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OPERATION, MAINTENANCE, AND MONITORING MANUAL

The Abandoned Solvent Center Site
Pompey, New York
Site Code #734035

General Electric Company and
Bristol-Myers Squibb Company

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O'BRIEN & GERE ENGINEERS, INC.

O'BRIEN & GERE OPERATIONS, INC.

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1. Introduction

This document provides guidelines and procedures for conducting operation, maintenance, and monitoring (OMM) activities and monitoring at the Abandoned Solvent Center Site (Site Code #734035), located in the Town of Pompey, Onondaga County, New York, during the post-closure period. This OMM manual has been prepared on behalf of the Participating Parties (PPs) for the Abandoned Solvent Center Site, General Electric Company (GE) and Bristol-Myers Squibb Company (BMS). This OMM manual has been prepared in accordance with the requirements set forth in the Administrative Order on Consent (effective August 1, 1995) and Partial Consent Decree (No. 97-CV-0976 dated December 15, 1997) for remedial design and remedial action between the New York State Department of Environmental Conservation (NYSDEC), GE, and BMS. This document supplements information contained in the following documents:

- Final Design Report, Prepared for Administrative Order on Consent, The Abandoned Solvent Center Site, Pompey, New York, Site Code #734035, October 1996, Revised March 1997, O'Brien & Gere Engineers, Inc. (O'Brien & Gere, 1997)
- Certification Report, The Abandoned Solvent Center Site, Pompey, New York, Site Code #734035, November 1998, O'Brien & Gere Engineers, Inc., (O'Brien & Gere, 1998b)
- Certification Report - Ground Water Treatment System, The Abandoned Solvent Center Site, Pompey, New York, Site Code #734035, November 1998, O'Brien & Gere Engineers, Inc. (O'Brien & Gere, 1998c)
- Record Drawings (included as Appendix A)
- Health and safety plan (included as Appendix B)
- Ground water sampling protocol (included as Appendix C)
- Sampling and analysis plan for residential drinking water treatment systems (included as Appendix D)

- Components of ground water collection system - wet well and dry vault (included as Exhibit A-1)

- Components of ground water treatment system (included as Exhibit A-2).

A three ring binder format is provided so that updates to this OMM manual may be made as conditions warrant during continuous operations.

1.1. Project description

As defined in the Record of Decision (ROD), the Abandoned Solvent Center Site comprises approximately 6.5 acres located at the intersection of U.S. Route 20 (Route 20) and Ridge Road (County Road 128) in the Town of Pompey, Onondaga County, New York. Route 20 and Ridge Road form the northwestern and eastern borders of the site, respectively. The existing Site Plan is shown on Sheet G-1 of the Record Drawings included as Appendix A.

The site was originally operated as a gas station in the 1950s until the 1960s when it was operated as a solvent recycling center. As reported in the January 1993 Feasibility Study (FS) prepared by Ecology and Environment Engineering, P.C. (Ecology and Environment) of Lancaster, New York, distillation equipment allegedly used in the 1960s to recycle spent solvents was located at the front of the site along with two above ground storage tanks. In 1986, after the site had been abandoned for a period of time, underground storage tanks were removed from the ground and a garage used for on-site operations was demolished. The debris was bulldozed into a small pile located southeast of the remaining garage foundation.

During sampling conducted by the Onondaga County Department of Health (OCDOH) in March and April of 1986, low levels of volatile organic compounds (VOCs) were detected in ground water from two residential wells (Bumpus and Shedlock residences, as shown on Sheet G-1 of the Record Drawings included as Appendix A) located north of Route 20 and down gradient from the site. Investigations by the United States Environmental Protection Agency (USEPA) conducted in May 1986 detected VOCs in site soils, in sediments in a drainage ditch adjacent to the site, and at low levels in two residential wells. Low levels of polychlorinated biphenyls (PCBs) were also detected in surface soils on the site.

A Remedial Investigation/Feasibility Study (RI/FS) was initiated by the NYSDEC in 1991. The RI was conducted by Ecology and Environment and is summarized in the document "Phase I and Phase II Remedial Investigation Report, Abandoned Solvent Center, Site Number 7-34-035" dated December 1992. The FS was also conducted by Ecology and Environment and is presented in the document "Feasibility Study, Abandoned Solvent Center, Site Number 7-34-035" dated January 1993. As part of the RI, ten soil borings and twenty-two monitoring wells were installed and sampled. In addition, a soil gas survey was conducted and surface soil, surface water, and sediment samples were collected and analyzed. As a result of work performed during the RI, the NYSDEC determined that soil, sediments, and ground water required remediation. VOCs were detected in surface soils and sediments as well as at low levels in the overburden and bedrock aquifers on- and off-site. Low levels of PCBs were also detected in surface soils on- and off-site.

A Record of Decision (ROD) for the site was issued by the NYSDEC in 1993 and presented the objectives and remedies to be met in the Remedial Design.

The remedial action objectives presented in the ROD were:

- Eliminate the exposure to contamination present in on- and off-site soils to prevent unacceptable risks to human health and the environment and reduce the potential for further off-site migration
- Remove contaminated sediments from the roadside drainage ditch
- Remove contaminated ground water to eliminate the potential for off-site migration of contamination.

O'Brien & Gere Engineers was retained by the PPs to prepare a Remedial Design Work Plan (RDWP), perform pre-design investigations, and prepare a Remedial Design to implement the ROD pursuant to an Administrative Order of Consent (effective August 1, 1995) between GE, BMS and the NYSDEC for the Abandoned Solvent Center Site.

O'Brien & Gere Engineers prepared the RDWP to serve as a guide in implementing activities associated with the Remedial Design. The RDWP was approved by the NYSDEC in December of 1995. Pre-design activities were conducted at the site to provide additional information required for the preparation of the Remedial Design in accordance with the NYSDEC approved RDWP. Following the completion of the pre-design activities, the

Remedial Design was developed. The Remedial Design was approved by NYSDEC in March 1997.

The remedial construction activities for the first phase of the project were competitively bid, with a contract for the construction phase awarded to O'Brien & Gere Technical Services, Inc. in June 1997. Construction activities commenced in July 1997.

The first phase of the remediation project, designed by O'Brien & Gere Engineers and constructed in 1997 and 1998 by O'Brien & Gere Technical Services includes the following major components.

- Installation of a soil bentonite ground water cutoff wall to a depth of approximately 20 feet below the ground surface to isolate the source of chemicals impacting soils and ground water.
- Installation of a ground water collection trench to a depth of approximately 20 to 27 feet below ground surface to remove contaminated ground water and reduce the potential for further off-site migration.
- Installation of a ground water handling system, consisting of a pump station to handle collected ground water.
- Installation of a low-permeability cover meeting the requirements of New York Code of Rules and Regulations (NYCRR) Solid Waste Regulations (6NYCRR Part 360) and the ROD.
- Removal of sediments from the drainage ditch located south of Route 20.
- Installation of asphalt lining in the ditches adjacent to Ridge Road and Route 20 within the limits of the low-permeability cover.
- Abandonment of ground water monitoring wells and piezometers.
- Installation of ground water monitoring wells and piezometers.
- Demolition of the Village Pump Tavern.

The second phase of the remediation consisted of the ground water treatment system, which was designed by O'Brien & Gere Engineers and constructed by O'Brien & Gere Technical Services in 1998. The purpose of the ground water treatment system is to treat ground water collected from the existing

ground water collection trench. The ground water treatment system consists of the following treatment process:

- Flow equalization/pH adjust
- Low profile air stripper
- Gravity discharge from the air stripper to an existing surface water discharge.

1.2. Summary of OMM activities

1.2.1. OMM closure components

This OMM manual is applicable to the following closure components of the Abandoned Solvent Center Site:

- Low-permeability capping system
- Ground water cutoff wall
- Ground water collection system
- Ground water treatment system
- Surface water control facilities
- Ground water monitoring system
- Residential drinking water treatment systems
- Site access
- Physical site security.

1.2.2. OMM activities

Post closure operation, maintenance, and monitoring of the closure components of the Abandoned Solvent Center Site is the responsibility of the PPs, GE and BMS. Operation, maintenance, and monitoring activities will be performed by a contractor selected by GE and BMS. During the first three years of the OMM phase, O'Brien and Gere will provide OMM services. OMM activities include:

- Routine inspection and maintenance of constructed features, including the capped area, ground water collection, monitoring, and treatment systems, ground water cutoff wall, surface water runoff facilities, residential drinking treatment water systems, site access, and physical site security, as described in Section 2.

- Performance of the long term monitoring, including a ground water monitoring program to monitor ground water conditions at the site and monitoring of residential drinking water treatment systems, as described in Section 3.

- Evaluation of operation, maintenance, and monitoring activities and identification of proposed changes to the OMM manual or site procedures and policies which would provide a safer/or more cost-effective program

- Record keeping.

1.2.3. Health and safety

The Health and Safety Plan developed by O'Brien & Gere and included as Appendix B will be used for OMM activities performed by O'Brien & Gere. It is anticipated that other contractors retained by the PPs will develop their own site-specific Health and Safety Plan for OMM activities at the site.

1.3. Requirements for updating the OMM Manual

This OMM Manual may require modifications or enhancements as a result of data generated, changing site conditions, or when more cost effective or better procedures are identified or developed by operations personnel who utilize the OMM Manual. As stated in Section 1, the three-ring binder format is provided so that changes to this OMM Manual may be facilitated as conditions warrant.

Potential changes to this OMM Manual identified by operations personnel shall first be described or discussed in detail with the PPs. If appropriate, the recommended change will be identified by the PPs to NYSDEC for approval. Once approved by NYSDEC, copies of revisions to the OMM manual will be forwarded to holders of the OMM Manual for insertion into

their respective copies. NYSDEC approved changes/revisions shall then become operational requirements. Distribution of revisions to the OMM Manual will be coordinated by the following contacts:

- Mr. Michael Ianniello
  Corporate Environmental Programs
  Remedial Project Manager
  General Electric Company
  1 Computer Drive South
  Albany, New York 12205
  518-458-6612

- Mr. JR Rao
  Associate Manager, EHS Planning
  Bristol-Myers Squibb Company
  6000 Thompson Road
  East Syracuse, New York 13057-5050
  315-432-9653

2. Post closure operation, maintenance, and monitoring activities

This section describes OMM activities to be performed at the Abandoned Solvent Center Site. OMM activities will be performed for the following components of the site:

- Low-permeability capping system
- Ground water cutoff wall
- Ground water collection system
- Ground water treatment system
- Surface water control facilities
- Ground water monitoring system
- Residential drinking water treatment systems
- Site access
- Physical site security.

2.1. Low-permeability capping system

2.1.1. Description

A low-permeability capping system was installed at the Abandoned Solvent Center Site, as shown on Sheet G-3 of the Record Drawings included as Appendix A. Details of the capping system are shown on Sheet G-11 of the Record Drawings included as Appendix A. The low-permeability capping system installed at the site consists of the following, from the bottom up:

Flexible membrane cover. The flexible membrane cover (FMC) consists of a textured 40 mil linear low density polyethylene (LLDPE) geomembrane.

Soil barrier protection layer. A 24-inch thick soil barrier protection layer was installed over the LLDPE geomembrane. The barrier protection layer serves to protect the LLDPE geomembrane from external forces.

Vegetated topsoil layer. Six inches of topsoil were placed above the soil barrier protection layer.

In addition, the area of Ridge Road within the limits of ground water collection trench and 50 feet south of the ground water cutoff wall was resurfaced with 1.5 inches of NYSDOT Item No. 403.18 top course. This area was resurfaced to extend the limits of the low-permeability cover between the Doyle and Penoyer properties.

2.1.2. Purpose

The low-permeability capping system was installed over the surface soils and materials excavated during construction of the ground water collection trench, ground water cutoff wall, and roadside ditches along Route 20 and Ridge Road to prevent direct contact with the materials and to reduce the amount of infiltration from precipitation.

2.1.3. Inspection and maintenance requirements

Routine inspection of the low permeability cover and immediately adjacent areas will be performed concurrently with the ground water monitoring program. Inspections will be performed quarterly the first year and semi-annually the second through fifth years. Periodic mowing of the vegetated cover will be performed to maintain satisfactory runoff. The inspector will observe the condition of the vegetative cover for areas of settlement, erosion, slope instability, or any other damage to the cap. If such features are noted, appropriate engineered solutions will be implemented.

No deep rooting shrubs, brush, or trees will be allowed to become established on the cover. Mowing will be performed only as required to prevent the establishment of woody plants (trees) that may penetrate the final cover. Routine cover inspection will also note any problems with thinning of vegetation.

2.2. Ground water cutoff wall

2.2.1. Description

The ground water cutoff wall is constructed of soil-bentonite. Soil excavated from the cutoff wall trench was mixed with bentonite slurry and dry bentonite to prepare the soil-bentonite backfill. The cutoff wall trench was installed to a depth of approximately 20 feet below ground surface and keyed a minimum of two feet into the dense till layer, as shown on Sheet G-5 of the Record Drawings included in Appendix A. The depth of the dense till layer was identified during the initial site investigation by the installation of soil borings along the proposed location of the ground water cutoff wall and confirmed during excavation of the trench for the cutoff wall.

As discussed in the NYSDEC-approved Remedial Design Report, the initially proposed horizontal alignment of the ground water cutoff wall on the Doyle property was expanded from the alignment presented in the ROD to accommodate materials to be removed from the ground water cutoff wall trench, ground water collection trench and ditch along Route 20. The NYSDEC approved Design Drawings also showed proposed minimum (based on the ROD) and maximum extent for the horizontal alignment of the ground water cutoff wall on the Doyle property.

The as-built horizontal alignment of the ground water cutoff wall is shown on Sheet G-3 of the Record Drawings as shown in Appendix A and falls within the proposed minimum and maximum extent for the cutoff wall presented in the NYSDEC-approved Remedial Design.

Where the cutoff wall crossed Ridge Road, a reinforced concrete slab was installed on top of the cutoff wall. This modification was approved by the Onondaga County Department of Transportation (OCDOT). A detail of the concrete slab is shown on Sheet G-11 of the Record Drawings as shown in Appendix A.

Two piezometers were installed along the eastern portion of the ground water cutoff wall as shown on Sheet G-3 of the Record Drawings as shown in Appendix A. The purpose of the piezometers is to monitor ground water levels in this area of the site.

2.2.2. Purpose

The up-gradient soil-bentonite ground water cutoff wall acts as a deflector to prevent ground water from entering the site and to isolate the source of chemicals impacting soils and ground water.

2.2.3. Inspection and maintenance requirements

Maintenance of the ground water cutoff wall will involve protection of the cutoff wall cover and upper portion of the wall from damage due to desiccation, cracking, and root penetration.

Routine inspections of the cutoff wall cover will be performed quarterly during the first year following closure and semi-annually thereafter. The inspections will consist of observing the surface of the cutoff wall cover to see if subsidence or erosion has occurred which could impact the integrity of the ground water cutoff wall. If these conditions are observed, the areas will be promptly repaired by the placement of additional cover material. Regrading may be conducted, if necessary, to promote drainage and minimize the percolation of run-on into the cutoff wall cover and cutoff wall.

2.3. Ground water collection system

2.3.1. Description

The ground water collection system consists of a nominal 3-foot wide trench with a 6-inch diameter perforated high density polyethylene (HDPE) pipe installed at the bottom of the trench. The HDPE pipe is located approximately 4-inches above the bottom of the trench, with the exception of a length of pipe approximately 195 feet long in vicinity of the intersection of Route 20 and Ridge Road. In this area, the bottom of the trench is approximately 7 feet below the pipe. The horizontal alignment of the ground water collection trench is shown on Sheet G-3 of the Record Drawings included as Appendix A.

The ground water collection trench extends to depths of 20 to 27 feet below ground surface as shown on Sheet G-6 of the Record Drawings as shown in Appendix A. The trench was backfilled with a cohesionless granular material (Type H material) in accordance with Section 02231 of the Specifications included as part of the NYSDEC-approved Remedial Design. Three cleanouts, eight piezometers and two standpipes were installed along the ground water collection trench as shown on Sheet G-3 of the Record Drawings as shown in Appendix A.

The trench and 6- inch HDPE pipe is sloped to drain by gravity to the 5-foot diameter concrete pump station located at the northeast corner of the site as shown on Sheet G-3 of the Record Drawings as shown in Appendix A. The

pump station was designed to convey a flow rate of 15 gpm and contains two submersible pumps (manufactured by Teel-Model 2P354) sized at approximately 45 gpm to lift the ground water through a 1.5-inch pipe inside a 4-inch CPVC secondary containment pipe to the dry vault. From the dry vault, the ground water is pumped through a 1.5-inch HDPE pipe inside a 4-inch HDPE secondary containment pipe to the distribution manhole. The distribution conveys water to the ground water treatment system described in Section 2.4. Details of the pump station and distribution manhole are shown on Sheet G-7 of the Record Drawings as shown in Appendix A. Technical information regarding components of the wet well and dry vault is included in Exhibit A-1.

2.3.2. Purpose

The ground water collection trench was installed to collect contaminated ground water and reduce the potential for further off-site migration. The pump station wet well and dry vault convey the collected ground water to the ground water treatment system described in Section 2.4.

2.3.3. Inspection, operation, and maintenance requirements

The ground water collection system will be inspected routinely following closure. This will include a visual inspectio . of the ground water collection system, including the ground water collection trench, cleanouts, standpipes, pumps, dry vault, and wet well. If any component of the ground water collection system is found to be damaged or malfunctioning, it will be promptly repaired or replaced.

2.4. Ground water treatment system

2.4.1. Description

The treatment train for the ground water treatment system consists of the following:

- Flow equalization/pH adjust
- Low profile air stripper
- Gravity discharge from the air stripper to the existing surface water discharge

The system is designed for a flow rate of 15 gallons per minute (gpm).

The location of the ground water treatment system is shown on Sheet G-1 of the Record Drawings for the ground water treatment system included in Appendix A. A layout of the equipment is shown on Sheet M-1 of the Record Drawings included in Appendix A. Structural details of the ground water treatment system building are shown on Sheets S-1 and S-2 of the Record Drawings included in Appendix A.

Process flow and instrumentation diagrams (P&IDs) are included on Sheets I-1 through I-2 of the Record Drawings included in Appendix A and show arrangements and controls for the ground water treatment system.

The following sections discuss components of the ground water treatment system in detail.

Flow Equalization/pH Adjust

Discharge piping from the existing wet well pump station terminates at the top of the side wall of the 200-gallon nominal capacity influent flow equalization tank. The tank is constructed of polyethylene. A 100-gallon equalization overflow tank is also provided. Venting from the equalization tank and equalization overflow tank is directed to the discharge side of the air stripper blower.

The equalization tank is equipped with a drain valve, redundant high level switch, and a pH probe. The level switch will shut down pumps supplying the tank. The pH probe is utilized in conjunction with a controller to regulate sulfuric acid feed into the tank.

The equalization overflow tank is also equipped with a drain valve, air stripper feed pump suction connection, shut-off valve, and level switches. High and low level set points are used to stop operation of the air stripper feed pump to prevent scaling of the air stripper.

The influent pH will be adjusted to a target level by adding sulfuric acid to prevent scaling of the air stripper. The 35% sulfuric acid drums are located on a spill skid. An acid metering pump is provided for the drums.

Air Stripper Feed Pump

A centrifugal pump is provided to convey flow to the top of the air stripper. The pump is capable of delivering 15 gpm, at 55 feet of total dynamic head

(TDH). Technical information regarding the air stripper pump is included in Exhibit A-2.

Low Profile Air Stripper

The low profile air stripper consists of a North East Environmental Products (NEEP) model 2331-P air stripper. The air stripper sump and trays are constructed of linear low density polyethylene (LLDPE). Technical data for the air stripper is included in Exhibit A-2.

The air stripper blower provides an air flow rate of 300 standard cubic feet per minute (scfm). Pressure and level switches on the air stripper are provided to shut the system down and alert operating personnel of high level (generally caused by tray fouling) or low pressure (generally indicating blower failure). Blower intake air is obtained from inside of the treatment building to mitigate potential for winter freezing and to facilitate normal room air change requirements. In the event of blower failure, the air stripper feed pump will stop. Additionally, the air stripper feed pump will not be allowed to start up until the blower is first satisfactorily operating. To prevent partially treated water from exiting the stripper, there will be a time delay between when the air stripper feed pump and when the blower shuts down. The blower will normally be operated in the "on" mode, except when water is not being treated, to maintain negative pressure in the equalization tank.

Treated water is discharged by gravity downstream of the air stripper via a 3-inch diameter PVC effluent pipe to the roadside drainage ditch south of Route 20, as shown on Sheet G-1 of the Record Drawings for the ground water treatment system included in Appendix A. The treated water must meet the NYSDEC-approved discharge criteria based on the Ambient Water Quality Standards and Guidance Values and Ground Water effluent Limitations (June 1998). The discharge limits are:

Table 2-1. *Discharge criteria and monitoring for ground water system discharge.*

Parameter	Discharge Criteria (μg/L)	Minimum Monitoring Frequency
Volatiles		
1,1 Dichloroethane	5	1/month
1,1 Dichloroethene	5	1/month
Cis-1,2 Dichloroethene	5	1/month
Trans-1,2 Dichloroethene	5	1/month
Ethylbenzene	5	1/month
Methyl Chloride	5	1/month
Tetrachloroethene	5	1/month
Toluene	5	1/month
1,1,1 Trichloroethane	5	1/month
Trichloroethene	3	1/month
Vinyl Chloride	2	1/month
Xylenes	5	1/month
Other		
pH	5.5 to 8.5 SU	1/month

NOTES:
1. Xylene is to be monitored for each individual component (ortho, meta, para).
2. pH will be monitored continuously during system operation.

Source: O'Brien & Gere Engineers, Inc.

Instrumentation and Controls

System controls are provided for automated normal operation of the ground water treatment system. Piping is labeled and valves are tagged as required to facilitate proper identification relative to process flow displays. Instrumentation will monitor operating parameters including:

- System flow rate, both instantaneous and totalized flow
- pH at the flow equalization tank and air stripper base
- Equalization tank and air stripper base liquid level
- Air stripper pressure monitoring.

Flow equalization and overflow tanks: The tank has an agitator with manual on/off controls and a pH analyzer/transmitter. Level switches are provided. A redundant high level switch provides an alarm and a pump-stop signal that will shut down the system feed pumps.

Sulfuric acid feed system: pH adjustment takes place in the flow equalization tank. The pH controller provides a 4-20mA signal that will be used to control the speed of a metering pump. The control loop function for this is by the pH controller.

Air stripper: The air stripper is a complete package unit from the manufacturer and includes the system controls. Signals taken from the package include: Low pressure on blower discharge, high pressure default, high level discharge sump alarms, and high and low pH alarms which shut down the system.

Autodialer: The autodialer for the influent pump station accepts alarm signals from the treatment system. Once an alarm input had been received, the autodialer will initiate dialing a prioritized list of individuals and will continue dialing the pre-programmed telephone list until someone answers the call and properly acknowledges receipt of the verbally identified alarm output information. Failure to respond to the site and manually reset the alarm input device within a preset amount of time will cause the autodialer to once again begin the calling sequence. Inputs to the autodialer which cause the autodialer to initiate the calling sequence include the following:

- Pump station failure
  - High level sump
  - Pump failure
  - Power loss
- Treatment system failure
  - High or low air stripper pH
  - High level in equalization tank
- High level in overflow tank
- High level in floor sump
- Blower failure
- High level air stripper

The autodialer call list is as follows, in order of calling priority:

- O'Brien & Gere Operations, Inc. - Syracuse office (monitored 24 hours/day by staff or security). Secretary or security to contact the following:
  - Operator - Doug Lyon
  - Manager - Jim Nighan
  - Back-up Manager - Ken Gerbsch
  - Back-up Operator - Gary Lawrence

2.4.2. Purpose

The ground water treatment system was constructed to treat the water collected in the ground water collection trench to the discharge limits listed in Table 2-1 of Section 2.4.1.

2.4.3. Inspection, operation, and maintenance requirements

Inspection, operation, and maintenance activities will be performed on a weekly basis. Inspection, operation, and maintenance activities will include the following:

- Inspection of equalization tank mixer operation and pH level, including calibration of pH probe (if required)
- Inspection of air stripper pH, including calibration of pH probe (if required)
- Inspection of sulfuric acid delivery system and containment system
- Inspection of floor sump for presence of liquid
- Inspection of air stripper fill for fouling
- Inspection of air stripper blower operation, including operating pressure
- Inspection of transfer pump operation, including operating pressure
- Inspection of heating and ventilation system
- Recording of effluent pH and flow meter readings

Equipment maintenance will be performed in accordance with manufacturers' recommendations.

Wastes generated from system operation will be stored on-site in a DOT 17H drum. The waste will be categorized as hazardous or non-hazardous and properly disposed of in accordance with applicable regulations.

2.5. Surface water control facilities

2.5.1. Description

Surface water control facilities at the site include drainage swales adjacent to the limits of the low-permeability cover and asphalt lined ditches along Route 20 and Ridge Road. The ditches adjacent to Ridge Road were lined with asphalt to extend the limits of the cap from the Penoyer and Doyle properties to Ridge Road. The asphalt lined ditches extend from the intersection of Ridge Road and Route 20 to the southern limit of the ground water cutoff wall crossing Ridge Road as shown on Sheet G-3 of the Record Drawings included as Appendix A. Asphalt lining was also installed in the ditch south of Route 20 to limit infiltration of surface water into the ground water collection trench.

2.5.2. Purpose

The surface water runoff facilities were constructed to protect the low-permeability cover from surface water runoff during a 25-year, 24-hour storm, and minimize infiltration due to precipitation and surface water.

2.5.3. Inspection and maintenance requirements

Inspections will be conducted at the same frequency as inspection of the final cover, quarterly the first year and semi-annually for the second through fifth years. Corrective actions to the drainage ditches along Route 20 and Ridge Road and the portion of Ridge Road between the cutoff wall and collection trench required as a result of operation and maintenance activities associated with the Doyle and Penoyer properties will be performed in consultation with the NYSDEC, NYSDOT, and OCDOT. Routine operation and maintenance, such as removal of accumulated sediment in the ditches, and routine repair of the asphalt in the pavement and ditches will be performed by the PPs.

Inspection of on-site drainage facilities (not associated with public roads) will be conducted at the same frequency as inspection of the low-permeability cover. Drainage facilities will be inspected for accumulation of debris which may inhibit flow and for excessive scouring which may erode ditches. Should debris accumulation be noted, it will be promptly removed to maintain flow capacity. If excessive scouring is noted, channel protection consisting of rip-rap or geosynthetic protection may be required.

2.6. Ground water monitoring system

2.6.1. Description

The Abandoned Solvent Center Site ground water monitoring system includes the following components:

- Ground water monitoring wells

MW-1S	MW-4S	MW-6D	MW-8I
MW-1D	MW-4D	MW-7S	MW-8D
MW-2S	MW-5S	MW-7I	MW-11S
MW-2I	MW-5D	MW-7D	
MW-2D	MW-6S	MW-8S	

- Piezometers (P-1 through P-10)
- Two standpipes

The location of the ground water monitoring wells, piezometers, and standpipes are shown on Sheets G-1 and G-3 of the Record Drawings included as Appendix A.

Logs for the ground water monitoring wells and piezometers are included in Exhibit B. Construction details for the piezometers are shown on Sheet G-8 of the Record Drawings included as Appendix A.

2.6.2. Purpose

The ground water monitoring wells serve to monitor the elevation of the ground water table as well as ground water collection points collect samples of ground water to be analyzed. Ground water levels in the wells, piezometers, and standpipes will be used to assess the performance of the ground water collection system and the ground water cutoff wall.

2.6.3. Inspection and maintenance requirements

During each sampling event, quarterly for the first year and semi-annually for the second through fifth years of monitoring, ground water monitoring wells, piezometers, and stand pipes will be inspected for signs of damage. After the fifth year, the sampling frequency will be re-evaluated. If damage is detected, or if routine sampling indicates a problem with one or more of the ground water monitoring wells, actions to be taken will be discussed with NYSDEC. Sampling procedures are included in Appendix C.

2.6.4. Manifesting/handling of development water

During ground water sampling activities, purge water will be generated as a result of developing the wells prior to sampling. Depending on the location of the wells, purge water may be allowed to infiltrate the ground surface in proximity of the monitoring well or the water will be containerized, transferred to the ground water treatment system building, and bled into the equalization tank by a metering pump. This approach is consistent with the approach used during the pre-design investigations as documented in the Final Design Report (O'Brien & Gere, 1997).

The proposed schedule for handling water from the monitoring wells is as follows:

Table 2-2. *Sampling purge water disposition details.*

Well ID	Location	Disposition
1S	Doyle (On-Site)	A
1D	Doyle (On-Site)	A
2S	Doyle (On-Site)	B
2I	Doyle (On-Site)	B
2D	Doyle (On-Site)	B
4S	Hickey	A
4D	Hickey	A
5S	Reid	A
5D	Reid	A
6S	Park	A
6D	Park	A
7S	Penoyer	B
7I	Penoyer	B
7D	Penoyer	B
8S	Shedlock	B
8I	Shedlock	B
8D	Shedlock	B
11S	Penoyer	B

NOTES:
1. A - Indicates purge water to be infiltrated into ground surface in proximity of the monitoring well sampled.
2. B - Indicates purge water to be containerized at well and transferred to the ground water treatment system building. The containerized water will then be bled into the equalization tank for treatment.
3. Locations of wells and property owners are shown on Sheet G-1 of the Record Drawings.

Source: O'Brien & Gere Engineers, Inc.

It will be necessary to transport containerized water across public roads to the ground water treatment system building located on the Doyle Property. It is understood that waste manifests will not be required for containerized water transported across public roads to the ground water treatment system building.

2.7. Residential drinking water treatment systems

2.7.1. Description

Residential drinking water treatment systems were installed in the Bumpus and Shedlock residences in 1992. Each treatment system currently consists of a filter cartridge and two carbon canisters in series.

2.7.2. Purpose

The residential drinking water treatment systems are utilized to treat water from the Bumpus and Shedlock residential wells for VOC removal.

2.7.3. Inspection, operation, and maintenance requirements

O'Brien & Gere has been retained by GE and BMS to provide services associated with sampling the system and coordination of operation and maintenance activities. Finger Lakes Water Conditioning has been retained as a subcontractor to O'Brien & Gere Operations to perform system operation and maintenance in conjunction with the sampling events.

Sampling of the drinking water treatment systems will be performed on a quarterly basis in accordance with the existing Sampling and Analysis Plan

(SAP). The SAP was previously submitted to NYSDEC and NYSDOH on March 26, 1996.

Three samples will be collected from each treatment unit, one prior to the first carbon unit (noted as the influent sample), one after the carbon unit (noted as the midpoint sample), and one after the second carbon unit (noted as the finished sample). The samples and one trip blank will be analyzed by EPA method 524.2 for VOCs. The sampling procedures are included in Appendix D.

2.8. Site access

2.8.1. Description

An asphalt-paved access road was constructed on the Penoyer property. The road consists of the following from the bottom up:

Mirafi 600x stabilization fabric

8 inches compacted run-of-crusher stone

4 inches NYSDOT Type "3" Base Course

2 inch NYSDOT Type "7" Wear Course

The location of the access road is shown on Sheet G-3 of the Record Drawings included in Appendix A. Details regarding the access road are shown on Sheet G-10 of the Record Drawings included in Appendix A.

2.8.2. Purpose

The purpose of the access road is to allow access to the low-permeability cover, ground water collection system, ground water cutoff wall, and ground water treatment system for inspection and maintenance purposes.

2.8.3. Inspection and maintenance requirements

The access road will be inspected at the same frequency as inspection of the low-permeability cover. During routine inspections following closure, the access road will be observed for rutting, potholes, and/or settlement. Should any of these conditions be observed, conditions will be corrected by filling with appropriate material. During the winter, the road will be plowed as

needed to facilitate access for routine inspection and monitoring. Snow banks resulting form plowing will be arranged to promote off-site drainage when thawing occurs.

2.9. Physical site security

2.9.1. Description

Access to the Abandoned Solvent Center Site is controlled by a perimeter fence around the limits of the low permeability cover on the Doyle and Penoyer properties, a series of vehicle gates on the access road, a mangate on the Penoyer property, and a mangate on the Doyle property. The gates and fence are six-foot high chain link topped with 3 strands of barbed wire. Warning signs are located along the fence to discourage trespassers.

Details regarding the chain link fence and gates are shown on Sheet G-10 of the Record Drawings included in Appendix A.

A security system was installed within the ground water treatment system building. The security system includes sensors on the man door with a keyed disarm station at the main entry. An alarm will be initiated if a door is opened without disarming the system. The autodialer will be given the signal to call-out on designated phone numbers.

2.9.2. Inspection and maintenance requirements

The integrity of the fence and gates will be inspected by walking the perimeter at the same frequency as the inspection of the low-permeability capping system. The structural integrity of the fencing system will be verified and breaches or weaknesses will be repaired as required. To maintain the security of the low-permeability cover and other systems, the access gates will be kept locked while the site is unattended.

2.10. Record keeping

Record keeping will be performed for an estimated period of thirty years following closure. An inspection checklist, included in Appendix E, will be developed and filled out during routine inspections. Copies of records, reports, or other information relative to operation, maintenance and monitoring activities at the site will be provided to NYSDEC and NYSDOH.

- Analytical data package
- Ground water field sampling logs
- Evaluation of hazardous constituent results versus the established ground water standards.

The data analysis will also include an evaluation of the general trend of levels of hazardous constituents with respect to previous analytical data.

3.2. Residential drinking water treatment systems

As discussed previously in Section 2.7.3, the residential drinking water treatment systems will be sampled on a quarterly basis. Three samples will be collected from each drinking water treatment system, one prior to the treatment system (noted as the influent sample), one after the first carbon unit (noted as the midpoint sample), and one after the second carbon unit (noted as the finished water sample). The samples and one trip blank will be submitted for analysis of VOCs in accordance with USEPA Method 524.2.

Results of analytical testing will be compared with the New York State Standards for Drinking Water. A letter report will be prepared for submittal to NYSDEC and NYSDOH.

3.3. Ground water treatment system

3.3.1. Analyses and frequency

Monitoring for the ground water treatment system will consist of monitoring the discharge from the ground water treatment system on a monthly basis. After the fifth year, the sampling frequency will be re-evaluated.

Samples will be collected from the sump of the air stripper. The samples will be analyzed in accordance with USEPA Method 601/602 for the parameters listed in Table 3-1.

Table 3- 1. *Discharge criteria and monitoring for ground water treatment system discharge.*

Parameter	Discharge Criteria(μg/L)	Minimum Monitoring Frequency
Volatiles		
1,1 Dichloroethane	5	1/month
1,1 Dichloroethene	5	1/month
Cis-1,2 Dichloroethene	5	1/month
Trans-1,2 Dichloroethene	5	1/month
Ethylbenzene	5	1/month
Methyl Chloride	5	1/month
Tetrachloroethene	5	1/month
Toluene	5	1/month
1,1,1 Trichloroethane	5	1/month
Trichloroethene	3	1/month
Vinyl Chloride	2	1/month
Xylenes	5	1/month
Other		
pH	5.5 to 8.5 SU	1/month

NOTES:
1. Xylene is to be monitored for each individual component (ortho, meta, para).
2. pH will be monitored continuously during system operation.

Source: O'Brien & Gere Engineers, Inc.

3.3.2. Data evaluation

Following receipt and review of the analytical data for each sampling event, a letter report will be prepared for submittal to NYSDEC. Data will be summarized and provided to NYSDEC on a monthly basis. The report will include a tabular presentation of analytical results and laboratory data sheets.

3. Long-term monitoring

Long-term monitoring to be performed at the Abandoned Solvent Center Site will consist of a ground water monitoring program, monitoring of the residential drinking water treatment systems, and monitoring discharge from the ground water treatment system.

3.1. Ground water monitoring

A ground water monitoring program will be conducted to monitor the ground water conditions at the Abandoned Solvent Center Site. A copy of the ground water sampling protocol is included in Appendix C. This protocol provides methods and procedures for the collection of representative ground water samples using a bailer or pump.

3.1.1. Monitoring wells

Ground water monitoring will be performed with the following wells:

MW-1S	MW-4S	MW-6D	MW-8I
MW-1D	MW-4D	MW-7S	MW-8D
MW-2S	MW-5S	MW-7I	MW-11S
MW-2I	MW-5D	MW-7D	
MW-2D	MW-6S	MW-8S	

The ground water monitoring wells serve to monitor the elevation of the ground water table as well as to collect samples of ground water to be analyzed.

3.1.2. Piezometers

Ten piezometers (P-1 through P-10) and two standpipes have been installed at the site. The locations of the piezometers and standpipes are shown on Sheet G-3 of the Record Drawings included as Appendix A.

The shallow piezometers (P-1 through P-6) are installed to a depth of approximately 20 feet below ground surface. The top of the sand pack for

the intermediate piezometers (P-7 through P-10) is screened a minimum of 2 feet below the top of the respective shallow piezometer. The intermediate piezometers are installed to a depth of approximately 32 feet. Ground water levels will be monitored in the standpipes and the piezometers to evaluate the presence of an inward hydraulic gradient to the ground water collection trench. Shallow piezometers (P-5 and P-6) located on either side of the cutoff wall near the northeast toe of the low-permeability cover will monitor ground water levels in the vicinity of the ground water cutoff wall. Details of the piezometers are shown on Sheet G-11 of the Record Drawings included as Appendix A.

3.1.3. Analyses and frequency

Ground water monitoring will be performed quarterly for the first year and semi-annually for the second through fifth years of operation in accordance with the sampling protocols as shown in Appendix C. After the fifth year, the sampling frequency will be re-evaluated. Ground water samples will be submitted for analysis of VOCs in accordance with USEPA Method 8021. Trip blanks will be collected and analyzed for VOCs as required during each sampling event. In addition, one duplicate will be collected during each sampling event for analysis of VOCs.

Ground water levels in the piezometers, standpipes, and ground water monitoring wells will be measured during the ground water sampling events to assess the performance of the ground water collection system. Ground water levels will be measured quarterly for the first year and semi-annually for the second through fifth years of OMM.

3.1.4. Data evaluation

Following receipt and review of the field and analytical data for each sampling event, a report will be prepared for submittal to NYSDEC. Data will be summarized and provided to NYSDEC quarterly for the first year and semi-annually for the second through fifth years, in the form of a letter report.

The reports will include the following information:

- Summary of activities performed (including any additional tasks)
- Depth to ground water measurements and static water elevations
- Tabular presentation of analytical results (including previous results)

An evaluation of the results of analytical testing versus the discharge criteria will also be presented in the letter report.

3.4. Record keeping

The long-term monitoring activities will be performed for a period of 30 years following closure, unless the five year reviews indicate that a different monitoring period is warranted. Modifications of monitoring procedures will be made only with the concurrence of the NYSDEC. Copies of records, reports, or other information relative to operation, maintenance, and monitoring activities at the site will be provided to NYSDEC and NYSDOH.

4. Contingency plan

The contingency plan presented in this Section will be implemented in the event that components of the implemented remedy fail to operate in accordance with the intent of the Remedial Design.

4.1. Freezing conditions

If freeze/thaw activity causes heaving that may impact the integrity of the low-permeability cover, the heaved area should be scarified, recompacted, topsoil reinstalled, and the area reseeded.

4.2. Heavy rains

Repeated heavy rainfall could cause erosion of the low-permeability cover, prior to establishment of a vegetative cover. If this occurs, the eroded area should be scarified and additional cover material added, if necessary, and recompacted. Topsoil would then be applied and reseeded. Areas of persistent erosion may require utilization of an erosion control fabric or ditching and rip-rap.

4.3. Ground water quantities

In the event that quantities of ground water collected increase significantly with time, an evaluation would be performed to identify the source of the ground water quantities being collected.

4.4. Ground water collection

In the event that the ground water collection system piping becomes clogged, cleaning of the pipes will be necessary to maintain the flow capacities in the system. If any component of the ground water collection system, including cleanouts, standpipes, dry vault, and wet well is found to be damaged or malfunctioning, it will be promptly repaired or replaced.

4.5. Ground water treatment system

The ground water treatment system is protected by several alarms that will dial out to O'Brien & Gere Operations in the event of an alarm condition, as discussed in Section 2.4.1. O'Brien & Gere Operations will respond to the alarm condition and address the cause of the alarm. A log of alarm conditions will be maintained. In the event of a major problem, the PPs and NYSDEC will be notified.

4.6. Ground water contamination

Potential impacts on ground water quality will be monitored by routine sampling and analysis of site ground water monitoring wells, as discussed in Section 3. The NYSDEC and NYSDOH will be provided with the results of sampling and analyses. If data evaluation performed in accordance with Section 3.1.4 indicates that ground water quality is worsening, additional sampling and analyses should be performed to verify the initial results. If warranted by the initial data evaluation and the verification sampling, an evaluation will be performed to evaluate if any further action could be necessary to determine the cause of and solution to the problem.

4.7. Surface water control facilities

Should flow in the surface water control facilities become inhibited by the accumulation of excessive debris or soil from the erosion of adjacent materials, appropriate measures would be taken to repair or clean the channel to maintain flow capacities. Areas of persistent channel erosion may require additional improvements including regrading, filling or placement of rip-rap.

4.8. Health and safety

In the event that routine maintenance and monitoring activities indicate problems with the remedial components, activities outlined in this contingency plan would be implemented. The type of health and safety requirements to be implemented in the event of failure of the remedial components would depend on the type of failure and field activities conducted in implementing this contingency Planner It is likely that health and safety requirements utilized in the event of implementation of this contingency plan will be similar to those implemented during remedial construction. However, it may be necessary to develop specific health and safety requirements and procedures to address the specific conditions encountered.

4.9. Emergency contacts

In the event of an emergency at the site, the PPs should be contacted as appropriate. The current addresses and phone numbers are as follows:

- Mr. Michael Ianniello
  Corporate Environmental Programs
  Remedial Project Manager
  General Electric Company
  1 Computer Drive South
  Albany, New York 12205
  518-458-6612

- Mr. JR Rao
  Associate Manager, EHS Planning
  Bristol-Myers Squibb Company
  6000 Thompson Road
  East Syracuse, New York 13057-5050
  315-432-9653

The NYSDEC may also be contacted as necessary. The current address and phone number is as follows:

- Mr. John Strang
  Department of Environmental Remediation
  NYS Department of Environmental Conservation
  50 Wolf Road
  Albany, New York 12233
  518-457-0927

References

Administrative Order on Consent between New York State Department of Environmental Conservation (NYSDEC), General Electric Company (GE) and Bristol-Myers Squibb Company (BMS), effective August 1, 1995

Ecology and Environment Engineering, P.C., 1993. Feasibility Study, Abandoned Solvent Center, Site Number 7-34-035, January 1993.

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O'Brien & Gere Engineers, Inc., 1998a. Basis of Design Report, Ground Water Treatment System Remedial Design, Abandoned Solvent Center Site, Pompey, New York, Site Code #734035, July 1998a.

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Partial Consent Decree (No. 97-CV-0976) between NYSDEC, GE, and BMS, December 15, 1997.