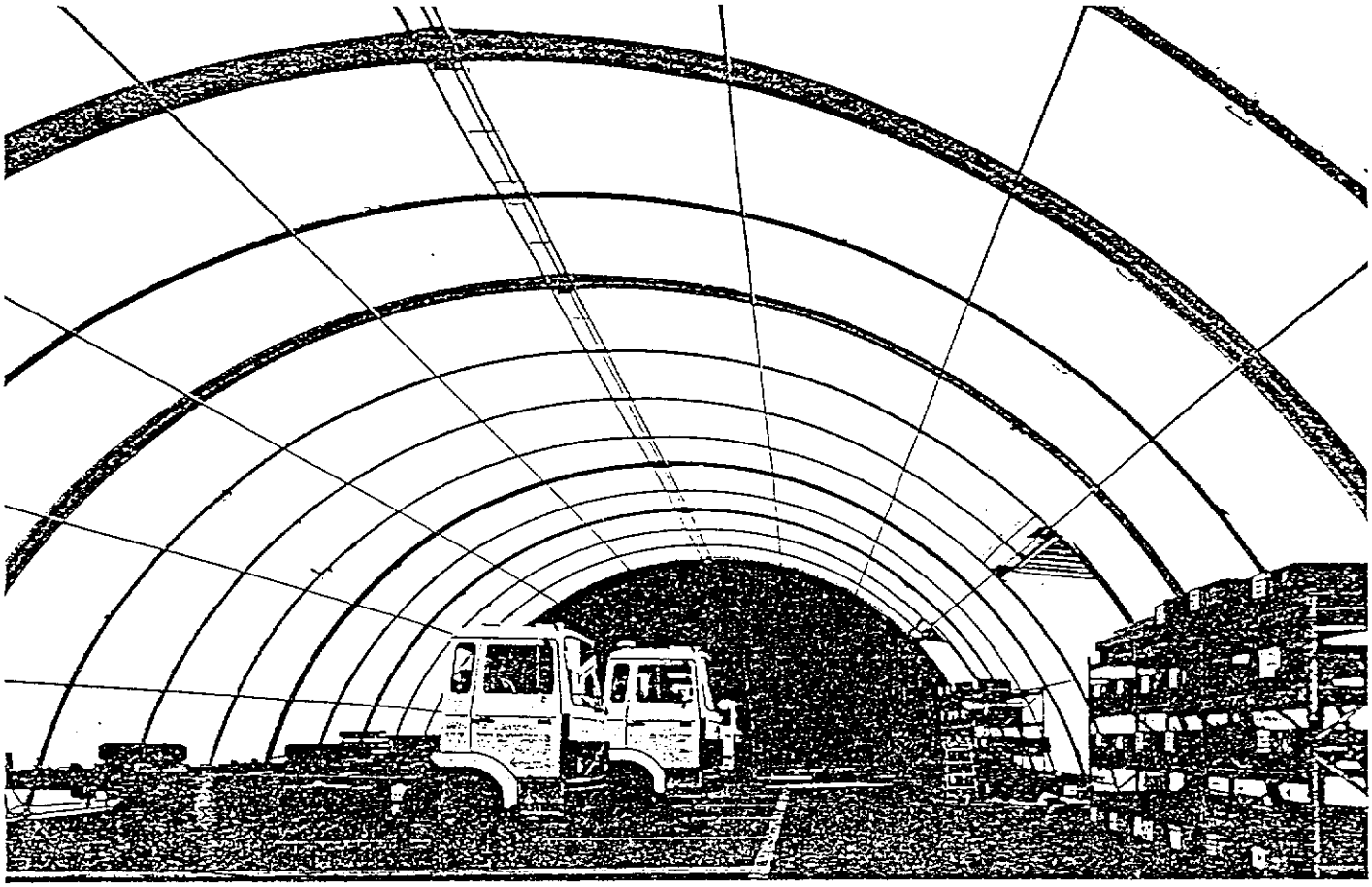
Quality shelter solutions...*worldwide!*

UNIVERSAL FABRIC STRUCTURES

1-800-634-8368

Universal reserves the right to change specifications without notice.

RS SERIES

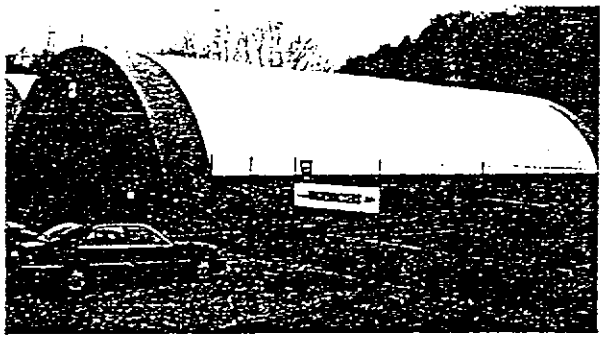


The RS Series or Roundspan structures are Universal's basic line of shelter systems.

These structures, although limited in scope, offer industry the most economical solution to enclosed space, while maintaining our reputation for high quality pre-engineered fabric structure products.

The RS Series of structures is constructed from curved hot dipped galvanized steel framework, integrally connected to a PVC coated polyester membrane roof. Built in modules of 7.5', this unique structure can be of any length based on a series of widths ranging from 40' to 60'.

The fabric roof is constructed in one piece, insuring an impermeable skin attached to full size gable ends. Doors can be inserted anywhere in the frame for either truck or personnel access and a wide variety of optional accessories are available.



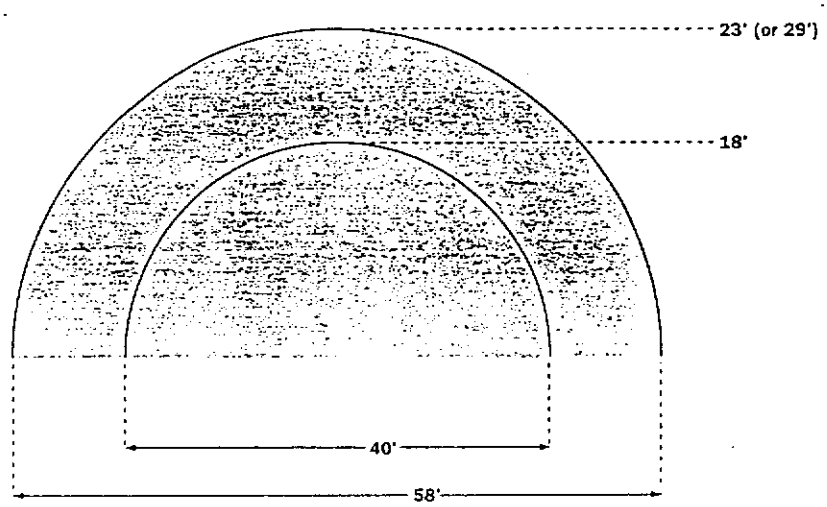
Ideal for truck maintenance or general storage, the RS Series offers the construction industry a simple, cost effective warehousing alternative.

Designed primarily for temporary or semi-permanent industrial warehousing applications, this cost effective structure system can meet most municipal and local codes and requires little or no ground preparation.

Supporting wind loads of 80 miles per hour and shedding snow, the Roundspan structures are functional in any climate.

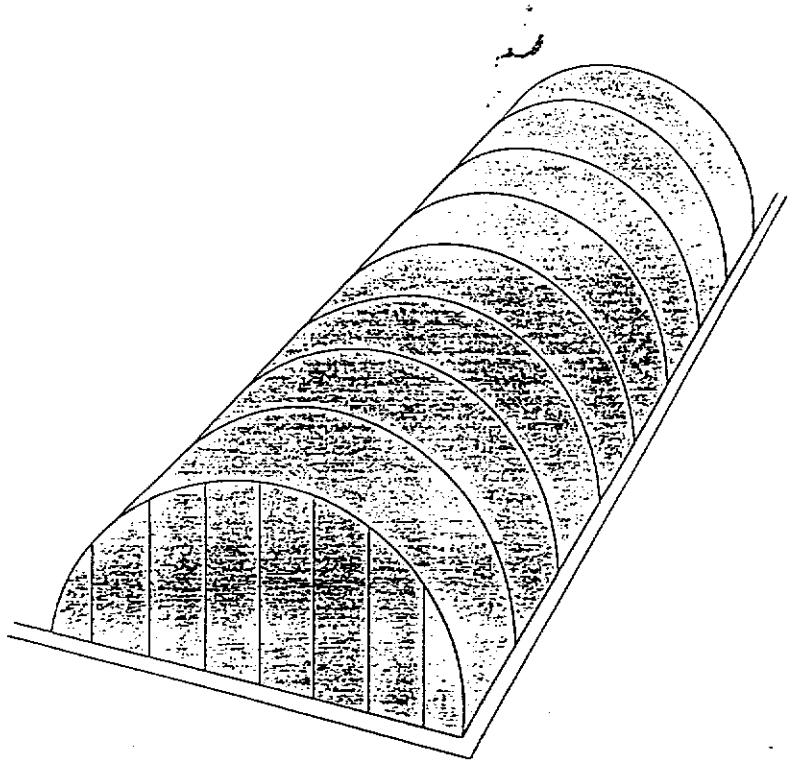
UNIVERSAL
FABRIC STRUCTURES

RSS ROUNDSPAN SERIES

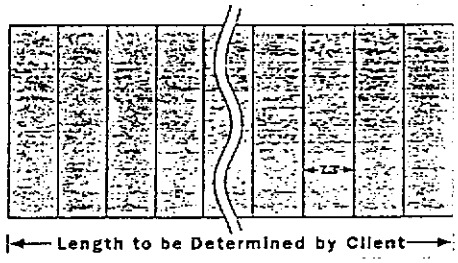


Elevation

- Rent or purchase...*worldwide!*
- Width – 40'-60'
- Length – indefinite (30' sections)
- Height – 18' to 29'
- 100% relocatable
- Unobstructed freespan space
- Rectangular floor plan for optimum usable space
- Snow load – Structure sheds snow
- No footings required
- Installation rate 2,000 square feet per day. Faster if required
- 30 Year galvanized steel components
- 10-12 Year fabric life
- Flame retardant
- Maintenance free
- Can be environmentally controlled in any climate
- Most sizes available from inventory
- Thermal insulation liners available
- 15,000 square feet in a single 40' container
- Five year warranty



Isometric View



Quality shelter solutions...*worldwide!*

UNIVERSAL FABRIC STRUCTURES

1-800-634-8368

Universal reserves the right to change specifications without notice.

PORTEC

Environmental Products

SCREENING PLANTS

KOLBERG MODEL 271 SHOWN

MULTIPLE APPLICATIONS

- TOP SOIL
- NURSERY
- AGLIME
- COMPOST
- REMEDIATION
- SAND & GRAVEL
- SLUDGE PROCESS
- RECYCLED ASPHALT
- LANDFILLS
- CLAY
- PEAT
- COAL
- ASH

SCREENING PLANTS WITH FLEXIBILITY

FEATURES AND COMPARISONS

Features	Model 251	Model 271	Series 26	Model 291
HOPPER FEEDER:				
Heavy Duty Grizzly	Manual sloped	Hydraulic sloped	Hydraulic horizontal	Hydraulic sloped
Clear opening	4 3/4"	5 1/2"	6"	5 1/2"
Self-relieving Hopper	6.5 cu yd 3/16" plate steel	9 cu yd 3/16" plate steel	12 cu yd 1/4" plate steel	12 cu yd 3/16" plate steel
Belt feeder	n/a	30" x 9'6"	30" x 10'	42" x 12'
Belt feeder speed(s)	n/a	variable speed	variable speed	variable speed
Shredder	n/a	Tine or mill Hydraulic open/close	Mill	Mill Hydraulic open/close
Tons Per Hour-typical. Note, actual TPH will vary based on feed rates, screen cloth size and material conditions.				
Sand & Gravel (1 1/2" x 0)	up to 200	up to 350	up to 400	up to 650
Soil	Not applicable	up to 250	up to 200	up to 550
CONVEYOR:				
Width/Length	30" x 40'	30" x 40'	30" x 50'	42" x 43'
Troughing idlers	35 degree CEMA B, 5" dia, 4' centers	35 degree CEMA B, 5" dia, 4' centers	35 degree CEMA B, 5" dia, 4' centers	35 degree CEMA B, 5" dia, 4' centers
Return idlers	CEMA B, 5" dia, steel, 10' centers	CEMA B, 5" dia, steel, 10' centers	CEMA B, 5" dia, steel, 10' centers	CEMA B, 5" dia, steel, 10' centers
Take-ups	HD screw type w/covers	HD screw type w/covers	HD screw type w/covers	HD screw type w/covers
Belt cleaners	Positive cleaners w/spring tensions	Positive cleaners w/spring tensions	Single blade, spring tensioned	Positive cleaners w/spring tensions
Head pulley	Rubber lagged	Rubber lagged	Rubber lagged	Rubber lagged
Tail pulley	Self cleaning wing	Self cleaning wing	Self-cleaning wing	Self-cleaning wing
VIBRATING SCREEN:				
Screen	4' x 8', 2 Decks	4' x 8', 2 Decks	5' x 10', 2 Decks	5' x 12', 2 Decks
Pitch adjustment range	15-50 degrees	15-50 degrees	20-30 degrees	15-50 degrees
Adjustment method	Manual	Hydraulic "on the fly"	Hydraulic	Hydraulic "on the fly"
Variable speed control	Yes w/Adjustable eccentrics	Yes w/Adjustable eccentrics	Yes w/Adjustable eccentrics	Yes w/Adjustable eccentrics
Screen springs	Elastmer	Elastmer	Coil	Elastmer
Chutes (PLUS fines collecting hopper)	6'-0" long top 3'-0" long bottom	6'-0" long top 3'-0" long bottom	6'-0" long top 3'-0" long bottom	9'-0" long top 4'-0" long bottom
STRUCTURE:				
Conveyor frame	Formed plate	Formed plate	Lattice	Formed plate
Undercarriage	Hydraulic, 22 deg operating incline	Hydraulic, 22 deg operating incline	Hydraulic, 18 deg operating incline	Hydraulic, 23 deg operating incline
Power	41.3 HP Rated Water cooled Diesel Elec start/Instruments	80 HP Rated Water cooled Diesel Elec start/Instruments	110 HP Rated Water cooled Diesel Elec start/Instruments	165 HP Rated Water cooled Diesel Elec start/Instruments
Standard Power	Supports additional "off-plant" conveyors/optional equipment	Supports additional "off-plant" conveyors/optional equipment	Supports additional "off-plant" conveyors/optional equipment	Supports additional "off-plant" conveyors/optional equipment
Fuel tank	45 Gal Lockable*	45 Gal Lockable*	45 Gal Lockable*	80 Gal Lockable*
Hydraulic reservoir	100 Gal Lockable*	100 Gal Lockable*	100 Gal Lockable*	150 Gal Lockable*
Portable	Single axle/dual wheels air brakes, flaps, lights	Single axle/dual wheels air brakes, flaps, lights	Tandem axle/dual wheels air brakes, flaps, lights OPTIONAL	Tandem axle/single wheel air brakes, flaps, lights
Width	8'-6"	8'-6"	11'-2"	10'-0"
Height	13'-6"	13'-6"	13'-6"	13'-5"
Weight	20,000	22,000	37,000	40,000
OPTIONAL:				
Remote control Grizzly	n/a	Yes	Yes	Yes
Feed hopper liners (AR or UHMW)	Yes	Yes	Yes	Yes
Wet screen w/spray bars	Yes	Yes	Yes	Yes
Feed hopper wings	n/a	Yes	Yes	Yes
Hydraulic screen adjust	Yes	Std	Yes	Std

*In the process of converting ALL to lockable tanks in 1995.

(SEE INDIVIDUAL SPECIFICATION SHEETS FOR ADDITIONAL DETAILS) • SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

PORTEC
ENVIRONMENTAL PRODUCTS
700 W. 21ST ST. • P.O. BOX 20 • YANKTON, SD 57078
PHONE: (605) 665-8771 • FAX: (605) 665-8858

ISSUE DATE 1/95

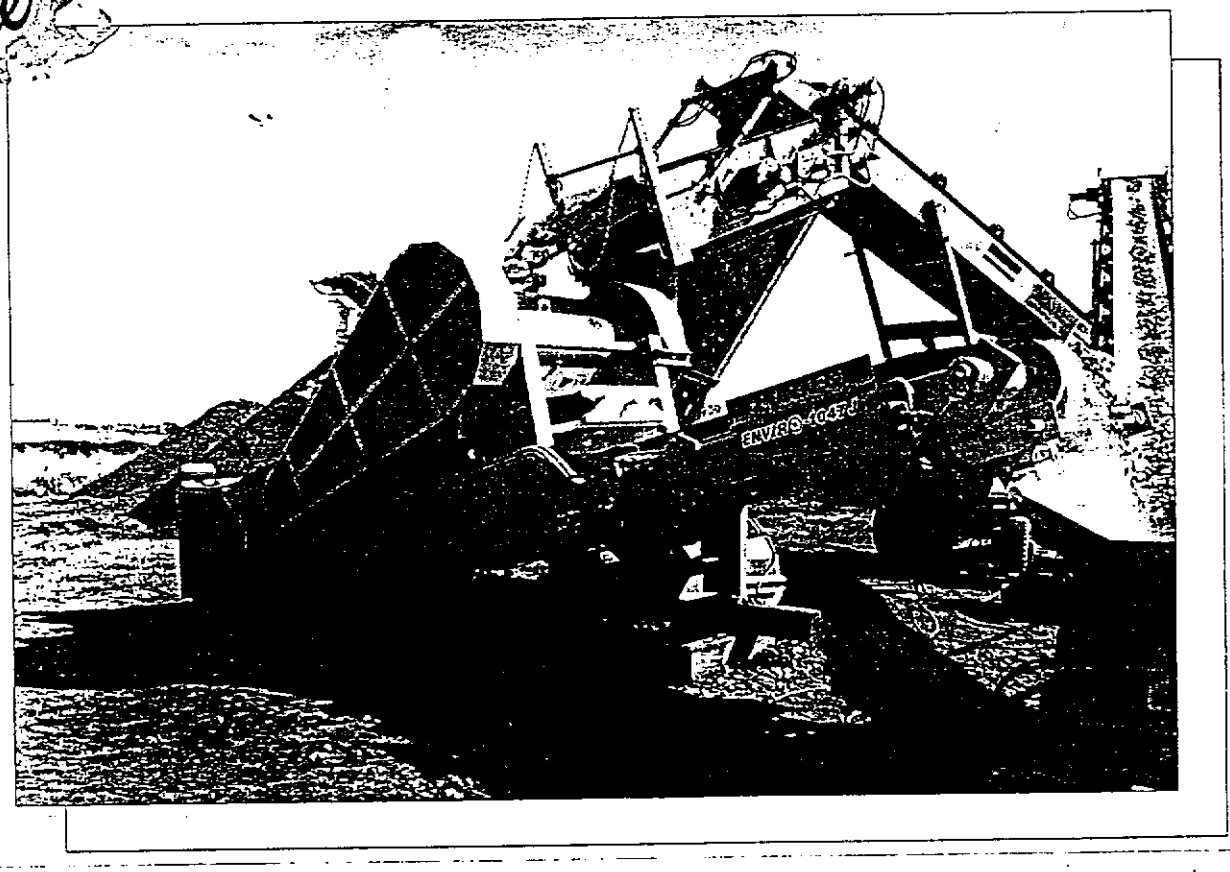
PORTEC

Environmental Products

ENVIRO-1047 J

PORTABLE CRUSHING PLANT

Introduces the

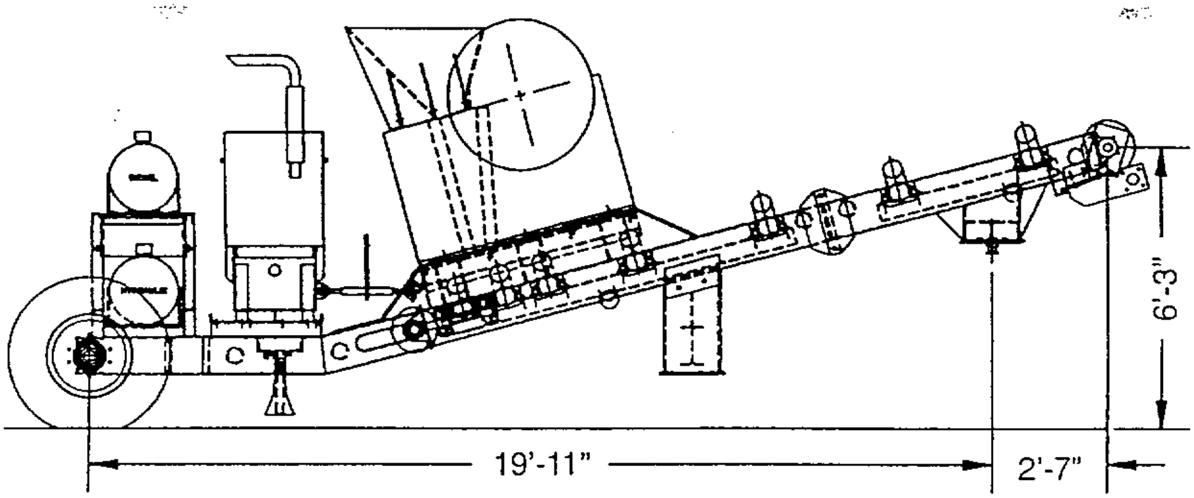


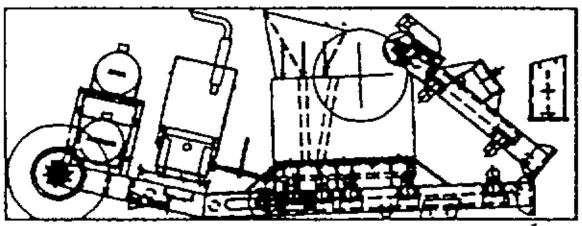
Designed for the producer who requires low tons per hour crushing requirements. The **ENVIRO-1047 J** is a low-cost, portable plant designed to be used in conjunction with bulk material screening plants. It's unique design enables the plant to be run in closed circuit operation with up to 100 tph of production.

MULTIPLE APPLICATIONS

- CONCRETE/ASPHALT (PRE-CONDITIONED)
- CONSTRUCTION DEBRIS
- AGGREGATE
- ENVIRONMENTAL
- SAND & GRAVEL
- VOLUME REDUCTION (BLOCK & BRICK)

SPECIFICATIONS





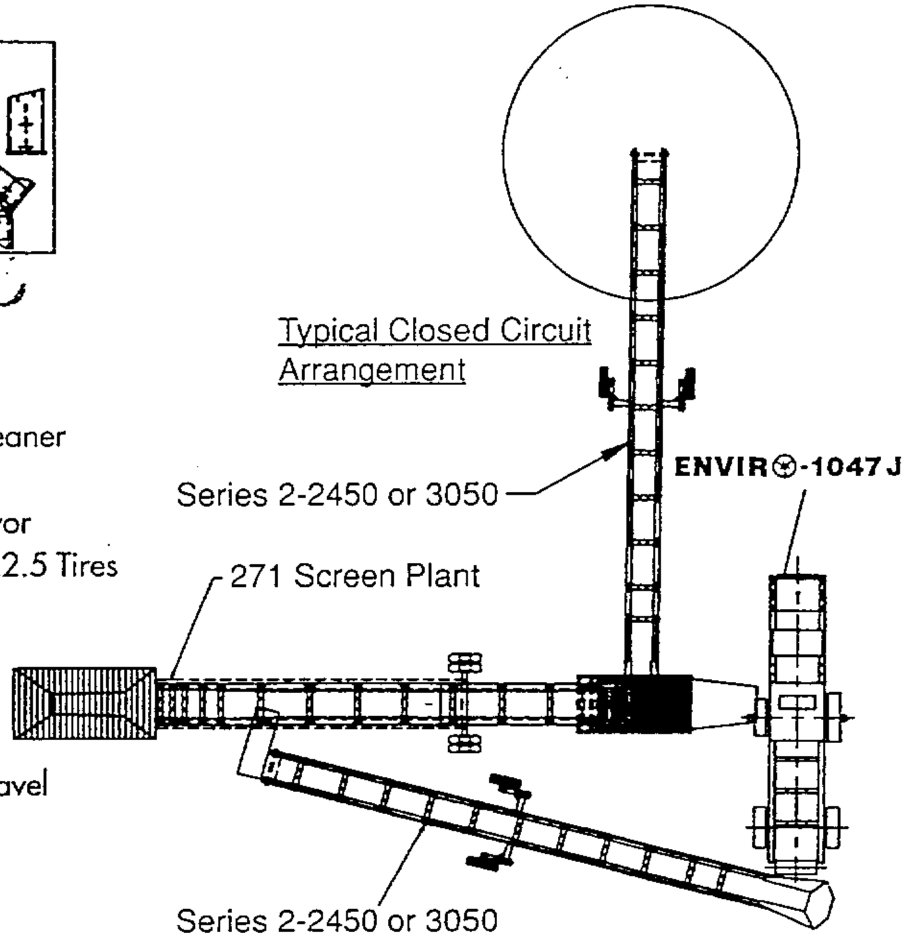
Ocean container for shipment

STANDARDS:

- 10" x 47" Fine Jaw Crusher
- 48" End Delivery Conveyor with Belt Cleaner
- 110 HP Diesel Power Unit
- Hydraulic Drive for (1) Off-Plant Conveyor
- Semi-Trailer with Single Axle, 11:00 x 22.5 Tires
- Two Screw Type Positioning Jacks
- Full Air Brakes

FEATURING:

- No Tear Down Required for Highway Travel
- Up to 100 TPH Production
- Accepts 8" Topsize
- Closed Setting Down to 3/4"
- Containerization in 20' Ocean Container



Typical Closed Circuit Arrangement

OPTIONS:

- Two Speed Landing Gear
- Travel Lights, Mud Flap & Fender Package

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

L.B. SMITH, INC.
P.O. BOX 565 783 WANGUM RD
FISHERS NY 14453
(716) 924-4930 (800) 627-7624
FAX LINE (716) 924-1571

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ENVIRONMENTAL PRODUCTS
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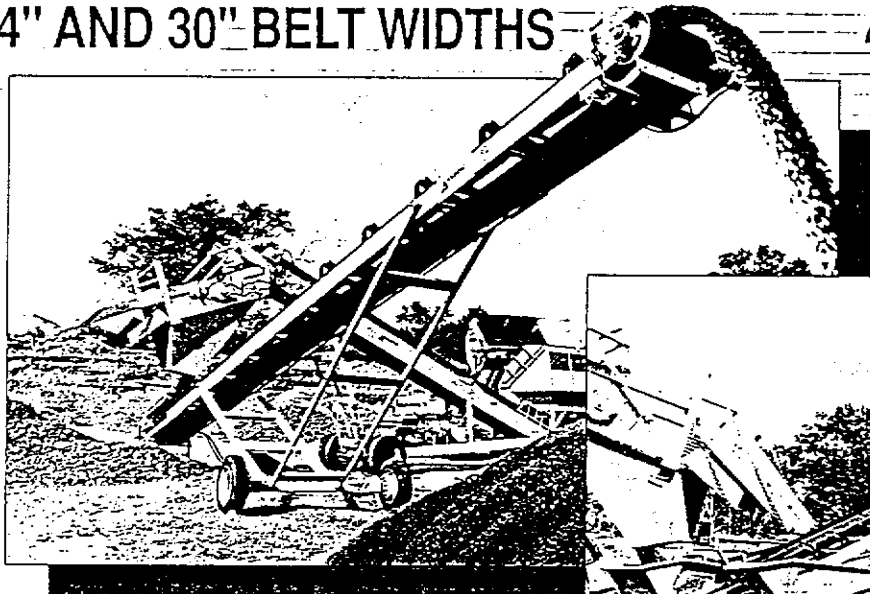
SERIES 2-A

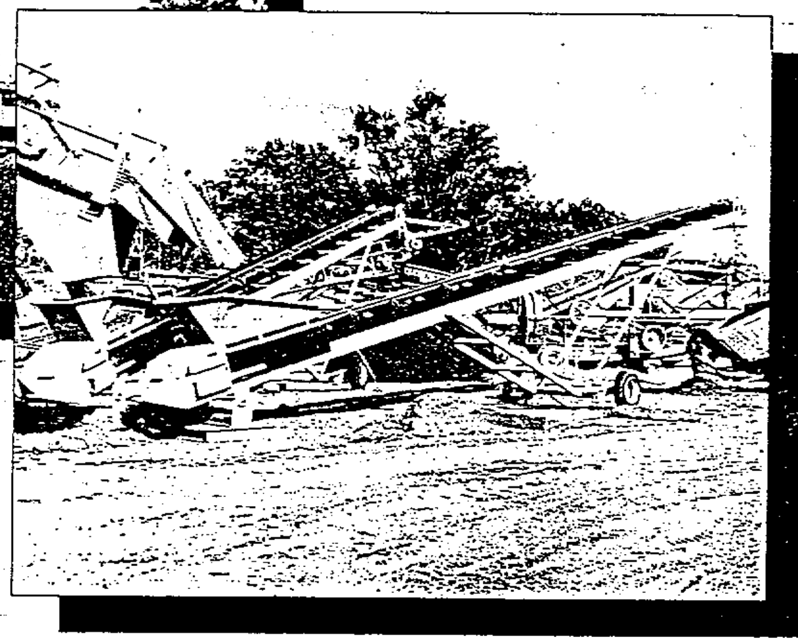
PORTEC

Environmental Products

PORTABLE HYDRAULIC CONVEYORS

24" AND 30" BELT WIDTHS — 40' TO 50' BELT LENGTHS





Featuring:

FRAME:
6" or 8" Jig welded Channel frame. (Depending on conveyor size.)

BELT TAKE-UP:
Screw type with protective rod covers.

RECEIVING TROUGH:
6 ft. long material receiving trough with clamped rubber flashing and radial receiving hopper.

DRIVE:
Direct coupled hydraulic geroler type motor.

TAIL PULLEY:
Self-cleaning wing type.

UNDERCARRIAGE:
Telescoping pin lock design.

TROUGHING IDLERS:
CEMA Class B type, sealed-for-life ball bearings, 3-roll 35 degree, 5" diameter steel on 4' centers.

CONVEYOR BELTING:
220 PIW with 1/8" top x 1/16" bottom covers.

HEAD PULLEY:
Rubber lagged.

RETURN IDLERS:
Steel roll return idlers placed on 10' - 0" centers.

PAINTING:
Primed with coat of iron oxide and a finish coat of enamel.

ANCHOR PIVOT AND PLATE:
Base plate, center pin and hinge assembly.

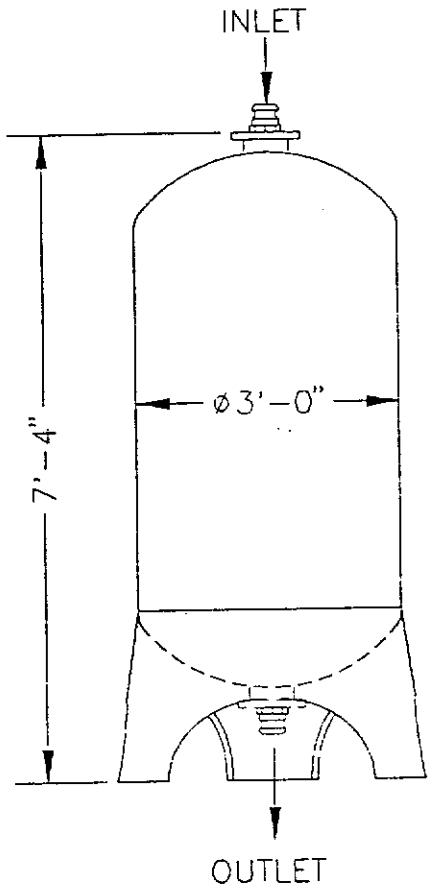
AXLE/TOWING ASSEMBLY:
Single axle with 8:00 x 17.5, 10 ply truck type tires, swivel wheels, heavy-duty pintle type hitch and safety chains assembly.

PORTEC
Construction Equipment Division
KOLBERG PRODUCTS
700 W. 21st STREET • P.O. BOX 20 • YANKTON, SOUTH DAKOTA 57078
TELEPHONE: 605-665-8771 • FAX: 605-665-8858

Carbon Service Company

GREEN 800 HP

LIQUID PHASE ADSORBER



MAXIMUM FLOW(#)	30 gpm
MAXIMUM PRESSURE	100 psig
MAXIMUM TEMPERATURE	100° F

STANDARD FEATURES

* 800 lbs. top quality reactivated carbon, coal base, 8 x 30 mesh, 850 min. I_2#.
* 1½" Cam-Lok® fittings w/ caps, inlet pressure gauge and outlet sample port.
* Heavy duty, corrosion resistant *Polyglass®* composite poly pressure rated vessel.
* An advanced internal distribution and collection system designed to maximize flow and carbon utilization.

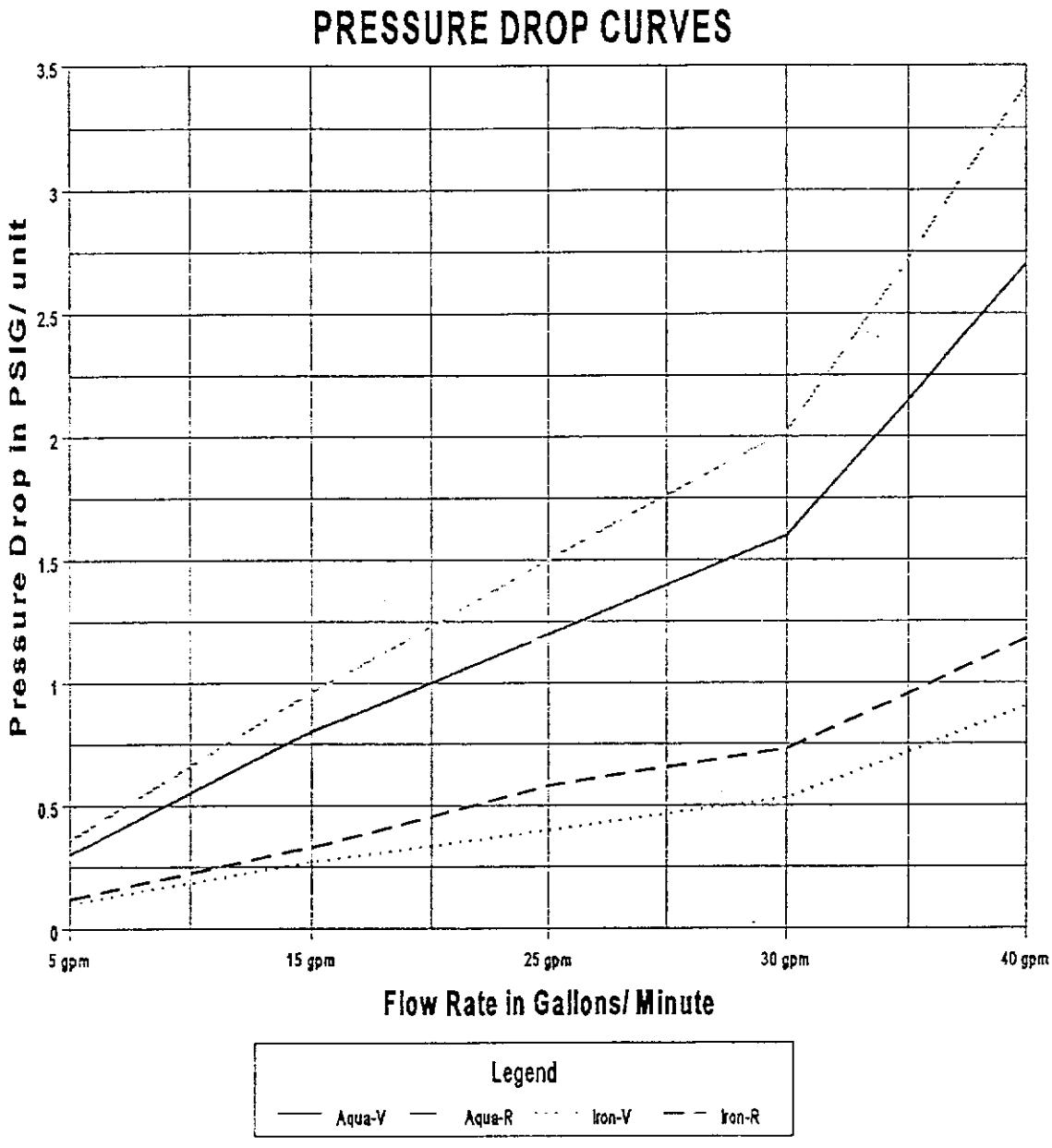
OPTIONAL FEATURES

* Virgin coal base carbon, 8 x 30 mesh, 900 min. I_2#. (+$240.00)
* Chemical grade hose assemblies.
  1½" x 6' (+$ 95.00)
  1½" x 12' (+$ 145.00)
  1½" x 20' (+$ 225.00)
* Duplex solids prefilter systems.

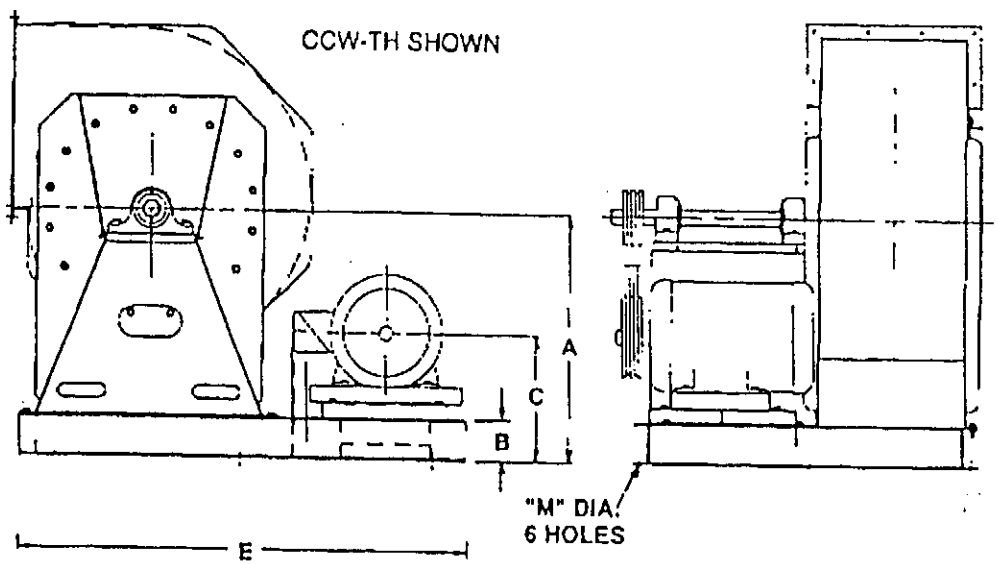
(#) Based on (2) two units operating in-series and may not be effective in all applications.

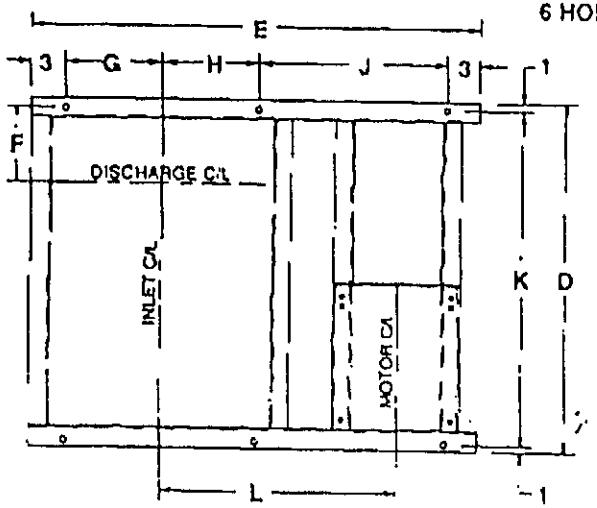
P.O. Box 838 • Donora, Pennsylvania 15033 • Phone 412-379-8032 • Fax 412-379-7780

Aqua /Green 800 HP & Iron. 720 HP



BCA/BCS-222-330 ARRANGEMENT 1 UNITARY BASE





NOTES:

BELT C/D = "N" DIMENSION

ARR'T 1R UNITARY BASE
MOTOR POSITION "W"

CHANNEL: 6 x 2.497 x .310
6" - 12#

ARR'T 1W SHOWN.
ARR'T 1Z IS MIRROR IMAGE

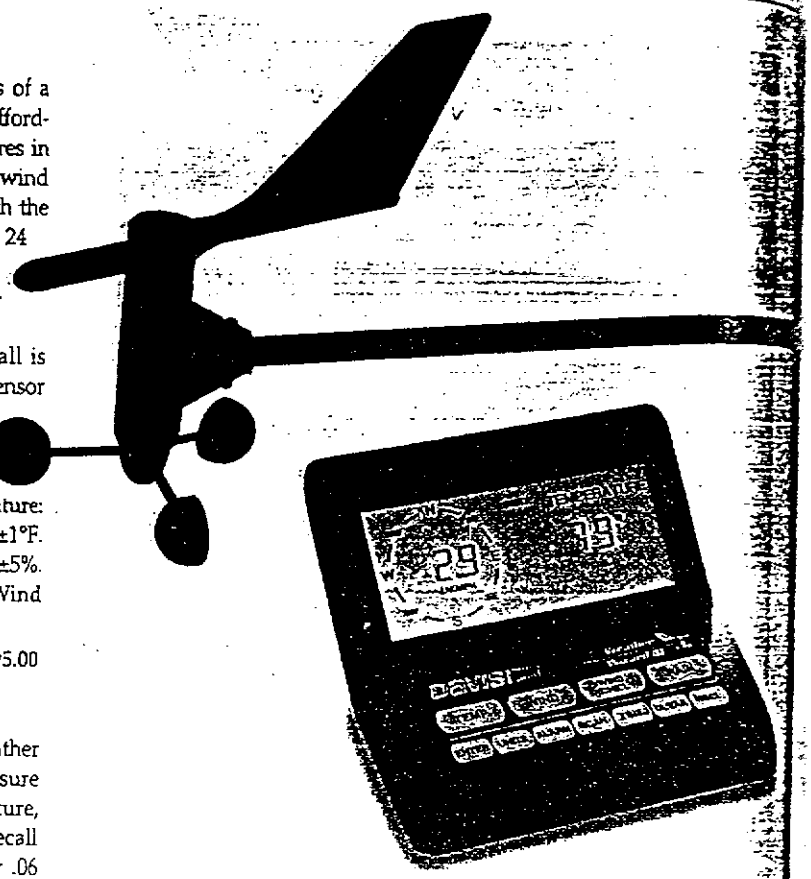
222	182T 184T 213T 215T 254T 256T 284T 286T 324T 326T 364T 365T	31	6	13½ 14½ 16⅞ 17⅞ 18⅞ 19¾	45⅞	47 50 52 56 59 62	10½	11	9½ 11 12 14 15½ 17	20½ 22 23 25 26½ 28	40⅞	24 26 27 30 31 33	¼	29.6 30.7 30.7 32.8 33.4 34.9	754 770 833 855 964 995 1109 1160 1294 1363 1525 1587	809 825 888 910 1019 1050 1164 1215 1349 1415 1581 1642
245	182T 184T 213T 215T 254T 256T 284T 286T 324T 326T 364T 365T	33	6	13½ 14½ 16⅞ 17⅞ 18⅞ 19¾	47⅞	51 54 56 60 63 66	10½	13	9½ 11 12 14 15½ 17	22½ 24 25 27 28½ 30	45⅞	26 28 29 32 33 35	½	32.4 33.5 33.4 35.5 36.0 37.4	844 860 920 945 1054 1085 1199 1250 1384 1450 1616 1677	922 938 1001 1023 1132 1163 1277 1328 1482 1528 1694 1755
270	213T 215T 254T 256T 284T 286T 324T 326T 364T 365T 404T 405T	36	6	14½ 16⅞ 17⅞ 18⅞ 19¾ 22¼	51½	56 58 60 66 69 73	11½	14	11 12 13 16 17½ 19¼	25 26 27 30 31½ 33½	49½	29 30 31 35 37 39	½	36.0 35.8 36.0 39.0 40.4 41.4	1092 1114 1223 1254 1364 1415 1555 1621 1787 1848	1178 1200 1309 1340 1450 1501 1641 1707 1873 1934
300	213T 215T 254T 256T 284T 286T 324T 326T 364T 365T 404T 405T 444T 445T	39	6	14⅞ 16⅞ 17⅞ 18⅞ 19¾ 22¼ 23¼	53⅞	58 62 64 70 73 76 79	13½	15½	10½ 12½ 13½ 16½ 18 19½ 21	26 28 29 32 33½ 35 36½	51⅞	30 32 33 38 39 41 42	⅝	41.4 38.7 39.2 39.3 43.1 43.5 44.3 44.9	2135 2236 1252 1274 1387 1418 1528 1579 1719 1785 1952 2013 2298 2399 2690 2867	2221 2322 1359 1381 1494 1525 1635 1686 1826 1892 2059 2120 2405 2506 2797 2974
330	254T 256T 284T 286T 324T 326T 364T 365T 404T 405T 444T 445T	42	6	16⅞ 17⅞ 18⅞ 19¾ 22¼ 23¼	58⅜	64 66 75 77 81 83	14⅜	17	12 13 17½ 18½ 20½ 21½	29 30 34½ 35½ 37½ 38½	56⅞	33 34 41 42 44 45	⅞	41.7 41.8 47.2 47.5 48.2 49.8	1559 1590 1696 1747 1892 1963 2128 2189 2478 2577 2866 3043	1673 1704 1810 1861 2011 2077 2242 2303 2590 2691 2980 3157

Weather Wizard III™

This weather station offers you the most requested features of a sophisticated, professional quality weather station – all at an affordable price. In addition to displaying inside/outside temperatures in either °F or °C, the Weather Wizard III displays wind speed, wind chill, and wind direction. All highs and lows are recorded with the time and date. It also has a clock which can be set for 12 or 24 hours, a date display, a direction display with sixteen compass points, AC operation with battery back-up, and alarms for temperature, wind speed, wind chill, and time.

A reversible mounting base for use on a desk, shelf, or wall is included, along with 40 ft. of cable, an external temperature sensor with 25 ft. cable, a junction box with 8 ft. cable, an AC adapter, and a detailed instruction booklet. Additional options available below. Inside temperature: range, 32°F to 140°F (0°C to 60°C); resolution, 1°; accuracy, ±1°F. Outside temperature: range, -50°F to +140°F (-45°C to +60°C); resolution, 1°; accuracy, ±1°F. Wind speed: range, 0 to 175 mph; resolution, 1 mph; accuracy, ±5%. Wind chill: range, 0°F to 134°F; resolution, 1°; accuracy, ±4°F. Wind direction: 1° or 10° increments. Dimensions: 5-1/4" x 5-7/8" x 3".

94514 (3.5 lbs.) $195.00



Weather Monitor II™

In addition to performing all the same fine features of the Weather Wizard III, this versatile weather station displays barometric pressure and high/low inside humidity (outside humidity as optional feature, see below). Features include a barometric pressure memory recall and barometric trend alarm for change greater than .02, .04, or .06 inches of mercury in an hour.

The Weather Monitor includes 40 ft. cable, an external temperature sensor with 25 ft. cable, a junction box with 8 ft. cable, an AC-power adapter, and detailed instruction booklet. Barometer: range, 26.00 in. Hg to 32.00 in. Hg (880.0 mbar to 1080.0 mbar); resolution, 0.01 in. Hg (0.1 mbar); accuracy, ±0.05 in. Hg (1.7 mbar). Inside humidity: range, 10% to 90%; resolution, 1%; accuracy, ±5%. Outside humidity (with optional sensor): range, 0% to 95%; resolution, 1%; accuracy, ±5%. See above copy for additional specifications.

94511 (4 lbs.) $385.00

Options for Monitor II and Wizard III Weather Stations

Optional Rain Collector – allows you to read both daily and accumulated rainfall. Self-emptying design measures in 0.01" (0.3 mm) increments. Mounting hardware, 50 ft. cable included. Measures 5-1/2" diameter x 7-1/2" high.

94506 (1.5 lbs.) $75.00

Optional Lighter Adapter – plugs directly into cigarette lighter to power either weather station.

94507 (1.5 lbs.) $9.00

Optional 40' Extension Cable – 4-Conductor.

94508 (8 oz.) $18.00

For Weather Monitor II only

Optional External Temperature/Humidity Sensor – allows you to measure outside humidity and dew point in addition to temperature. Includes 40 ft. cable.

94512 (15 oz.) $125.00

Optional 40 ft. Extension Cable – 6-Conductor.

94513 (12 oz.) $22.00

Weatherlink Software

Software program that allows you to link your Weather Wizard III or Weather Monitor II to an IBM or compatible computer or a Macintosh computer. Allows you to create graphs, calculate average weather conditions, generate summaries, analyze trends, and more. Weatherlink stores data until it is transferred to your PC. Store every 1, 5, 15, 30, 60, or 120 minutes and transfer every 1, 5, 15, 30, 60, or 120 days. For permanent storage, save on a floppy or hard disk. Data may be exported to Lotus® 1-2-3® or dBase III compatible spreadsheet or database software.

Software features allow you to: display the weather on one screen; choose any function and graph on daily, weekly, monthly, or yearly basis; graph two days, weeks, months, or years on the same screen; display two different functions on the same graphs; track weather information from two or more Weather Stations.

To install, fit the Weatherlink inside the mounting base of your Weather Station and just plug it in. Then, run the cable to a serial port on your PC. To monitor weather conditions in remote locations, use the optional Modem Adapter with a Hayes or compatible modem on either IBM or Macintosh computers. For use with IBM PC, XT, AT, PS/2 or compatible personal computers with 512K conventional memory. Requires Hercules monochrome, CGA, EGA, VGA, or compatible video graphics adapter and monitor, MS-DOS® or PC-DOS® 2.1 or higher, and one serial port. Supports RS-232 serial ports 1, 2, 3, or 4 and most dot matrix and laser jet printers. Program comes complete with both 9-pin and 25-pin RS-232 serial port adapters, 8 ft. of cable, detailed instruction booklet, and 5-1/4" 360K floppy disk and 3-1/2" 720K floppy disk.

94509 Weatherlink Software for IBM or compatible (1 lb.) $165.00
94515 Weatherlink Software for Macintosh (1 lb.) $165.00
94510 Optional Modem Adapter (1 oz.) $6.00

APPENDIX I

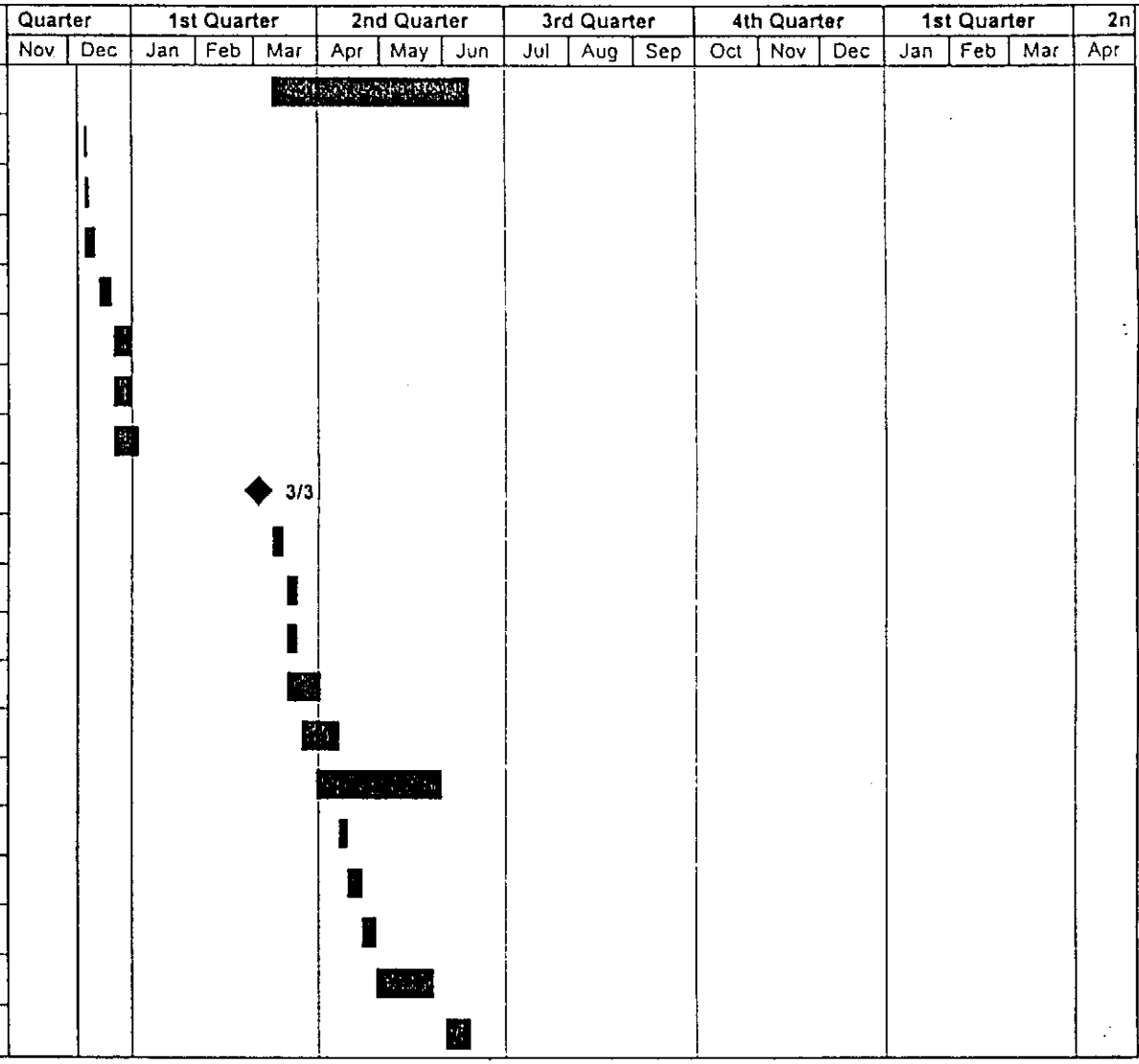
PROJECT SCHEDULE

NORWICH MGP SITE

PROPOSED SPRING CO "RUCTION SCHEDULE

(5,000 Tons/Blended Soil ,000 Tons/Impacted Soil)

ID	Task Name	Duration	Start	Finish
1	UTILITY BOILER	70d	3/10/97	6/13/97
2	Contractor Mobilization	1d	12/9/96	12/9/96
3	Install. Siltation Fencing	2d	12/9/96	12/10/96
4	Clearing & Fencing Mod.	5d	12/9/96	12/13/96
5	Install Temporary Structure	5d	12/16/96	12/21/96
6	Install Air Purifying Equip.	7d	12/23/96	12/31/96
7	Install Electrical Work	7d	12/23/96	12/31/96
8	Prepare Stockpile Areas	10d	12/23/96	1/3/97
9	DEC Approval	0d	3/3/97	3/3/97
10	Contractor Spring Mob.	5d	3/10/97	3/14/97
11	Set-up C&S Equipment	5d	3/17/97	3/21/97
12	Set-up Water System	5d	3/17/97	3/21/97
13	Blend Coal/Carbon Jennison	12d	3/17/97	4/1/97
14	Excav. Within Structure	14d	3/24/97	4/10/97
15	Trans. Product to Jennison	45d	3/31/97	5/30/97
16	Excav. Tar Well	2d	4/11/97	4/14/97
17	Remove Temp. Structure	5d	4/15/97	4/21/97
18	Excav. Abandon Pipes	5d	4/22/97	4/28/97
19	Excav. Site Surface	20d	4/29/97	5/26/97
20	Contractor Demobilize	10d	6/2/97	6/13/97



Project: Bert W Finch
Date: 12/5/96

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress

CONSENT BY RESPONDENT

Respondent hereby waives its right to a hearing herein as provided by law; consents to the issuance and entry of this Order; and agrees to be bound by its terms, not to contest the authority or jurisdiction of the Department to issue or enforce this Order, and not to contest the validity of this Order or its terms.

NEW YORK STATE ELECTRIC & GAS CORPORATION

by: Vincent W Rider

Typed name of signer: Vincent W. Rider

Title of signer: Vice President - Electric Generation

Date signed: March 25, 1994

STATE OF NEW YORK)
) ss:
COUNTY OF Broome)

On this 25th day of March, 1994, before me personally appeared Vincent W. Rider, to me known, who, being duly sworn, did depose and say that he resides in Endwell, New York; that he is Vice President - Electric Generation of the New York State Electric & Gas Corporation; that he executed the foregoing instrument on behalf of the New York State Electric & Gas Corporation; that he knew the seal of said corporation; that the seal affixed to said instrument was such corporate seal; that it was so affixed by order of the Board of Directors of said corporation; and that he signed his name thereto by like order.

Gail A. Marion
Notary Public State of New York
Registration number: 5003473
My commission expires: 10/26/94

GAIL A. MARION
Notary Public, State of New York
No. 5003473
Residing in Broome County
My commission expires Oct. 26 19 94

APPENDIX K

SW-846 CALCULATIONS

WORKSHEET FOR CALCULATION OF NUMBER OF SAMPLES TO COLLECT

SW-846 SIMPLE RANDOM SAMPLING

INDIVIDUAL MEASUREMENTS OF VARIABLE: ***Benzene***

Number of samples : ***19***

Sample Id.	Value for Analyte (ppm)
B91-01	0.008
B91-02	1.6
B91-05	48
B91-07	0.27
B91-15D	0.003
B91-19	0.001
B91-31	0.001
B91-04	0.001
B91-10	0.002
B91-15	0.002
SS91-4	0.005
SS91-6	0.001
SS92-1	0.001
SS92-2	0.001
SS92-3	0.001
SS92-4	0.001
SS92-5	0.001
GW92-13	0.001
SB92-3	0.001

SAMPLE MEAN ($\bar{x}$)	2.626368 ppm		
SAMPLE VARIANCE (s^2)	120.8653		
STANDARD DEVIATION OF SAMPLE:	10.99387		
STANDARD ERROR (ALSO STD DEVIATION OF MEAN)	2.522168 ppm		
CONFIDENCE INTERVAL:	-0.72811 to	5.980851 ppm	

ESTIMATE NUMBER OF SAMPLES:

REGULATORY LEVEL (RT)	10 ppm
t² VALUE ($t^2_{.20}$)	1.33
SW-846 EQ. 8 NO. SAMPLES	4
ADD THREE EXTRA	+3
NUMBER OF SAMPLES INDICATED BY SW-846:	**7**

$$n = \frac{t^2_{.20}\, s^2}{\Delta^2} \qquad (\Delta = RT - \bar{x})$$

$$= 3.93 \text{ samples}$$

(Chapter 9, SW-846, eq. 8)

APPENDIX L

ALTERNATIVE SAMPLING AND ANALYSIS PROTOCOL

NYSEG

November 14, 1996

GEM.330.CGNO
GEMDEC-96-0245

Mr. Andrew J. Goeller
Environmental Program Specialist
New York State Department of
Environmental Conservation
Region 7, Binghamton Sub-Office
1679 NY Route 11
Kirkwood, NY 13795-9772

Subject: Alternative Sampling and Analysis Protocol for the Relief Holder at the Norwich Former
Manufactured Gas Plant Site, Norwich, New York

Dear Mr. Goeller:

Please find enclosed the finalized version of the Alternative Sampling and Analysis Protocol for the Relief Holder at the Norwich Former Manufactured Gas Plant Site, Norwich, New York. This protocol serves to document the procedures for the sampling and analysis of the coal tar material to be taken from the relief holder as well as the coal tar blended material that will be generated in rendering the coal tar non-hazardous. The guidelines established in this document will ensure that the blended coal tar material is non-hazardous and can be transported to a permitted NYSEG facility for thermal destruction.

The protocol as delineated herein, reflects the same contents as the draft version that you approved in your acceptance letter dated November 13, 1996, with one exception. The pesticide Heptaclor (and its epoxide) has been removed from the TCLP analyte list in Table 1. Since pesticides were not to be included in the list of analytical parameters for this protocol, I have taken the liberty of correcting this inadvertent inclusion.

I appreciate your prompt attention in the review and approval of this document. Should you have any further questions or comments, please feel free to contact me at (607) 762-8787.

Sincerely,

John J. Ruspantini
Environmental Specialist

New York State Department of Environmental Conservation
Region 7, Binghamton Sub-Office
1679 NY Route 11
Kirkwood, New York 13795-9772

(607) 775-2545
FAX (607) 775-2687

Michael D. Zagata
Commissioner

November 13, 1996

John Ruspantini
NYSEG Corporation
Corporate Drive - Kirkwood Industrial Park
P.O. Box 5224
Binghamton, New York 13902-5224

RE: SAMPLING & ANALYSIS PROTOCOL
RELIEF HOLDER
NORWICH FORMER MGP SITE
NORWICH, NEW YORK

Dear Mr. Ruspantini:

The information in your letter of 11-13-96 has been reviewed. This information pertains to the sampling & analysis protocol intended for the coal tar material located in the relief holder at the Norwich former manufactured gas plant site. This protocol differs from the standard (05-20-94) protocol as detailed in the Coal Tar Soils Management Manual. This sampling & analysis protocol, to be referenced as the 11-13-96 protocol, is hereby approved for use on the estimated 900 cubic yards of coal tar material located in the relief holder at the Norwich site, as well as the additional blending materials used to render the coal tar non-hazardous.

Preliminary site screening approval for the Norwich site was previously issued. It is understood that the primary destination for this material is Jennison Station. Shipment of this material to Hickling Station is also acceptable. If the material is to be transported to any other facility, please contact me for specific approval. The CTS may not be transported to either Jennison or Hickling Stations until analysis of samples demonstrates that each shippable pile is free of hazardous waste, as defined by applicable federal and state laws, and written approval to transport has been issued.

This letter does not provide approval to begin excavation activity at the Norwich site. Please contact Eric Obrecht at the Albany DEC office for guidance on this issue. If you have any questions regarding the sampling & analysis of the CTS, please contact me at 607-775-2545. Thank you.

Sincerely,

Andrew J. Goeller
Environmental Program Specialist

cc: E. Obrecht
M. Nirchi

New York State Electric & Gas Corp.

Alternative Sampling and Analysis Protocol for the Relief Holder at the Norwich Former Manufactured Gas Plant Site Norwich, New York

November 14, 1996

Introduction:

NYSEG is preparing to excavate surface soils, contents of subsurface tar wells, and the contents of a subsurface relief holder from the former manufactured Gas Plant (MGP) site in Norwich New York in accordance with a NYSDEC approved work plan. The relief holder encompasses a surface area of approximately 2000 square feet. The anticipated depth of contaminated soil is approximately 12 feet. This would represent an estimated 900 cubic yards of relief holder material to be excavated.

In January 1993 samples were collected from the relief holder and analyzed by NYSEG and the NYSDEC to determine the hazardous characteristics of the material. The results obtained by NYSEG are attached to this sampling protocol. NYSEG was granted a permit by NYSDEC to thermally destroy non-hazardous coal tar contaminated soil at two coal fired generating stations. Incorporated into these permits is a sampling protocol to demonstrate that materials received at the generating stations are non-hazardous. The protocol allows for a NYSDEC approved alternative sampling protocol for specific sites. NYSEG has collected and analyzed many samples of coal tar contaminated material during remedial investigations and remediation projects. The results of these analyses demonstrate that coal tar can be characteristically hazardous for benzene, reactive sulfide, and reactive cyanide. Review of the analyses from the Norwich MGP site also demonstrate that the relief holder contents will fail Toxicity Characteristic Leaching Procedure (TCLP) for benzene. The analyses also demonstrate that the material is non-hazardous for the remaining TCLP analytes, reactive cyanide, and reactive sulfide.

The Norwich MGP site is located in close proximity to a residential neighborhood. Storage capacity on the site is limited. The relief holder contents will be excavated and rendered non-hazardous under a structure equipped to treat exhausted air for volatile organic compounds. The material will then be stored outside the structure until analyses confirm that the material is non-hazardous and can be transported to the disposal facility. Since the greatest potential for odors and emissions to affect the residents will be during this period of time, NYSEG is proposing an alternative sampling protocol to expedite the acceptance of the material for shipment to the permitted generating facility. The alternative protocol will verify that no hazardous material is transported from the site.

Sampling Protocol:

This protocol will pertain only to the relief holder contents from the Norwich former MGP site destined for thermal destruction at one of NYSEG's permitted generating facilities. All sampling at the site will be performed in accordance with the site specific Quality Assurance Project Plan (QAPP). A separate alternative sampling protocol may be sent to the NYSDEC for review and approval for other materials from the site which will be sent to a NYSEG generating station for thermal destruction. All analyses will be performed by a laboratory certified by the NYSDOH. Data will be sent to the NYSDEC for review and approval before material is transported to a generating facility for thermal destruction. All reports will be certified that samples

were collected in accordance with the *Sampling and Analysis Protocol for Coal Tar Sites*, and the 6 NYCRR part 360 permits for the generating stations.

Prior to the commencement of the remediation project, two samples from the relief holder area will be collected. The first sample will be a composite of five random grab samples. This composite sample will be analyzed for TCLP volatiles, semivolatiles, metals, reactive sulfide and reactive cyanides. The second sample will be a discreet, randomly collected grab sample to be anaylzed for TCLP benzene and metals. Based on the results of these samples, any analyte with a concentration exceeding 50% of the regulatory TCLP limit would be included for testing at the 200 cubic yard interval (See Table 1). During the remediation project, material excavated from the relief holder will be placed in a 30 cubic yard mixing container and blended with coal and other suitable materials to render the material non-hazardous. One grab sample will be randomly collected from each 10 cubic yards of blended material and composited with three other 10 yard grab samples to represent approximately 40 cubic yards of material. The composite sample representing each 40 cubic yards of material will be split. One of the samples will be analyzed for TCLP benzene (See Table 2). The other sample will be composited with five other samples representing 40 cubic yards to comprise a sample which represents 200 cubic yards of material. The samples representing 200 cubic yards will be analyzed for total lead, % sulfur, BTU/lb, and any other analyte detected in concentration of greater than 50% of the TCLP regulatory limit in the initial sample (See Table 3). The lbs. sulfur / MMBTU will be calculated.

If the results of these analyses demonstrate that the material is non-hazardous, with NYSDEC concurrence, the material will be shipped to the disposal facility. If the material is determined to be hazardous then it will be returned to the structure for additional blending and be resampled and analyzed. If the material exceeds 2.5 lbs. sulfur / MMBTU then the sulfur content of the mixture of the material with coal at the generating station will be calculated for a 25:75 mixture of material to coal. If this calculation shows that the material is less than 2.5 lbs. sulfur / MMBTU, then the material is acceptable to be transported to a permitted NYSEG facility. The blend of material to coal may be adjusted to ensure that no mixture exceeding 2.5 lbs. sulfur / MMBTU is burned at the plants.

TABLE 1: INITIAL SAMPLE TCLP ANALYTES AND ACTION LEVELS

TCLP ANALYTE	Regulatory limit (mg/l)	Action Level (mg/L)
Arsenic	5.0	2.5
Barium	100.0	50.0
Benzene	0.5	2.5
Cadmium	1.0	0.5
Carbon tetrachloride	0.5	0.25
Chlorobenzene	100.0	50.0
Chloroform	6.0	3.0
Chromium	5.0	2.5
Cresols (total of o,m,p)	200.0	100.0
2,4-Dichlorophenoxyacetic acid	10.0	5.0
1,4-Dichlorobenzene	7.5	3.75
1,2-Dichloroethane	0.5	0.25
1,1-Dichloroethylene	0.7	0.35
2,4-Dinitrotoluene	0.13	0.065
Hexachlorobenzene	0.13	0.065
Hexachlorobutadiene	0.5	0.25
Hexachloroethane	3.0	0.15
Lead	5.0	2.5
Mercury	0.2	0.1
Methyl ethyl ketone	200.0	100.0
Nitrobenzene	2.0	1.0
Pentachlorophenol	100.0	50.0
Pyridine	5.0	2.5
Selenium	1.0	0.5
Silver	5.0	2.5
Tetrachloroethylene	0.7	0.35
Trichloroethylene	0.5	0.25
2,4,5-Trichlorophenol	400.0	200.0
2,4,6-Trichlorophenol	2.0	1.0
Vinyl chloride	0.2	0.1

TABLE 2: ANALYTES FOR 40 CUBIC YARD INTERVALS

TCLP ANALYTE	Regulatory limit (mg/L)	Estimated # of Samples
Benzene	0.5	45

TABLE 3: ANALYTES FOR 200 CUBIC YARD INTERVALS

ANALYTE	Regalutory Limit	Estimated # of Samples
Total Lead	*	9
% Sulfur	**	9
BTU/lb	**	9
Other***	***	9

* No regulatory limit has been set on lead. Analyses are being performed to collect background data related to Prevention of Significant Deterioration(PSD).

** These values will be used to calculate lbs sulfur/MMBTU. If the CTS material exceeds 2.5 lbs sulfur/MMBTU, then the blending ratios will be adjusted to ensure that the blend of material burned will not exceed this limit.

***Based on the results of the samples collected prior to commencement of the remediation project, any analyte with a concentration exceeding 50% of the regulatory TCLP limit will be included for testing at the 200 cubic yard interval.