1.0 INTRODUCTION

On December 12, 1994, the New York State Department of Environmental Conservation (Department or NYSDEC) signed a Record of Decision (ROD) to select a remedy for the cleanup of the Morse Industrial Corporation Site (site). The major component of the remedy was a two-phase vacuum extraction system that was installed to intercept and treat contaminated groundwater and soil vapor emanating from the site. However, performance monitoring has indicated that the system has only been partially effective. Contaminated groundwater continues to migrate off site, while soil vapor has adversely impacted the indoor air quality in a number of on-site buildings and in several nearby structures. In addition, investigations conducted subsequent to implementation of the ROD revealed the presence of a weathered petroleum product in the subsurface in several areas of the plant.

This proposed ROD amendment includes an upgrade to the existing extraction system to provide more effective hydraulic control of the groundwater plume and to enhance removal of the contaminant mass. This would be combined with in situ treatment of the plume.

Additional provisions of this proposed ROD amendment include the removal of weathered petroleum product, the implementation of mitigative measures to address soil vapor intrusion into the plant buildings, and the evaluation of remedial alternatives to control and/or mitigate the migration of soil vapor into the surrounding neighborhood.

A public comment period has been set from February 19, 2009 to March 20, 2009 to provide an opportunity for the public to comment on the proposed amendment. A public meeting is scheduled for Thursday, March 5, 2009 at the Ithaca Town Hall beginning at 7:00 PM. An availability session will also be held from 2:30 to 4:30 PM on the same day to allow interested parties an opportunity to meet with State officials on an individual basis.

At the public meeting, a description of the original ROD and the circumstances that have led to the proposed amendment will be presented. After the presentation, a question and answer period will be held, during which time verbal or written comments will be accepted. We encourage you to review this proposal and attend the meeting.

Written comments may also be sent to:

Gregg A. Townsend, PE
Regional Hazardous Waste Remediation Engineer
NYS Dept. of Environmental Conservation
Division of Environmental Remediation
615 Erie Boulevard West
Syracuse, NY 13204-2400
Phone: (315) 426-7551

Comments will be summarized and responses will be provided in a Responsiveness Summary that will be issued as part of the ROD amendment, once it is finalized.
The information here is a summary of what can be found in greater detail in reports that have been placed in the Administrative Record for the site. These documents are available at the following repository:

Tompkins County Public Library
101 East Green Street
Ithaca, NY 14850
Phone: (607) 272-4557
Hours: M-Th: 10AM - 8:15PM, F-Sa: 10AM - 5PM, Su: 1PM - 5PM

The Department may modify or reject the proposed amendment based on new information or public comments. Therefore, the public is encouraged to review and comment on this document.

2.0 SITE INFORMATION

2.1 Site Description

The Morse Industrial Corporation site occupies 110 acres along the west side of South Aurora Street/Danby Road (Route 96B) in the South Hill portion of the Town of Ithaca (Figure 1). The site’s surface elevation ranges from 450 to 720 feet above mean sea level, resulting in a very hilly topography. The site consists of three main buildings flanked by a number of smaller buildings to the southwest and a series of access roads and parking lots that terrace the hillside above the plant to the east. Undeveloped woodland borders the site to the southwest along the steep embankments of South Hill. North of the plant, the topography drops off at a 40% grade (approximately 80 feet) to a residential area. This is bordered by Six Mile Creek to the west, which flows north along the base of South Hill and eventually empties into Cayuga Lake approximately two miles northwest of the site. Access to the site is restricted by a fence and guardhouse. The layout of the site is depicted on Figure 2.

2.2 Site History

The original plant building was constructed in 1906 by Morse Industrial Corporation, which manufactured steel roller chain for the automobile industry. From approximately 1928 to 1983, Borg-Warner Corporation owned the property and manufactured automotive components and power transmission equipment. Up until the late 1970s, Borg-Warner used trichloroethene (TCE), a common solvent at the time, for cleaning and degreasing metal parts. An estimated sixty metal piercing and blanking machines were in operation from the early 1950s to 1977. These machines reportedly operated without drip pans in the 1950s, and solvents used to clean the residual oil from the floors appear to have been flushed into the plant’s sanitary sewer system. In addition, solvents were discharged to the facility’s fire water reservoir, which is constructed of concrete and extends approximately 19 feet below ground surface (bgs). Groundwater is encountered at a depth of 12 feet bgs in the vicinity of the reservoir at the soil/bedrock interface. It is believed that the solvents migrated through cold joint cracks in the sidewalls and base of the reservoir and into the surrounding bedrock, which is highly jointed and fracted.

In 1983, Morse Industrial Corporation was purchased from Borg-Warner by Emerson Electric Company, and in the late 1980s the facility became known as Emerson Power Transmission (EPT). EPT currently manufactures industrial roller chain, bearings, and clutching for the power transmission industry. Under Emerson’s ownership, TCE has not been used at the facility.

In February 1987, EPT notified the Department of the discovery of TCE in oil skimmed from the surface of the fire water reservoir. An environmental assessment was initiated at that time to address TCE contamination in the reservoir and to determine whether TCE had impacted groundwater. As part of this work, the reservoir was emptied and cleaned using high pressure water, and monitoring wells were installed around its perimeter. Samples collected from the wells confirmed that the local groundwater had been impacted, and that the reservoir was likely the source.
As a consequence, in July 1987 the site was added to the New York State Registry of Inactive Hazardous Waste Disposal Sites.

In July 1988, EPT entered into a Consent Order with the Department to perform a Remedial Investigation/Feasibility Study (RI/FS). The RI Report was submitted in February 1990. Based on the results of the investigation, and given the schedule length of the RI/FS, the Department requested that EPT take immediate steps to address the groundwater contamination associated with the reservoir. Accordingly, in May 1991 the existing Order was amended to require implementation of an Interim Remedial Measure (IRM), and in August of that year EPT finished construction of a groundwater pump and treat system to operate until such time as the FS was completed.

Also as part of the amended Order, EPT was required to implement a monitoring program to assess the potential for contaminated soil vapor to migrate from the site to adjacent properties.

In August 1992, the reservoir was rehabilitated and put back into service. This entailed patching cracks in the concrete and installing a liner.

From October 1993 through February 1994, as part of the FS, EPT conducted a pilot test utilizing a two-phase vacuum extraction system. The results of the pilot test indicated that the two-phase system would outperform the existing pump and treat system. The FS Report was submitted in August 1994. Following issuance of the ROD in December 1994, the pump and treat system was modified to accommodate vacuum extraction, and the two-phase system was placed into operation in July 1996.

2.3 Nature and Extent of Site Contamination

As described in the original ROD and other documents, many soil, groundwater, product, soil vapor, and indoor air samples have been collected to characterize the nature and extent of contamination, both on site and off site. The primary contaminants of concern are chlorinated volatile organic compounds (VOCs) including TCE, tetrachloroethylene (“perc” or PCE), and their degradation products. Groundwater and soil vapor are the media that have experienced the most adverse impact.

Historically, the highest concentrations of VOCs in groundwater have been detected downgradient of the fire water reservoir. A TCE concentration of 43,000 parts per billion (ppb) was detected in a sample collected from this area as recently as July 2007. (The corresponding groundwater quality standard for TCE is 5 ppb.) In general, the concentration of TCE and other VOCs declines northwest of the plant in the direction of groundwater flow. VOC concentrations in wells located in the neighborhood north of the site have been very low to non-detect.

With respect to soil vapor, VOC concentrations have been detected at levels high enough to warrant sub-slab, basement, and indoor air testing in several plant buildings and off-site structures. The results of this testing, when compared to the New York State Department of Health (NYSDOH) guidance for soil vapor intrusion, prompted the installation of vapor mitigation systems on some nearby homes. Mitigation measures are also planned for on-site buildings, while the off-site study/mitigation area continues to be expanded.

In addition to VOCs, a weathered petroleum product has been encountered in several locations throughout the plant, including a former open stone reservoir, the former location of a 500-gallon aboveground gasoline storage tank, and the area around the fire water reservoir. These areas of concern (AOCs) are referred to as AOC 4, AOC 15, and AOC 24, respectively. Whenever product was observed in a boring completed within one of these AOCs, a soil sample was collected from the saturated zone immediately below the product layer for VOC analysis. All of the sample results were either non-detect, or were below the Department’s soil cleanup objectives for restricted industrial use settings.
2.4 Summary of Human Exposure Pathways

This section describes the types of human exposures that may present added health risks to persons at or around the site. An exposure pathway describes the means by which an individual may come into contact with a contaminant. An exposure pathway has five elements: 1) a contaminant source; 2) contaminant release and transport mechanisms; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population.

The source of contamination is the location where contaminants were released to the environment (i.e., any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure. An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Pathways which are known to, or may exist at the site include:

- Direct contact with contaminated soil or groundwater by construction or utility workers.
- Inhalation of contaminated vapors by plant personnel or off-site residents or building occupants as a result of soil vapor intrusion into on-site buildings and nearby structures.

2.5 Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

Site contamination has impacted the shallow and intermediate bedrock groundwater (i.e., the B-zone and C-zone, respectively) underlying the site. However, the only potential pathway for environmental exposure would be from a groundwater discharge or site runoff into Six Mile Creek. Groundwater samples indicate that the contaminant plume has not traveled far enough to affect the creek. In addition, three drainage swales that empty into the creek were sampled and the results indicate that surface water is not contributing detectable concentrations of VOCs to the creek. Very low levels of petroleum hydrocarbons were detected, but the most likely source is surface runoff from parking lots and roads.

2.6 Original Remedy

The elements of the remedy selected in the original ROD included the following:

- Installation and operation of a two-phase vacuum extraction system to remove and treat contaminated groundwater and soil vapor associated with historical releases of VOCs from the fire water reservoir.
- Sampling of select monitoring wells to track the progress of remediation and to check for any changes in the contaminant plume.
- Excavation of petroleum-contaminated soil from the scrap metal conveyor/loading area.
- Continuation of the soil vapor monitoring program.
3.0 DESCRIPTION OF PROPOSED CHANGES

3.1 New Information/Interim Remedial Actions

On-site

A series of investigations was conducted in the area of the fire water reservoir in August 2003, June 2006 and the fall of 2007 to further evaluate the hydraulic characteristics of the B-zone and C-zone aquifers. In general, the investigations found that dissolved contaminants are migrating horizontally within the highly fractured B-zone, and vertically through open joint sets that intersect a horizontal bedding plane fracture at the base of the C-zone. This fracture represents a significant migration pathway for contaminated groundwater. In addition, the investigations identified the presence of a substantial amount of VOC mass within the upper portion of the B-zone, and a weathered petroleum product in a well located east of the reservoir.

In the spring of 2008, a pre-design investigation was completed to further characterize the C-zone bedding plane fracture, and to delineate the extent of affected groundwater within the fracture. An exploratory boring was also completed in the deeper D-zone to confirm previous observations that the lower section of the bedrock remains unaffected by historical releases of contamination from the reservoir.

The original groundwater extraction system only extracted groundwater from a portion of the C-zone. The system was upgraded during the fall of 2008 by the incorporation of additional extraction wells to address the contaminant mass in both the C-zone bedding plane fracture and in the highly fractured and jointed B-zone.

From the start of operations in July 1996 through December 2007, the existing system had removed approximately 417 pounds of aqueous-phase and vapor-phase VOCs, combined. In comparison, the removal rate of the upgraded system has been estimated at just over three pounds per day for the aqueous phase alone. The system enhancements were completed as an Interim Remedial Measure (IRM) pursuant to the existing Order and a NYSDEC-approved work plan. An Operations, Maintenance, and Monitoring (OM&M) Plan is being implemented to evaluate the system’s effectiveness.

One of the areas of concern evaluated as part of the 2007 Supplemental Remedial Investigation (SRI) was the former Department 507 degreaser (i.e., AOC 1). Historical operations included two conveyor-type vapor degreasers located in a depressed floor area within Building 4. Solvents used in the degreasing process included TCE and Safe-Tee-Solvent, a mixture of PCE and methylene chloride. During drilling activities a solvent odor was noted in three of four borings completed in this area, and elevated levels of VOCs were detected in soil and groundwater samples collected from both the interior and exterior of the building.

A weathered petroleum product was identified in three areas of concern during the installation of soil borings and monitoring wells as part of the SRI. As discussed in Section 2.3, these areas include a former open stone reservoir, the former location of a 500-gallon aboveground gasoline tank, and the area around the fire water reservoir.

The results of an indoor air assessment performed in the EPT facility in December 2005 and February 2006 identified several locations within the plant buildings where mitigative measures are necessary to address soil vapor intrusion.
Off-site

Between August 2003 and July 2008, a series of supplemental investigations was completed by EPT to better define the nature and extent of contamination on and off site, and to understand the relationship between the contaminants of concern, transport pathways, routes of exposure, and receptors. These investigations found that during Borg-Warner’s ownership, solvents were discharged into the municipal sewers that service the plant from Turner Place and South Cayuga Street to the northwest (Figure 2). The sewer lines are trenched directly into fractured, unsaturated bedrock. Historically, wastewater containing dissolved VOCs leaked through joints and cracks in the sewer lines into sediment-filled fractures in the bedrock. Residual contamination remains in the pore spaces of the sediment, held by capillary forces. The VOCs subsequently volatilize and are transported by diffusion along one or more preferential pathways: the sewer lines themselves, residential sewer laterals, and/or the bedrock fractures. The indoor air quality in several homes in the vicinity of the sewer lines has been adversely impacted by soil vapor intrusion, resulting in the installation of sub-slab depressurization systems to mitigate exposure to VOC vapors.

Remedial actions to address the off-site migration of contaminated soil vapor will be selected by the NYSDEC following EPT’s evaluation of the investigation results and completion of an alternatives analysis. Alternatives to be evaluated must include soil vapor extraction (SVE) and in situ treatment (e.g., granular activated carbon) along the confirmed migration pathways, as well as in situ treatment of the VOC-contaminated bedrock. Following review of the alternatives analysis, the Department will identify a remedy that will be subject to public review and comment prior to implementation.

3.2 Proposed Changes

On-site Groundwater

Fire Water Reservoir

The proposed remedy is in situ treatment to be utilized in conjunction with the upgraded groundwater extraction system to enhance VOC mass reduction in groundwater in the area below the reservoir. The estimated present worth cost to upgrade the existing groundwater extraction system is $1,365,000 based on a conservative, five-year period of operation. The actual cost could be higher if the system needs to remain in service for a longer period of time, or if long-term groundwater monitoring is required. The estimated capital cost for the system upgrade is $607,000 and the estimated annual OM&M cost is $175,000. With respect to in situ treatment, bench- and/or pilot-scale testing would be required in order for an appropriate technology to be selected. A work plan for the testing would be submitted for Department review.

Former Department 507 Degreaser

The proposed remedial alternative to address VOC-contaminated groundwater in the former degreaser area is In situ Chemical Oxidation (ISCO) followed by Monitored Natural Attenuation (MNA). Pilot testing would need to be performed to select an appropriate oxidant, application procedure, and optimal rate of application. It is anticipated that persulfate will be tested because it has the capability of oxidizing all of the VOCs present and is less likely to inhibit the natural biodegradation process as compared to other oxidants such as permanganate. As part of the proposed alternative, two monitoring wells would be installed downgradient of the former degreaser area to determine the extent, if any, of affected groundwater in the shallow B-zone. The scope of the proposed remedial approach would then be adjusted depending upon the results of groundwater samples collected from these wells. The estimated costs for ISCO and MNA are $687,000 and $541,000, respectively.
On-site Soils

The proposed remedy for addressing the VOC-contaminated soils in the former degreaser area is containment/institutional controls. This would involve installation of a low-permeability asphalt cap outside Building 4 and modification of the existing concrete floor inside the building as necessary to mitigate potential exposure to contaminated soil and soil vapor, respectively, and to minimize surface water infiltration (outside the building). The existing asphalt outside the building would be saw cut and removed, along with the gravel subbase to accommodate construction of a new cap. This cap would include a vapor barrier, a layer of gravel fill, and a layer of low-permeability asphalt or concrete. The surface would be finished to match the existing grade of the surrounding asphalt.

Because this remedy would result in contamination remaining in place above soil cleanup objectives, a Site Management Plan would be implemented to insure that the remedy remains protective of public health and the environment. This would include provisions for inspection and maintenance of the cap, a Soils Management Plan to address the potential for future disturbance of the contaminated soil, groundwater monitoring, and use restrictions in the form of an environmental easement. Further, EPT would be required to submit periodic certification that the engineering and institutional controls (ICs/ECs) remain in effect. The estimated cost for this alternative, including annual monitoring and maintenance is $127,000.

Weathered Petroleum Product

The proposed alternative for addressing the presence of weathered petroleum product in AOCs 4, 15, and 24 is removal and off-site disposal. Further evaluation would be conducted to determine the product thickness at each AOC and the most appropriate means of removal (i.e., wells versus collection sumps). The estimated cost for this alternative is $586,000.

On-site Soil Vapor Intrusion

The following described actions are proposed to be conducted as IRMs this winter pursuant to the existing Order and a NYSDEC-approved work plan.

- Basement Level (Buildings 3, 4, 6A, 33 and 34): The interior surfaces of the buildings would be inspected for the presence of cracks and pipe and wire penetrations. Cracks and penetrations would be sealed using elastomeric joint sealant, compatible caulks, non-shrink mortar, grouts, expanding foam, drain seals, or air-tight gaskets. The specific type of material used and the appropriate method of sealing would depend on the size and orientation of the crack/penetration. Repairs to cracks and penetrations that cannot be properly sealed would involve the removal and replacement of a section of the surrounding floor or wall. Upon completion of the work, an OM&M Plan would be implemented to provide regular inspections of the integrity of the repairs, and to monitor indoor air quality. The results of the inspections and monitoring would be reported to the NYSDEC and NYSDOH for evaluation.

Although Building 3 is not currently in use, it is accessed on occasion by maintenance personnel. Therefore, in addition to the above, a Health and Safety Plan (HAS) would be prepared for staff needing access to the building to perform maintenance activities. Further, within Building 4 is a quality assurance laboratory that operates on an independent air handling system. Indoor air sampling would be performed to evaluate the potential for exposure to VOC vapors. If a concern is identified, then the lab would either be moved to another location, or an evaluation of the air handling system would be conducted to determine if enhancements could be made to improve air flow. The floor of the lab would also be assessed for cracks or penetrations and sealed in the same manner as described above, and an OM&M Plan would be implemented.
Main Level (Buildings 8 and 10): The interior surfaces of these buildings would be assessed and repaired in the same manner as described above for the basement level buildings, and an OM&M Plan would be implemented.

Building 24: Building 24 is a five-story, free-standing building located off the northeast corner of the main plant building. Portions of the building had been leased by EPT to the Paleontological Research Institute (PRI) and a non-profit organization for storage space. However, PRI and the non-profit vacated the building in late 2008 and the building will remain unoccupied. Access will be restricted to maintenance and security personnel, and a HASP will be prepared in the event maintenance activities need to be performed.

4.0 EVALUATION OF PROPOSED CHANGES

4.1 Remedial Goals

Goals for the cleanup of the site were established in the original ROD, and have been modified as necessary to account for the results of subsequent investigations. At a minimum, the remedial actions selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remedial goals for this site are to eliminate or reduce to the extent practicable:

- impacts to public health resulting from soil vapor intrusion into buildings at the site and nearby structures;
- ingestion/direct contact with contaminated soil;
- the presence of weathered petroleum product, which represents a potential source of soil and groundwater contamination; and
- the migration of VOC-contaminated groundwater from the site;

Further, the remedial goals for the site include attaining, to the extent practicable:

- ambient water quality standards and guidance values; and
- soil cleanup objectives for the protection of public health and the environment.

4.2 Evaluation Criteria

The criteria used to compare the remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCR Part 375). For each criterion, a brief description is provided. A detailed discussion of the evaluation criteria and comparative analysis is contained in the original Feasibility Study.

The first two evaluation criteria are called threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Public Health and the Environment. This criterion is an overall evaluation of each alternative’s ability to protect public health and the environment.
2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. Implementability. The technical feasibility and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

This final criterion is considered a modifying criterion and is considered after evaluating those above. It is focused upon after public comments on the proposed ROD amendment have been received.

8. Community Acceptance. Concerns of the community regarding the proposed changes are evaluated. A Responsiveness Summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the final remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

4.3 Evaluation of Alternatives

On-site Groundwater

*Fire Water Reservoir*

The original groundwater extraction and treatment system only addressed a limited portion of the plume, which has resulted in a substantial amount of contamination remaining in the environment. The upgraded system has been designed to address the plume and its migration pathways comprehensively, thereby providing a significant increase in the rate of contaminant removal.
The primary SCG considered by the NYSDEC in developing the proposed ROD amendment for the VOC-contaminated groundwater was TOGS 1.1.1 (Ambient Water Quality Standards and Guidance Values). Since the original groundwater extraction and treatment system was placed into operation, monitoring has shown that contaminant levels have not decreased over time and, in fact, remain at several orders of magnitude above the corresponding standards and guidance values. Accordingly, the configuration of the upgraded system is intended to remove VOCs from the most highly contaminated portions of the plume, and the proposed use of in situ treatment beneath the fire water reservoir will address the plume at its source, further reducing contaminant levels in the groundwater.

The only potential short-term risk associated with the proposed remedy would be exposure to contaminated media by the remediation contractor and subcontractors during construction/implementation. However, all field activities associated with the remedy are routine in nature, and would be conducted in accordance with a project-specific HASP.

In terms of the length of time needed to achieve the remedial objectives, the original groundwater extraction and treatment system had been in operation for seventeen years, and its success in attaining compliance with applicable groundwater quality standards and guidance values was negligible. Operation of the upgraded system, in conjunction with in situ treatment, could achieve the remedial goals in as little as two years.

The original groundwater extraction and treatment system has not proven to be effective in removing the VOC mass, since only a small portion of the contaminant plume has been targeted. In contrast, the upgraded extraction and treatment system combined with the use of in situ treatment is expected to have much greater long-term effectiveness.

Although the original groundwater extraction and treatment system did achieve some degree of reduction in the contaminant mass in both groundwater and soil vapor in the area downgradient of the fire water reservoir, expansion of the system will provide a greater rate of mass reduction in both the aqueous phase and the vapor phase. A reduction in contaminant toxicity would also be accomplished through the in situ treatment of contaminated groundwater beneath the reservoir.

*Former Department 507 Degreaser*

With respect to VOC-contaminated groundwater in the former degreaser area, a number of remedial alternatives were considered, including MNA, air sparging with soil vapor extraction (SVE), in situ treatment, and groundwater extraction and treatment. Potential in situ treatment technologies that were evaluated included chemical oxidation, bioremediation, and installation of a permeable reactive barrier.

MNA was not considered viable as a stand-alone remedy because it would not hydraulically contain the dissolved VOCs, and the source areas and “hot spots” would not be specifically targeted.

Air sparging with SVE was eliminated because the overlying building would prevent direct application of air sparging to the groundwater beneath. In addition, the low permeability and heterogeneity of the subsurface soil would prevent the uniform distribution of air throughout the saturated zone and the transfer of stripped VOCs to the vadose zone.

A permeable reactive barrier (PRB) is a linear zone of reactive materials that either transects or intersects a plume of contaminated groundwater. This technology was not considered feasible because the presence of the building would preclude installation of a PRB along the entire width of the contaminant plume. Further, groundwater treatment would likely need to be extended into the B-zone, and installation of a PRB into bedrock would be cost prohibitive.
Groundwater extraction and treatment was eliminated because this type of system can require a large network of extraction points to insure adequate capture in low-permeability formations such as in the case of the former degreaser area. This can result in a significant increase in equipment and energy costs over the operating life of the system.

While both ISCO and in situ bioremediation satisfied all of the evaluation criteria utilized in the analysis of alternatives, the estimated time frame for ISCO to achieve the remedial goals, including compliance with ambient water quality standards and guidance values is five years, whereas in situ bioremediation is expected to require ten years.

On-site Soils

Remedial alternatives that were evaluated to address VOC-contaminated soils in the former degreaser area included containment/institutional controls, SVE, and excavation.

SVE was eliminated as a viable alternative due to the presence of low-permeability soils and existing structures, which would limit the effectiveness of the technology.

Excavation was not considered feasible because source removal inside an active manufacturing facility (at a depth of ten feet or greater in this instance) would be very difficult, and soils beneath building walls would be inaccessible. In addition, the area is located adjacent to the main wall of Building 4, where excavation of soils at depth could compromise the integrity of the structure.

Weathered Petroleum Product

Remedial alternatives that were evaluated to address the presence of the weathered petroleum product included MNA, ISCO, in situ bioremediation, and removal and off-site disposal.

With regard to MNA, there is no evidence that natural processes are actively degrading the product, and MNA was not considered a viable alternative.

ISCO was eliminated because oxidation is not effective in treating a significant thickness of product.

In situ bioremediation was not retained as a viable alternative because there is no evidence that natural processes are actively degrading the product; injection is difficult in low-permeability, heterogeneous soils, and its application would be complicated by the presence of buildings and structures.

The proposed alternative for addressing the presence of weathered petroleum product in AOCs 4, 15, and 24 is removal and off-site disposal.

5.0 SUMMARY OF PROPOSED CHANGES AND ADDITIONAL REMEDIAL ACTIONS

The Department is proposing to amend the Record of Decision (ROD) for the Morse Industrial Corporation site. The elements of the proposed amendment, to be implemented pursuant to the existing Order, are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. Upgrades to the existing groundwater extraction and treatment system, already completed as an IRM, to provide greater hydraulic control of the groundwater plume within the bedrock subsurface and to increase the removal rate of dissolved-phase and vapor-phase VOC contamination.
3. In situ treatment of groundwater below the fire water reservoir to supplement the upgraded groundwater extraction and treatment system.

4. Construction/maintenance of a low-permeability cap over contaminated soils in the vicinity of the former Department 507 degreaser to prevent direct contact with the soil or inhalation of soil vapors, and to minimize surface water infiltration. In situ treatment of groundwater would also be provided.

5. Sealing/repair of cracks and penetrations in on-site buildings to be completed as an IRM to eliminate the potential for plant employees to be exposed to VOC vapors via soil vapor intrusion.

6. Removal and off-site disposal of free product from AOCs 4, 15, and 24 to eliminate potential sources of soil and/or groundwater contamination.

7. Completion of an alternatives analysis and selection of remedial actions to address the migration of VOC vapors into the surrounding neighborhood and to mitigate the potential for residents to be exposed via soil vapor intrusion into homes. A public review and comment period would be provided prior to final selection of a remedy.

8. Imposition of an institutional control in the form of an environmental easement that would require: (a) limiting the use and development of the property to industrial use; (b) compliance with the approved Site Management Plan; (c) restricting the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; and (d) the property owner to complete and submit to the Department a periodic certification of institutional and engineering controls.

9. Development of a Site Management Plan to identify and implement all required institutional and engineering controls, including all necessary operation, maintenance, and monitoring activities.

10. The property owner would provide periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or other such expert acceptable to the Department, until the Department notifies the property owner in writing that this certification is no longer needed. This submittal would: a) contain certification that the institutional controls in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; b) allow the Department access to the site; and c) state that nothing has occurred that will impair the ability of the control to protect public health or the environment, or constitute failure to comply with the Site Management Plan unless otherwise approved by the Department.

**6.0 NEXT STEPS**

As described above, there will be a public meeting and comment period on the proposed ROD amendment. At the close of the comment period, the Department will evaluate the comments received and prepare a Responsiveness Summary which will be made available to the public. A notice describing the Department's final decision will be sent to all persons on the site mailing list.

If you have questions or need additional information, you may contact any of the following:

<table>
<thead>
<tr>
<th>Gregg A. Townsend, PE</th>
<th>Diane Carlton</th>
<th>Susan B. Shearer, PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYSDEC</td>
<td>NYSDEC</td>
<td>NYSDOH</td>
</tr>
<tr>
<td>Division of Environmental Remediation</td>
<td>Division of Public Affairs</td>
<td>547 River Street, Room 300</td>
</tr>
<tr>
<td>615 Erie Boulevard West</td>
<td>615 Erie Boulevard West</td>
<td>Troy, NY 12180-2216</td>
</tr>
<tr>
<td>Syracuse, NY 13204-2400</td>
<td>Syracuse, NY 13204-2400</td>
<td>Phone: (518) 402-7860</td>
</tr>
<tr>
<td>Phone: (315) 426-7551</td>
<td>Phone: (315) 426-7403</td>
<td>(800) 458-1158, ext. 27860</td>
</tr>
</tbody>
</table>

Proposed ROD Amendment: Morse Industrial Corporation