ROD File

Morse Industrial Corporation

Inactive Hazardous Waste Site

Ithaca, Tompkins County, New York
Site No. 7-55-010

RECORD OF DECISION

December 1994

Prepared by:

New York State Department of Environmental Conservation
Division of Hazardous Waste Remediation

DECLARATION STATEMENT - RECORD OF DECISION

Morse Industrial Corporation Inactive Hazardous Waste Site
Ithaca, Tompkins County, New York
Site No. 7-55-010

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedial action for the Morse Industrial Corporation Inactive Hazardous Waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law (ECL). The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based upon the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Morse Industrial Corporation Inactive Hazardous Waste Site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A bibliography of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential threat to public health and the environment.

Description of Selected Remedy

Based upon the results of the Remedial Investigation/Feasibility Study (RI/FS) for the Morse Industrial Corporation site and the criteria identified for evaluation of alternatives, the NYSDEC has selected Two Phase Groundwater Extraction for remediating the contaminated groundwater and excavation and disposal at an asphalt plant or landfill for the petroleum constituent contaminated soil. The components of the remedy are as follows:

- Two Phase Groundwater Vacuum Extraction wells will be installed and operated until remedial goals are met. The three existing conventional extraction wells will be modified to accommodate vacuum extraction and a minimum of two new vacuum extraction wells will be installed.

- The existing IRM treatment system will be modified to include provision for the treatment of the air stream produced as a result of the vacuum extraction process. It will be modified to conform to the operational constraints of the vacuum extraction system.

- Selected wells will be sampled as part of the Operation, Maintenance and Monitoring (OM&M) to track the progress of remediation as well as any plume changes and VOC removal rates will be monitored. If removal levels fall below the optimum point for operating the vacuum extraction system, the vacuum extraction wells may be modified, with NYSDEC approval, to conventional extraction wells.

- A soil excavation program to remove petroleum contaminated soil from the scrap conveyor/loading area. Contaminated soil that cannot be excavated due to physical constraints will be paved over. Excavated soil will be sent to an asphalt plant or a permitted landfill, depending on the availability of an asphalt plant to accept the soil.

- Concurrent with the OM&M program, the ongoing vadose zone sampling program will be completed. Should the sampling indicate a problem in the vadose zone which may impact human health, mitigative measures will be developed and implemented.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the statutory preference for remedies that reduce toxicity, mobility, or volume as a principal element.

Although the petroleum contaminated soil is not a defined hazardous waste, the cleanup of this soil is discussed in the ROD. The cleanup of this soil is consistent with procedures used in the NYSDEC Oil Spills Program.

12/23/94
Date

Ann Hill DeBarbieri
Deputy Commissioner

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MORSE INDUSTRIAL CORPORATION SITE
Town of Ithaca, Tompkins County, New York
Site No.7-55-010

SECTION 1: SITE LOCATION AND DESCRIPTION

The Morse site occupies 94 acres adjacent to highway 96B in the Town of Ithaca, Tompkins County. The area is residential and industrial with Ithaca College located to the southeast of the plant, on highway 96B. A New York State Electric and Gas (NYSEG) substation is located adjacent to the northwest site boundary. North of the plant, the topography drops off at a 40% grade (approx. 80 feet) to a residential area. Many of the these houses are rented by college students. The site surface elevation ranges from 450 to 720 feet above mean sea level; resulting in a very hilly topography. Figure 1 shows the site location and Figure 2 shows the site layout.

The site has been an industrial facility since 1906 and is presently dominated by the main plant building. Located around the main plant building are several smaller buildings and a scrap conveyor/railroad car loading area. Access to the site is restricted by a fence and guardhouse.

Emerson Power Transmission Company (EPT), formally Morse Industrial Corporation, currently manufactures steel roller chain at the plant. This process includes metal stamping, heat treating, oil quenching, parts washing, and final product assembly.

SECTION 2: SITE HISTORY

2.1: Operational/Disposal History

Information relative to specific activities from the start of industrial operations at the site in 1906 through 1950 is largely unavailable. From about 1950 through 1977, activities included metal stamping, solvent degreasing, purification of spent trichloroethylene (TCE) by distillation, copper plating, cadmium plating, and wire drawing.

An estimated 60 metal piercing and blanking machines operated from the early 1950's to 1977. These machines apparently operated without oil drip pans in the 1950's and solvents used to clean the residual oil from the floors appear to have been flushed into the plant sewer.

A metal scrap conveyor and several solvent degreaser distillers were installed in the early 1960's. In 1973, a distiller used to recycle TCE was removed. No documentation exists regarding the removal and disposal of the distiller or any resulting waste products. At an unknown time,

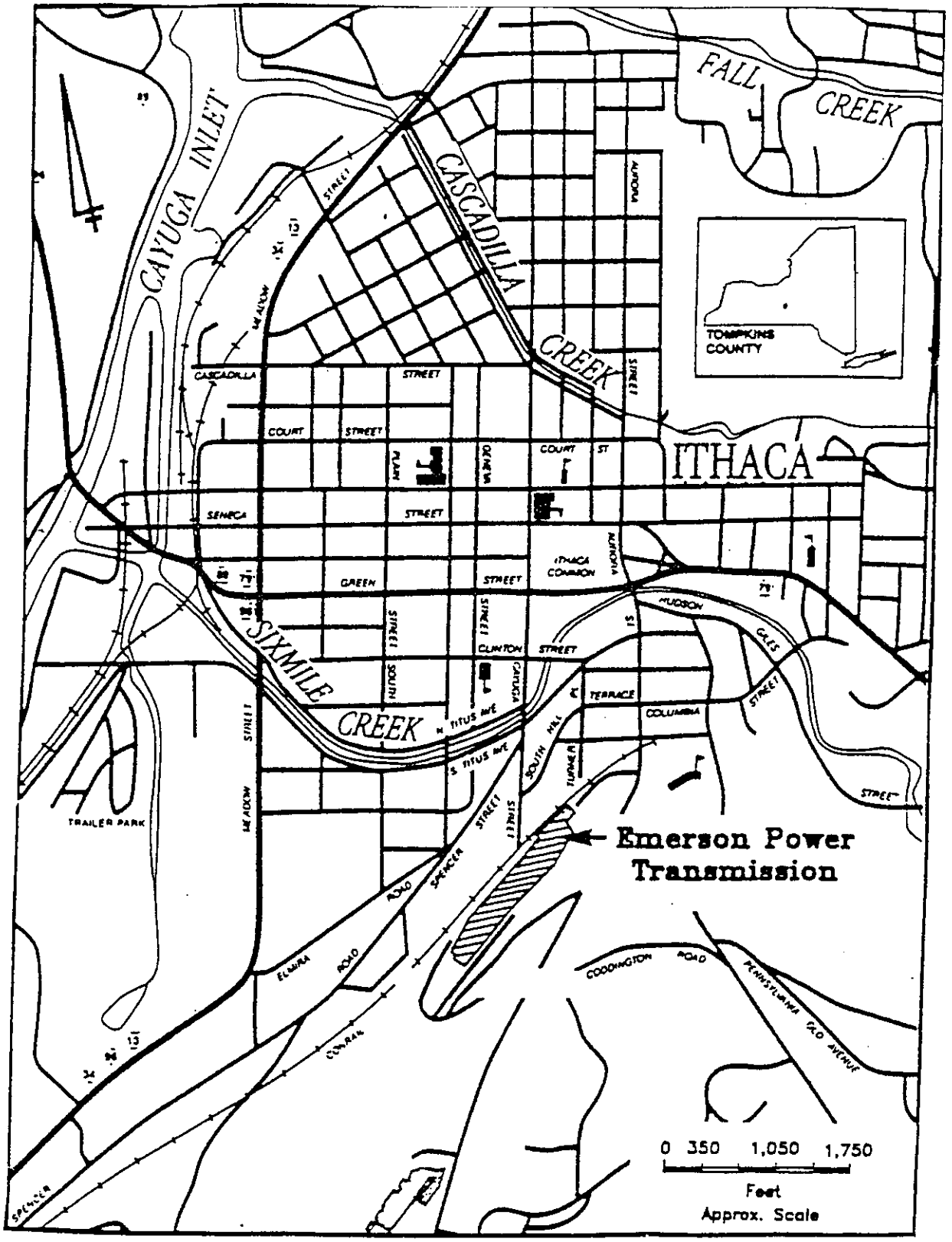

Figure 1 Site Location

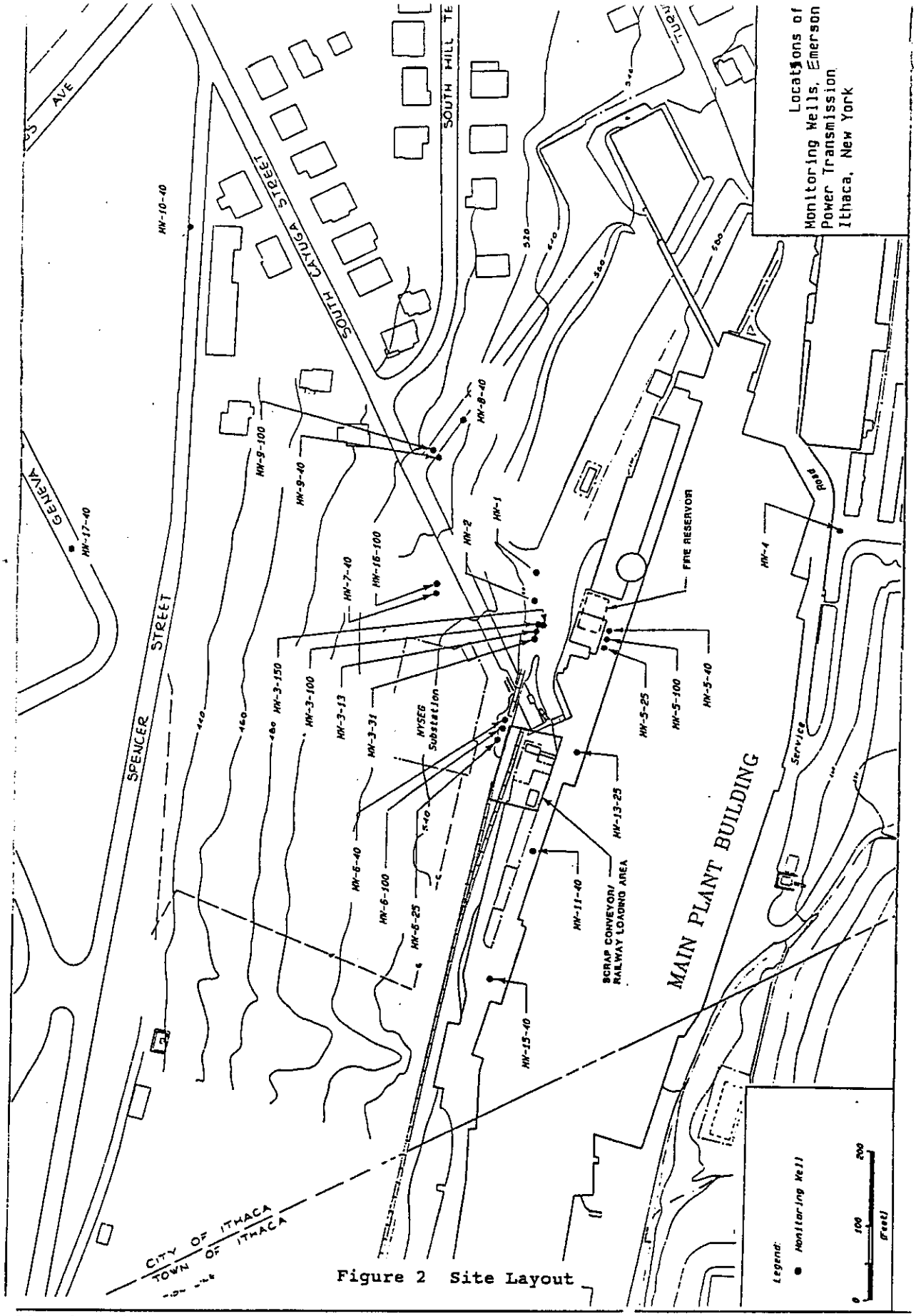

Figure 2 Site Layout

solvent leaked from the degreaser into the sanitary sewer. TCE usage ceased in 1983.

Copper plating and Cadmium plating occurred from 1967-1982 and 1960-1975 respectively. A wire mill operated from 1969-1984 to make wire pins for roller chain.

Current operations include primarily metal stamping and steel roller chain assembly.

2.2: Remedial History

February 1987: EPT notified NYSDEC of the discovery of TCE in oil skimmed off the surface of an underground fire reservoir. At this time, EPT hired Radian Corporation to prepare a preliminary environmental assessment to address TCE contamination in the fire reservoir and to investigate whether TCE had impacted groundwater.

As part of this work, the reservoir was emptied and cleaned using high pressure water and five monitoring wells were installed. Samples were collected of the groundwater from these wells, soil, surface water and sediment from Six Mile Creek, and seeps. This sampling showed local groundwater was contaminated and that the fire reservoir was most likely a source. The study also detected petroleum hydrocarbons in soil taken from the railroad ditch.

July 1987: The site was added to the New York State Registry of Inactive Hazardous Waste Disposal Sites.

July 1988: EPT signed a consent order with the NYSDEC for a remedial investigation/ feasibility study (RI/FS) and remedial program at the site.

February 1990: Radian Corporation submitted the RI. This information was used to evaluate interim remedial measure (IRM) alternatives and to complete the Feasibility Study (FS).

May 1991: EPT entered into a consent order for an IRM.

August 1991: EPT finished construction of a groundwater extraction and treatment system (henceforth referred to as "pump and treat system") to operate as an IRM prior to completion of the FS.

May 1991: NYSDOH collected air samples from homes near the Morse site. Based on these samples, the NYSDOH requested and EPT agreed to install vadose zone monitoring wells to assess the potential for impacts adjacent to the site.

August 1992: The Fire Reservoir was rehabilitated and put back into service. Cracks in the concrete were patched and a liner was installed.

February 1994: EPT completed a pilot test using the Xerox Two-Phase Vacuum Extraction system, which was initiated in October 1993. Pilot test objectives included: evaluating system effectiveness for removing VOCs from the soil, dewatered bedrock, and groundwater; comparing system performance to the pump and treat system; and evaluating the benefit of supplementing or replacing the pump and treat system with two-phase vacuum extraction for remediation.

The pilot test results showed that the two-phase vacuum extraction system outperforms the pump and treat system. The two-phase vacuum extraction system removes greater quantities of groundwater, has higher VOC removal rates, and has a greater zone of influence.

June 1994: Four vadose monitoring wells were installed and will be sampled on two occasions. This investigation will be completed concurrently with the monitoring program for the remedy selected by this PRAP. Should the need for further remediation or other mitigation be identified it will be evaluated as a component of the operation and maintenance program for the site.

SECTION 3: CURRENT STATUS

The Potentially Responsible Party (PRP), Emerson Power Transmission, initiated a RI/FS in July 1988 to address the contamination at the site.

3.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of contamination resulting from previous activities at the site. The RI was conducted in two phases, the first phase between July 1988 and July 1989 and the second phase between July 1989 and February 1990. A report entitled *Final Report; Remedial Investigation Stages 1 and 2; Emerson Power Transmission (EPT); Ithaca, New York; February 1990* has been prepared describing the field activities and findings of the RI in detail. A summary of the activities included in the RI follows:

- Soil gas survey to determine the potential for site impact on nearby properties and to provide data on the extent of contamination.

- Geologic mapping to determine bedrock type and the occurrence of fracturing.

- Installation of monitoring wells and boreholes to determine the contaminations extent and collect data on area physical and hydraulic properties.

- Sampling of groundwater, soil, surface water, and sediment.

To determine which media (soil, groundwater, etc.) contains contamination at levels of concern, the analytical data obtained from the RI was compared to environmental Standards, Criteria, and

Guidance (SCGs). Groundwater, drinking water and surface water SCGs identified for the Morse site were based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of NYS Sanitary Code. For the evaluation and interpretation of soil and sediment analytical results, NYSDEC soil cleanup guidelines for the protection of groundwater, background conditions, and risk-based remediation criteria were used to develop remediation goals for soil.

Based upon the results of the RI in comparison to the SCGs and potential public health and environmental exposure routes, certain areas and media of the site require remediation. These are summarized below. More complete information can be found in the RI Report.

Chemical concentrations are reported in parts per billion (ppb) and parts per million (ppm). For comparison purposes, SCGs are given for each medium.

Geology and Hydrogeology

The Morse site is located on fractured bedrock and thin overburden and fill material located on a north facing hillside. The overburden is thin near the building and on the steeper slopes, thickening towards the base of the hill. The thickness of the overburden ranges from less than one foot to 33 feet. A mix of glacial till and fill material comprise the thin, low permeability overburden near the facility with glacial outwash deposits making up the thickening, higher permeability overburden towards the base of the hill. Bedrock underlying the site consists of the Ithaca Siltstone, a member of the Upper Devonian Genesee Formation. The siltstone is relatively impermeable, but does contain partings along the bedding planes and near vertical joints. Joint set orientations are north-northwest, east-northeast, and northeast. Both fracture types (partings and joints) provide secondary permeability features for groundwater flow within the bedrock. These features appear to decrease with depth.

Groundwater flow is to the north in the overburden and bedrock with a downward vertical hydraulic gradient. The overburden and fractured bedrock are hydraulically connected throughout the site.

Groundwater

The solvent trichlorethylene (TCE) was detected in about half of the 23 wells sampled, with concentrations ranging from 2 to 470,000 ppb. Concentrations directly downgradient of the fire reservoir, at the top of bedrock were highest (470,000 ppb). Concentrations decreased above and below this zone. Off site wells had low or non-detectible levels of contamination. Decreasing TCE concentrations occurred to the northeast, in the direction of groundwater flow. A monitoring well approximately 130 feet to the northeast of the fire reservoir had a TCE concentration of 60 ppb. Directly upgradient and adjacent to the fire reservoir, a well had a TCE concentration of 18 ppb.

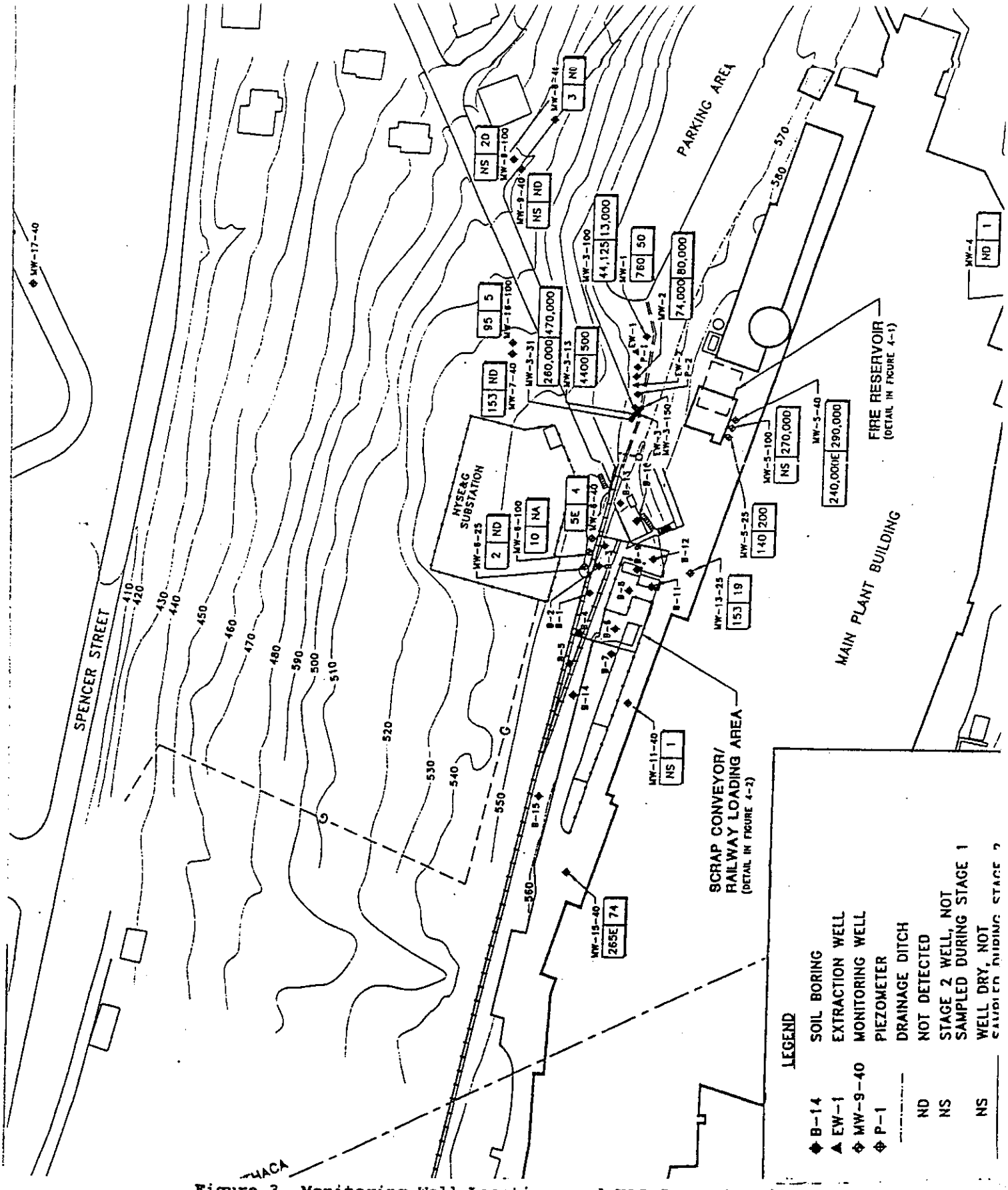

Figure 3 Monitoring Well Locations and VOC Concentrations

TCE degradation products were found in groundwater downgradient from the fire reservoir, including 1,2-dichloroethylene (1,2 DCE) at a maximum concentrated 28,000 ppb and vinyl chloride (VC) at a maximum concentration of 850 ppb. Since these products are not used by EPT, this is evidence that TCE has been in the groundwater long enough to degrade.

Tetrachloroethylene (PCE) was also detected in on-site wells (10,000 ppb max.). Chloroform was detected in several wells and all seep samples (46 ppb max.). Chloroform concentrations were comparable to that found in the municipal water supply serving the plant and may be attributed to leaking water pipes.

The New York State Groundwater Standard is 5 ppb for TCE, PCE, and 1,2-DCE and 2 ppb for vinyl chloride. Figure 3 shows the wells and the concentrations of the VOC contamination identified by the RI.

Fire Reservoir

Water which seeped into the fire reservoir after it was cleaned in 1988 was tested for volatile organic compounds (VOCs), total petroleum hydrocarbons (TPHs), and polychlorinated biphenyls (PCBs). TCE was detected at concentrations ranging from 4 to 16 ppb. These concentrations correspond to what was found in wells upgradient of the reservoir. The probable source is water leaching from cracks in the concrete.

TPHs were detected at low levels. The probable source is surface runoff from the parking lot. PCBs were detected at a concentration of 27 ppb. No PCBs have been detected in groundwater around the reservoir. The levels of PCBs identified in the fire reservoir have been attributed to residual oil located in cracks in the concrete reservoir wall. The walls have subsequently been cleaned and sealed with a liner and the structure returned to use as a fire reservoir for the facility.

Scrap Conveyor/Loading Area

Surface and subsurface soil samples from 15 boring locations were tested for VOCs, TPHs, and PCBs. High concentrations of TPHs were detected ranging from 1,600 to 73,000 ppm. Petroleum contaminated soil, which is indicated by the TPH testing is not considered to be hazardous waste, unless specific constituents exceed regulatory levels which define characteristic hazardous wastes. Based on the low levels of benzene and the other VOCs identified in some of the samples, this is not the case.

All soil samples contained less than 2 ppm PCBs; below the soil clean up objective of 10 ppm. While VOCs were detected (PCE, TCE, 1,1-dichloroethylene (DCE), VC and methylene chloride) at total VOC concentrations ranging from 35 to 620 ppb, the individual constituents do not exceed the soil guidance criteria. These compounds are believed to be residual solvents associated with the metal scrap formally handled in this area. Figure 4 shows the results of the soil boring and sampling program.

Groundwater from wells downgradient of the scrap area contained less than 10 ppb of the VOCs with individual constituents all less than standards.

Surface Water and Sediments

Three surface drainages that empty into Six Mile creek were sampled (surface water and sediment). Surface water and sediment samples were attempted in Six Mile Creek. However, for technical reasons only surface water samples were possible in Six Mile Creek. All samples were tested for TPHs and VOCs. Samples indicated that surface water was not contributing detectible concentrations of VOCs to Six Mile Creek. Low levels of TPHs were detected ($\leq$ ppm) in surface drainages. The most likely source of the TPHs is surface runoff from parking lots and roads.

3.2: Interim Remedial Measures

An IRM is constructed at sites when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS. Because of the schedule length for the RI/FS, the NYSDEC requested that EPT perform an IRM. Pursuant to a consent order, EPT designed a groundwater pump and treat system, which was installed in 1991.

The IRM consists of a system that pumps groundwater from three extraction wells. The groundwater is pumped into an equalization tank from which, after suspended solids have settled out, the water is pumped through granulated activated carbon filters. Periodically, the solids are removed and disposed of appropriately.

The IRM maintains a drawdown in the extraction wells ranging from 10 to 30 feet. The removal of groundwater from the extraction well has had little or no influence on the water level observed in adjacent piezometers and monitoring wells. This suggests that the radius of influence of the pump and treat system is limited to the immediate vicinity of each extraction well. This also limits the extent of the capture zone. Although the system is operating as designed, the limited capture zone makes the long-term success of the IRM questionable.

3.3: Summary of Human Exposure Pathways

This section describes the types of human exposure pathways that may be present to persons at or around the site. A more detailed discussion of the pathways can be found in Section 1.2 of the FS Report.

An exposure pathway is the process by which an individual comes into contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of

exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Completed pathways which are known to or may exist at the site include:

1) Ingestion of groundwater or soil contaminated with the various solvents identified by the RI are potential pathways of exposure. Groundwater flow is slow, limiting the migration of groundwater, and thereby the receptors that could be exposed to contamination. Also, the local residences currently use municipal water, making potential the groundwater pathway incomplete at this time.

   A fence and guardhouse limit access to the site. A steep hill and retaining wall separate the contaminated soil from where Emerson employees work; limiting the possibility of soil ingestion. The soil is also covered by a layer of gravel reducing the chance of surface water being contaminated through erosion. Samples taken from surface drainage and Six Mile Creek indicate that contaminants have not spread via surface water. Therefore, surface water is not considered a completed potential exposure pathway.

2) Inhalation of vapors from the vadose zone is a potential pathway of exposure. The vadose zone in soil is the soil immediately above the groundwater table, which may carry vapors, especially VOCs which are contaminants of concern at the site. This potential pathway is currently being monitored under a vadose zone sampling program. This pathway's potential for exposure of the public to contamination will continue to be monitored as part of the operation of the remedy. Should conditions warrant, alternatives to address the vadose impact would be evaluated and implemented as part of the operation and monitoring of the selected remedial alternative.

3) Dust from the contaminated soil area could be spread by wind. However, this route is presently limited by the fact that contaminated soil is currently under a gravel layer and is expected to remain so for the foreseeable future.

3.4 Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures which may be presented by the site. The only potential pathway for environmental exposure would be from a groundwater discharge or site runoff into Six Mile Creek. Samples indicate that contamination of groundwater has not travelled far enough to affect Six Mile Creek. Contaminated runoff flowing into Six Mile Creek is unlikely since the contaminated soil is under a layer of gravel, which stabilizes the existing soil.

SECTION 4: ENFORCEMENT STATUS

PRPs are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The NYSDEC and the Emerson Power Transmission Company entered into a Consent Order on July 13, 1988. The Order obligates the responsible party to implement a full remedial program. The Order was then amended on May 5, 1991 for the performance of an IRM.

The following is the chronological enforcement history of this site.

Orders on Consent

Date	Index	Subject
7/13/88	A7-0125-8-09	Remedial Program
5/5/91	A7-0125-97-09	Interim Remedial Measure (IRM)

SECTION 5: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR 375-1.10. These goals are established under the overall goal of meeting all SCGs and protecting human health and the environment.

At a minimum, the remedy selected should eliminate or mitigate all significant threats to the public health and to the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- Reduce, control, or eliminate the contamination present within the soils on site.
- Eliminate continued migration of contaminants in the groundwater, preventing potential impact in the vadose zone downgradient of the site.
- Eliminate the threat to surface waters by eliminating any future contaminated surface run-off from the contaminated soils on site.
- Eliminate the potential for direct human or animal contact with the contaminated soils on site.

- Mitigate the impacts of contaminated groundwater to the environment.
- Provide for attainment of SCGs for groundwater quality at the limits of the area of concern.

SECTION 6: SUMMARY OF THE EVALUATION OF ALTERNATIVES

Potential remedial alternatives for the Morse site were identified, screened and evaluated in a FS. This evaluation is presented in the report entitled *Feasibility Study Report; Emerson Power Transmission (EPT); Ithaca, NY; July, 1994*. A summary of the detailed analysis follows.

6.1: Description of Alternatives

The potential remedies are intended to address the solvent contaminated groundwater attributable to the fire reservoir. Alternatives were also developed to address soil contaminated with petroleum products from the scrap conveyor/loading area. These alternatives are presented in this section, however, they will not be included in the evaluation in Section 7.2 since the material are nonhazardous wastes as defined in this program and should not be subject to the remedy selection process of 6NYCRR 375-1.10.

6.1.1: Groundwater Alternatives

No Action

The no action alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in its present state.

Under this alternative the site would remain in its present condition and human health and the environment would not be provided any additional protection. The pump and treat IRM would be disconnected and all identified exposures would continue.

Groundwater Pump and Treat with Conventional Wells

Capital Cost:	$210,600
Annual O&M:	$169,080
Present Worth:	$671,039
Time to Implement:	6 months

Under this alternative the current IRM would be expanded to include fifteen pumping wells. The wells would operate for a minimum of three years. However, because of the local hydrogeology

it is possible that the system would have to operate much longer to achieve the remedial goals. Each well would pump at three gallons per hour. Water extracted from each well would be treated using the activated carbon system currently operating at the facility for the IRM. Treated water would be discharged via the existing permitted SPDES outfall.

Two Phase Groundwater Extraction

Capital Cost:	$184,000
Annual O&M:	$176,000
Present Worth:	$664,101
Time to Implement:	6 months

This alternative is similar to the previous alternative in that groundwater would be removed and treated using activated carbon. This alternative, however, utilizes a two phase groundwater extraction system. Two phase extraction utilizes a vacuum pump which removes both groundwater and soil vapor. Under the existing hydrogeological conditions, this method would be able to extract greater amounts of groundwater and exert a greater zone of influence, increasing the size of the capture zone. In addition, this technology also would remove contaminants from the soils in the vadose zone, before they reach the groundwater, increasing the overall efficiency of the remediation.

Five two phase extraction wells would be located in the area of greatest contaminant concentration. The system should operate for three years, but may reach goals in a shorter time frame. Vapor-liquid separators would separate air and water streams. Both streams would be treated by activated carbon drums as appropriate. Treated water would be discharged via the permitted SPDES outfall and treated air would be discharged to the atmosphere.

6.1.2: Soil Alternatives

No Action

The no action alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state.

Under this alternative as the site would remain in its present condition, and human health and the environment would not be provided any additional protection. All identified exposures would continue.

Excavation and Disposal in a Landfill

Capital Cost:	$249,000
Annual O&M:	$0
Present Worth:	$249,000
Time to Implement:	3 months

Approximately 1,200 tons of petroleum hydrocarbon contaminated soil would be removed from the scrap conveyor/loading area and disposed of at a permitted landfill under this alternative.

A large retaining wall is located adjacent to the excavation area. Digging close to this wall could cause it to collapse. For this reason the extent of excavation would be limited by the stability of the retaining wall. Contaminated soil that cannot be excavated would be paved over. Environmental controls would prevent dust from blowing off-site and control runoff during rain events. Periodic testing of the excavation perimeter would determine when the remedial goals have been met. The excavation would be backfilled with clean soil.

Excavation and Recycling of the Soil in Asphalt Processing

Capital Cost:	$213,725
Annual O&M:	$0
Present Worth:	$213,725
Time to Implement:	3 months

Approximately 1,200 tons of petroleum hydrocarbon contaminated soil would be removed from the scrap conveyor/loading area and transported to an asphalt processing facility to be used as road paving aggregate. The Solid Waste regulations, 6 NYCCRR Part 360-1.15 (12) allow the use of petroleum contaminated soil as aggregate instead of clean soil at a Department authorized asphalt production facility. This beneficial use recycles this material eliminating the need for disposal of the soil in a landfill.

Excavation would also be limited by a large retaining wall as described above. Contaminated soil that cannot be excavated will be paved over. Environmental controls would prevent dust from blowing off-site and control runoff during rain events. Periodic testing of the excavation perimeter would determine when the remedial goals have been met. The excavation would be backfilled with clean soil.

6.2: Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6NYCRR Part 375). For each of the criteria, a brief description is provided followed by an evaluation of the

alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is contained in the FS.

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

1. Compliance with New York State Standards Criteria and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

   The groundwater no-action alternative would not meet chemical specific SCGs since high levels of contamination would be left in the aquifer. The Pump and Treat alternative may not be able to meet chemical specific SCGs due to the local geology. The Two Phase Extraction alternative would have the best chance of meeting SCGs, as demonstrated during the pilot test when one two phase well was able to remove an average of 0.84 pounds per week of VOCs as compared to 0.04 pounds per week of VOCs for three conventional wells combined.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of the health and environmental impacts to assess whether each alternative is protective.

   The groundwater no-action alternative would not address the risk to human health and the environment since contamination would remain in groundwater and continue to migrate. The Pump and Treat alternative and the Two Phase Extraction alternative would be protective of human health and the environment, with the extraction alternative addressing the contamination more effectively since it would be removed from both the groundwater and the vadose soils.

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 implementation are evaluated.

   The no-action alternative would not pose any additional risk to the community since no action would be taken. It is not known how long it would take for natural attenuation to achieve remedial goals. The only potential short term risks associated with the Pump and Treat alternative and the Two Phase Extraction alternative would be handling soil cuttings generated during drilling, and this is a routine operation. The length of time needed to achieve the remedial objectives is also estimated and compared with the other alternatives.

The Two Phase Extraction alternative is expected to achieve remedial goals within three years. The Pump and Treat Alternative will likely take longer than three years to achieve remedial goals.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of alternatives after implementation of the response actions. 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 controls intended to limit the risk, and 3) the reliability of these controls.

   The groundwater no-action alternative would not be effective in the long term since significant amounts of mobile and toxic contaminants would remain. The goal of both the Pump and Treat alternative and the Two Phase Groundwater Extraction alternative is to remove all contaminants. The Pump and Treat alternative may not be able to remove all contamination, thereby questioning its long term effectiveness. Two Phase Extraction would be the alternative that is most likely to remove and treat contaminants and therefore has the greatest long term effectiveness.

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.

   The no-action alternative would produce no reduction in toxicity, mobility, or volume of the contaminants. The Pump and Treat and Two Phase Extraction alternatives would both remove and concentrate contaminants in carbon filters, thereby reducing the mobility, toxicity, and volume. However, it is anticipated that the two phase extraction would remove a greater amount since it would also remove contaminants from the vadose zone.

   It was shown during the pilot test that the Two Phase Extraction alternative would be more effective than the Pump and Treat alternative at removing contamination. The contaminated carbon from the carbon treatment system would be sent off site for treatment or destruction.

6. Implementability. The technical and administrative feasibility of implementing each alternative is evaluated. Technically, this includes the difficulties associated with the construction, the reliability of the technology, and the ability to monitor the effectiveness of the remedy. Administratively, the availability of the necessary personal and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc..

   The no-action alternative would be readily implementable. The Pump and Treat and the Two Phase Extraction alternatives would also both be readily implementable since they

rely on proven and accessible technology.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 1.

Table 1 REMEDIAL COSTS

ALTERNATIVE	NO ACTION	PUMP AND TREAT WITH CONVENTIONAL WELLS	TWO PHASE GROUNDWATER EXTRACTION
CAPITAL COST	$0	$210,600	$184,000
ANNUAL COST	$0	$169,080	$176,000
PRESENT WORTH	$0	$671,039	$664,101

8. Community Acceptance. Concerns of the community relative to the Proposed Remedial Action Plan have been evaluated. A Responsiveness Summary which addresses verbal comments is provided in Appendix A. The community in general is supportive of the selected remedy. The majority of the concerns expressed at the public meeting dealt with the investigation of the soil vadose zone. As previously stated, the vadose zone monitoring program will continue concurrently with the OM&M Program.

SECTION 7: SUMMARY OF THE SELECTED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is selecting the Two Phase Vacuum Extraction alternative to address groundwater contamination. The petroleum soil contamination will be addressed by excavation followed either by use in the production of asphalt, or if not in demand, this material will be landfilled.

The selection of the Two Phase Vacuum Extraction alternative is based upon this alternative's ability to best comply with the above criteria. The no-action alternative would not meet SCGs, would not be protective of human health and the environment, would not be effective in the long term, and would not significantly reduce the toxicity, mobility, or volume of the contaminants.

The goal of both the Pump and Treat alternative and the Two Phase Extraction alternative would be the same, to remove contaminated groundwater and provide treatment using activated carbon filtration. Because of local geology, the Two Phase Extraction alternative is much more effective at removing contamination and will be more likely to achieve cleanup goals.

The estimated present worth cost to implement the groundwater remedy is $664,101. The cost to construct the groundwater remedy is estimated to be $184,600. The estimated average annual operation and maintenance cost for 3 years is $176,080.

The elements of the selected remedy are as follows:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Uncertainties identified during the RI/FS will be resolved.

2. Two Phase Groundwater Extraction wells will be installed and operated until remedial goals are meet. The three existing conventional extraction wells will be modified to accommodate vacuum extraction and at a minimum two new vacuum extraction wells will be installed. The first of these new wells will be located in the vicinity of the existing MW-5 cluster and the second west of existing MW3-31, toward Cayuga Street. The existing wells and the proposed location of the new wells are highlighted on Figure 5.

3. Select monitoring wells will be sampled to track the progress of the remediation as well as to check for any changes in the plume. This monitoring will be a component of the operations maintenance and monitoring (OM&M) program for the site and will be developed in the design phase. Included as a component of the OM&M program will be provision for monitoring of the VOC removal rates. Should removal levels fall below the optimum point for operation of the vacuum extraction system, the vacuum extraction wells could be modified, with NYSDEC approval, to convention extraction wells.

4. The existing IRM treatment system will be modified to include provision for the treatment of the air stream produced as a result of the vacuum extraction process. It will be modified to conform to the operational constraints of the vacuum extraction system.

5. A soil excavation program to remove the petroleum contaminated soil from the scrap conveyor/ loading area. The excavated soil will be incorporated into asphalt pavement products at a facility authorized by the Department. If such a facility is not readily available this material will be disposed in a permitted landfill. A large retaining wall exists adjacent to the excavation area. Excavation near the wall may impact its structural integrity, therefore, the extent of excavation will be limited. Contaminated soil that cannot be excavated will be paved over.

6. The ongoing vadose zone sampling program will be completed concurrently with the OM&M program for the selected remedy. Should this sampling indicate a problem in the vadose zone, which may impact human health, additional mitigation alternatives will be evaluated at that time to address any identified exposure. Any necessary measures will be implemented as a component of the OM&M program.

SECTION 8: SUMMARY OF CITIZEN PARTICIPATION ACTIVITIES

A Citizen Participation Plan was developed concurrently with the RI/FS process. The municipal objectives of the Citizen Participation Plan are: inform the public about conditions at the site; educate the public about the PRAP; obtain public comment on the PRAP; obtain support (community acceptance) of the remedial action; and ensure that all comments obtained from the public are evaluated and answered in a Responsiveness Summary.

As part of the Citizen Participation Plan, the following activities were conducted:

Fact Sheet was mailed out to all interested parties
August 30, 1994, the public comment period commenced
September 13, 1994, a public meeting to present the PRAP was held
September 30, 1994, the public comment period ended

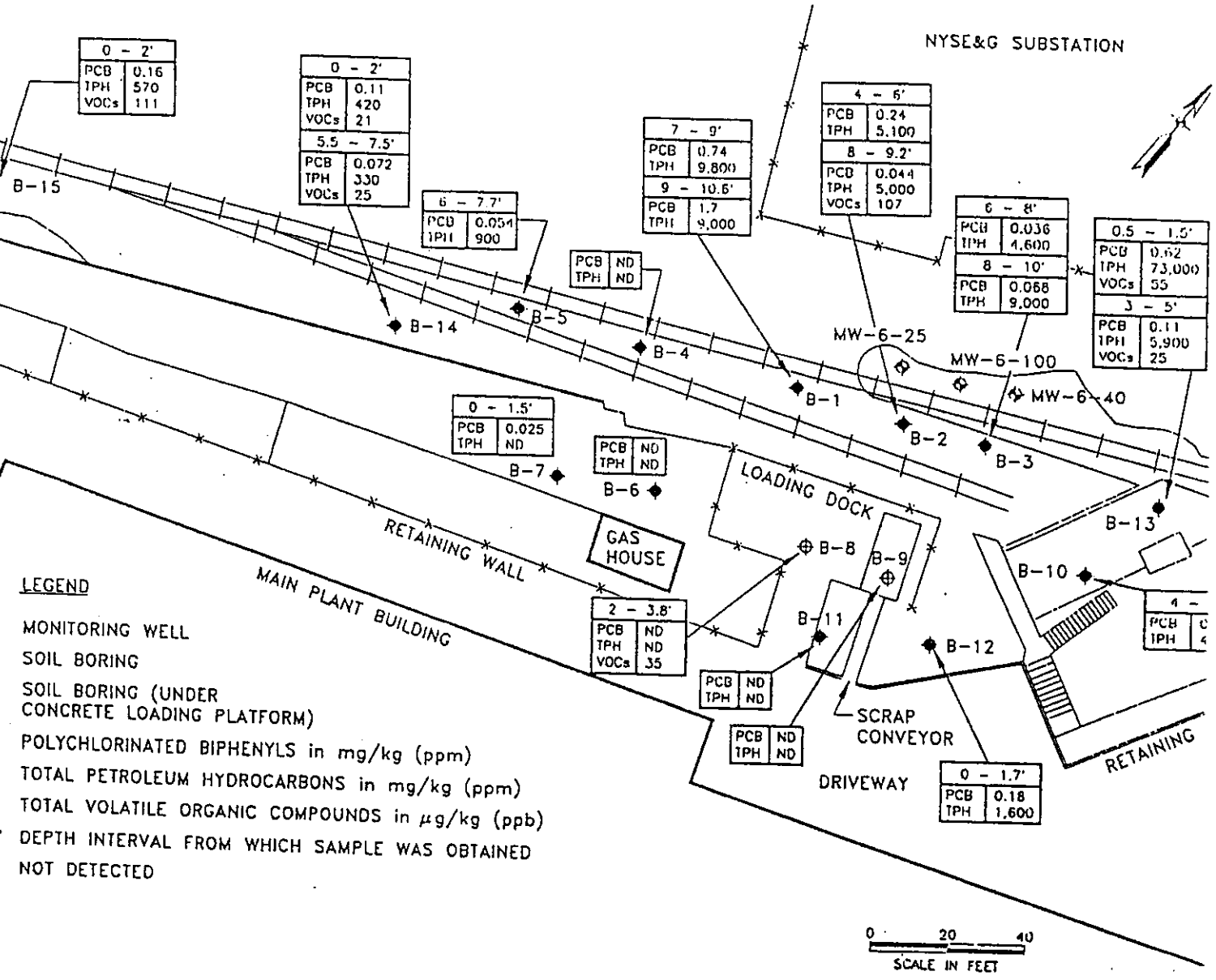

Figure 4 Scrap Conveyor Soil Boring and Sampling Locations

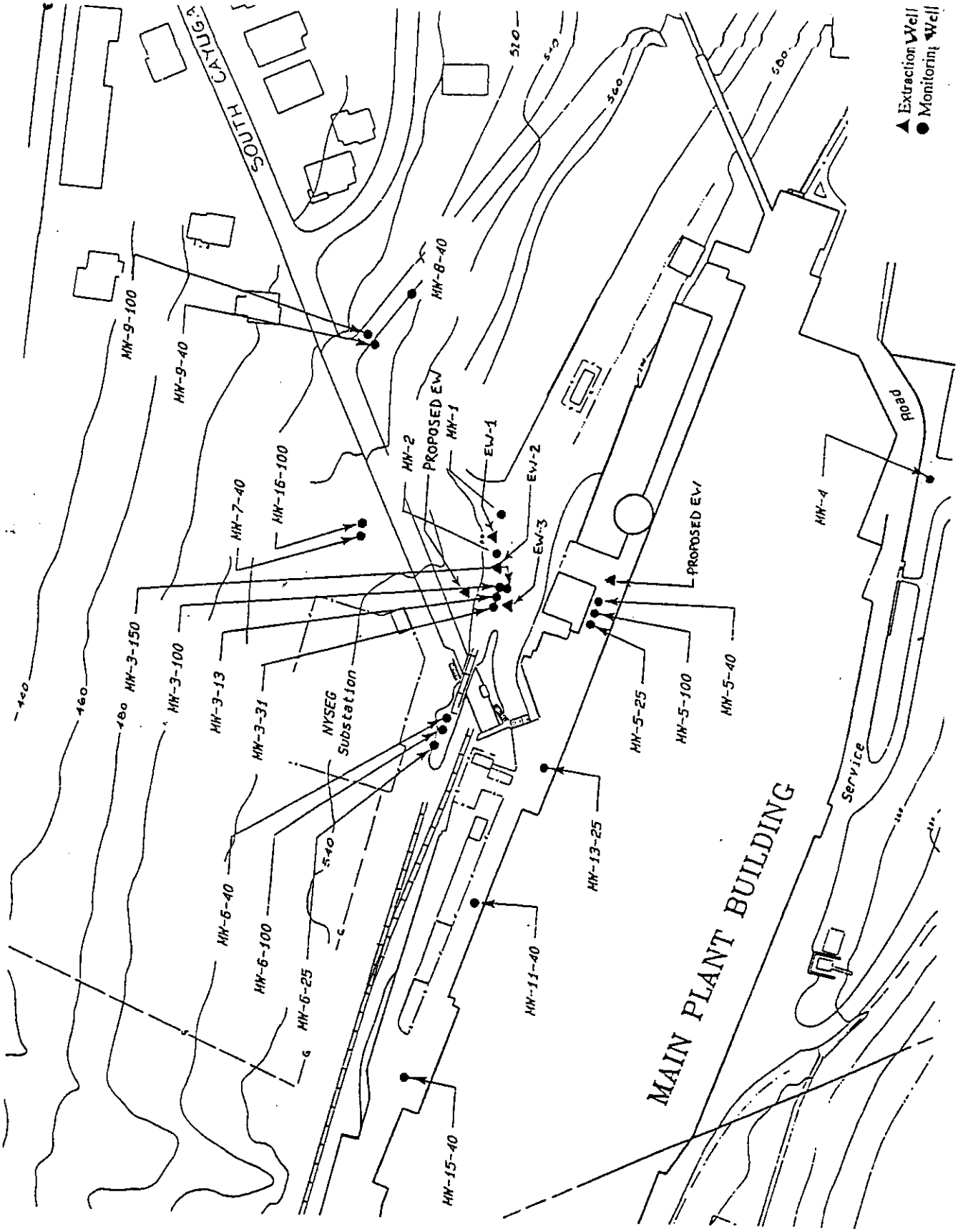

Figure 5 Two Phase Vapor Extraction Well Locations

APPENDIX A

RESPONSIVENESS SUMMARY

for the

PROPOSED REMEDIAL ACTION PLAN

Morse Industrial Corporation Inactive Hazardous Waste Site
Ithaca, Tompkins County
Site No. 7-55-010

The Proposed Remedial Action Plan (PRAP) was prepared by the New York State Department of Environmental Conservation (NYSDEC) and issued to the local document repository on August 30, 1994. This Plan outlined the preferred remedial measures proposed for remediation of the Morse Industrial Corporation site. The preferred remedy consists of:

* Removal of contaminated groundwater, using two phase groundwater extraction followed by treatment with granular activated carbon.

* Excavation and disposal of petroleum constituent contaminated soil.

The release of the PRAP was announced via a notice to the mailing list, informing the public of the PRAP's availability.

A public meeting was held on September 13, 1994 which included a presentation of the PRAP and discussion of the proposed remedy and at which comments on the proposed remedy were recorded. These comments are presented below and have become part of the administrative record for this site. No written comments on the PRAP were received. This Responsiveness Summary responds to the questions and comments raised at the September 13, 1994 public meeting which relate to the selection of the proposed remedy.

The following summarizes the comments received at the public meeting related to the PRAP, and provides the State's response.

1) **What is "soil vadose"?**

"Soil vadose" is a reference to the soil vadose zone. The soil vadose zone (or zone of aeration) is the area between the ground surface and the water table. This zone is not

filled, except temporarily, with water and has the potential to act as a pathway for the volatile compounds (which are the contaminants of concern at this site) in their gaseous phase.

2) **What are the technical problems prohibited sampling of the vadose monitoring wells?**

The vadose monitoring wells are designed to allow sampling of vapors found in the soils of the vadose zone. As such, they are required to be dry for proper sampling. Due to a high groundwater table resulting from the high amounts of rainfall, the wells have been filled with water. When the water subsides, warm weather and cold weather samples will be taken from all the wells.

Five monitoring wells were planned for installation. Due to a leak in a NYSEG gas line, only four wells were installed. When the gas line is repaired, the fifth well will be installed. Since the vadose horizon appears saturated, for at least part of the year, this transport pathway may not be a concern all the time.

3) **What is the extent of contamination off site?**

The highest contamination levels were found on the Morse property immediately downgradient of the fire reservoir, at the overburden-bedrock interface, within about 120 feet of the structure. Concentrations decreased rapidly as the groundwater moves laterally and vertically away from the fire reservoir. The plume appears to extend to the EPT plant access road off of South Cayuga Street, where low contamination levels are found at a depth of 100 feet. Samples from a well located in this same area, but which monitors the groundwater 40 feet below the ground, did not detect any of the site related contaminants. Figure 3 of the ROD shows the location of the wells and VOC concentrations found during sampling.

4) **How volatile is TCE?**

TCE is a moderately volatile chemical. The volatility of TCE is approximately the same as rubbing alcohol (isopropanol). When TCE is dissolved in water, the amount of chemical that will volatilize depends on the concentration. As the concentration of TCE in the groundwater decreases, the volatility of TCE will decrease. Therefore, the area where TCE has the greatest volatility is in the EPT plant area.

5) **Is the Two Phase Groundwater Extraction alternative cheaper than the Pump and treat with Conventional Wells alternative?**

Two Phase Groundwater Extraction is less expensive than the Pump and Treat with

conventional wells alternative using the assumption that both will achieve the remedial goals in the same time period. Assuming this scenario the difference in cost estimates is small , however, the conventional pump and treat system is unlikely to achieve the remedial goals in the same time period as the vacuum extraction system. Therefore, the pump and treat alternative would have an increased operational costs in the long term, making it a less cost effective alternative over time.

6) **Is the Two Phase Groundwater Extraction alternative more effective than the Pump and Treat with Conventional Wells alternative?**

Yes. As shown during the Two Phase Groundwater Extraction pilot test, two phase removes greater quantities of groundwater, has higher VOC removal rates, and has a greater zone of influence. Also, the two phase system will remove and treat contaminants in the soil vapor, while the pump and treat system would not.

7) **During the remedial investigation, we saw drums on site. What were in these drums?**

Those drums most likely contained drill cuttings that were generated as a result of the well installation. These drums have since been removed from the site and disposed of appropriately.

8) **What is in the drainage that flows down South Cayuga Street?**

This is the result of a permitted and monitored SPDES Outfall. Overflow from the fire reservoir, treated water from the existing IRM, and site drainage all flow from the plant site through this SPDES Outfall. This Outfall discharges to a ditch which leaves the EPT property and runs along South Cayuga Street.

9) **What exposures are associated with the soil vadose zone?**

The concern with the soil vadose zone is that this zone can act as a pathway for gaseous volatile organic compounds. Contaminants of concern could enter basements in nearby homes if sufficient concentrations of contaminants are present. The fact that the vadose wells encountered high groundwater may indicate that this concern is intermittent near the Morse Plant. the monitoring program will help to confirm conditions in the vadose. The potential for contamination appears limited to the immediate vicinity of the plant.

10) **How many times will/were indoor air samples taken?**

One round of indoor air sampling occurred in May, 1991. If the ongoing vadose well sampling indicates no contamination exists in the vadose zone, no future indoor air sampling will occur. If the vadose well sampling indicates contamination present in the

vadose zone additional investigation may be necessary, which may include additional indoor air sampling.

11) **Our basements are set in bedrock. Water periodically flows into our basements. Assuming this is groundwater, is there a potential risk of contaminated water flowing into our basement?**

Groundwater samples taken from the 40 foot deep monitoring wells, which are nearest to the residential areas showed non-detectable levels of contamination for the contaminant of concern. Only the 100 foot deep monitoring well in this same location showed any contamination and this was at low levels, about 20 ppb. If contaminated groundwater has migrated as far as the residential houses, its vertical movement would cause this contamination to be present at much greater depths than the basements. For these reasons, groundwater flowing into your basement would not be expected to be contaminated.

12) **Is the vadose well survey taking the place of new indoor air sampling?**

The vadose well survey is presently taking the place of additional indoor air sampling. The evaluation of indoor air for sampling is very complex. The vadose well monitoring should provide evidence of the potential for basement air contamination.

13) **If the vadose wells do not show contamination, is it impossible to have contamination reach our basements?**

Because of the fractured bedrock, it is possible that contamination will miss the monitoring well and enter your basement. However, if there is contamination in the vadose zone, the vadose zone wells are more likely to clearly detect that contamination than indoor air sampling. Soil gas surveys done earlier do not indicate a widespread problem. The vadose wells should provide an indication of whether or not a problem exists.

14) **What are the health risks associated with the site or the contamination in the vadose zone?**

Health risk is only a concern if exposures to harmful chemicals are taking place. Available data does not show this is occurring. This will be further evaluated as the soil vadose survey is completed. If significant contamination is not found, there would be no risk.

15) **Are you aware that people used to cross country ski across the area referred to as the 'scrap conveyor/railway loading' area?**

This is new information however, the snow cover present during ski season would isolate

skiers from the contaminants. Incidental travel across the site would not present a significant exposure.

16) **Do you know what is going on with the NYSEG gas line?**

The old natural gas lines, in which leaks had developed, are being replaced with new lines and the gas in the vadose zone will dissipate.

17) **In reference to the indoor air sampling, you stated that the study was inconclusive. What do you mean by inconclusive? Does this refer to health risks or whether or not soil vadose was transmitting contaminants into our basements?**

The levels of contamination encountered were low. The compounds of concern at the site can also be found in many commercial products and contaminants found in an indoor air survey can originate in the home. The vadose survey will help to determine whether this exposure route is a concern.

18) **There was a three year time lapse between the indoor air sampling program and the installation of the vadose monitoring wells. What caused this delay?**

The levels encountered in the indoor air in three homes were low. An interim remedial effort was planned and implemented and discussions were held on the need for and best method to further investigate this issue. The levels encountered did not indicate a hazard or emergency nor was there an indication of a widespread problem. the monitoring effort proposed is intended to resolve a remaining issue.

APPENDIX B

ADMINISTRATIVE RECORD

The following documents constitute the Administrative Record for the Morse Industrial site Record of Decision (ROD):

1. Final RI Report
2. Final FS Report
3. Preliminary Environmental Assessment of the Fire Water Reservoir
4. Summary Report for the Operation of the Interim Remedial Measures System.
5. Two-Phase Vacuum Extraction Pilot Test Report
6. Listing in the New York State Registry of Inactive Hazardous Waste Sites
7. Responsiveness Summary for RI/FS
8. Chronological list of response actions
9. Public Participation Plan
10. Analytical Data, Vol.'s 1-5 (Quality Assurance/Quality Control raw data, data summary sheets, chain of custody forms
11. Revised Work Plan for Stage 2 RI - 5/30/89
12. Revised Work Plan for Stage 2 RI - 7/19/87
13. Notice of Public Meeting - Proposed Remedial Action Plan
14. Fact Sheet, August - 1994
15. NYSDEC letter (dated 8/22/94) to Radian establishing cleanup goals for petroleum contaminated soil.