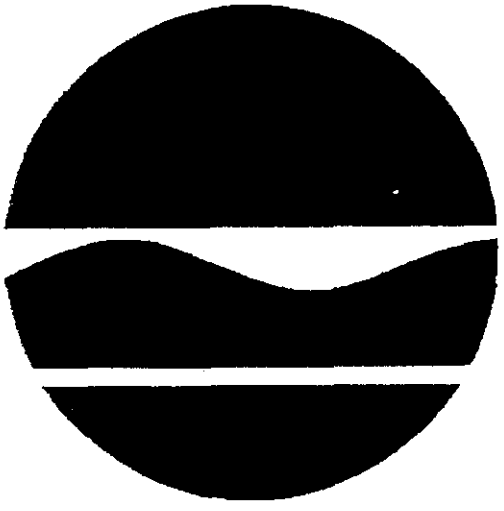
OWEGO HEAT TREAT
Inactive Hazardous Waste Site

Apalachin, Tioga County, New York
Site No. 7-54-011

RECORD OF DECISION

March 1994



Prepared by:

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

DECLARATION STATEMENT - RECORD OF DECISION

Owego Heat Treat Site
Town of Owego,Tioga County, New York
Site No. 7-54-011

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedial action for the Owego Heat Treat 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 Owego Heat Treat 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, has been addressed by implementing the response action described in this ROD and this action has addressed a current or potential threat to public health and the environment.

Description of Selected Remedy

Based upon the results of the investigations for the Owego Heat Treat Site and the criteria identified for evaluation of alternatives the NYSDEC has selected as the remedy, no further action with enhanced monitoring and institutional controls. The components of the remedy are as follows:

1. Continued operation of the groundwater pump and treat system.

2. Installation of two to four additional groundwater monitoring wells.

3. Long-term sampling of monitoring wells and residential wells on the site.

4. Deed restriction on the property to prevent development of drinking water supplies utilizing impacted or threatened groundwater.

5. Annual evaluation of the remedy's effectiveness.

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 preference for remedies that reduce toxicity, mobility, or volume as a principal element.

March 25 1994
Date

Ann Hill DeBarbieri
Deputy Commissioner

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SECTION 1: SITE LOCATION AND DESCRIPTION

The Owego Heat Treat site is located at 182 Marshland Drive, Apalachin in the Town of Owego, Tioga County. The site is within the property boundaries of Owego Heat Treat, Inc., which occupies a 37 acre parcel bordered by the Susquehanna River to the north and Route 17W to the south. Properties to the east and west are largely residential and/or agricultural, with the exception of a newly constructed golf course which borders the southeast corner of the site.

The Owego Heat Treat facility consists of six buildings (designated B1-B6) with two production wells (designated B3 and B5) and occupies approximately four acres. Three residences (designated H1-H3) which are owned by the company are also on the property. Each residence obtains drinking water from its own private well (similarly designated H1-H3). The majority of the Owego Heat Treat property is used for agricultural and/or recreational purposes. Figure 1 shows the layout of the facility.

SECTION 2: SITE HISTORY

2.1: Operational/Disposal History

Heat treating operations at the facility began in 1953 and continue at present. In general, operations performed at the facility involve heating of prefabricated parts to specified temperatures and controlling the rate of cooling through use of oil quenching techniques. After quenching, parts are placed in degreasing tanks. Historically, tetrachloroethylene (PCE) has been used at the facility for degreasing purposes. In 1992, use of PCE was discontinued in favor of using an alkaline process and 1,1,1-trichloroethane. More recently, the company is increasing the use of citrus based degreasers, which are considered environmentally safe.

During renovation of the floor in Building B2 in December 1987, a strong chemical odor was detected emanating from soils under the flooring. Upon inspection of the concrete lined pit underlying a PCE tank in the southeast corner of Building B2, standing water was observed with noticeable contamination. The standing water was pumped into 55 gallon drums and disposed of. Subsequently, soils underlying the pit were excavated and disposed of in accordance with NYSDEC guidance. Post excavation samples detected less than 0.05 parts per million (ppm) of volatile organic chemicals present in remaining soils.

Owego Heat Treat also sampled the three residential wells on the property. At that time contamination of well H1 was detected.

2.2: Remedial History

After the initial response activities, Owego Heat Treat agreed to undertake a hydrogeological investigation at the request of NYSDEC. That investigation included a soil gas survey in and around the perimeter of Building B2 as well as the installation and sampling of five groundwater monitoring wells. Residential wells (on-site and off-site) were also sampled. Results of the initial investigation indicated that groundwater was contaminated, however there were no impacts to off-site residences. Since completion of the initial investigation in 1989, additional work has been performed to delineate the plume of contamination and ensure private water supplies were protected. That work included the following:

1. Additional soil gas work in Building B2 prior to completing renovation of the building,
2. Installation of four monitoring wells,
3. Completion of an electrical resistivity survey, and
4. Design and construction of an interim remedial measure to control migration of contamination from the source area.

Results of the investigations are summarized in Section 3.1. The interim remedial measure is discussed below.

2.3 Interim Remedial Measure

In March 1992, under terms of a consent order between Owego Heat Treat and NYSDEC, construction of a groundwater treatment system was completed. The treatment system consists of a groundwater recovery well which is pumped to an air stripping tower which treats the contaminated groundwater. Treated water is then discharged back into the groundwater system.

The recovery well was located immediately downgradient of the source of contamination (Building B2) to control migration of contaminants emanating from the source. As depicted on figure 2, the capture zone (area influenced by pumping) of the recovery well extends beyond the width of the plume, thus preventing the migration of contamination to areas downgradient of the recovery well. The recovery well will not capture contamination which is already downgradient of the capture zone (basically the area north of monitoring well MW-2). However, by eliminating a continuing source of contamination to the downgradient areas, attenuation of contamination should occur. Based on a contaminant transport model, which considers variability of site physical and chemical parameters, it is predicted that contaminant concentrations in the area of MW-2 (well with highest concentration of contamination) should decrease to below regulatory levels (5 parts per billion) within three years. Contaminant levels downgradient of MW-2 should also decrease in a similar manner.

At present the operation of the groundwater treatment system has resulted in a continuing decline in contaminant concentrations at the site. This decline in concentrations has been consistent with the estimated attenuation predicted by the contaminant transport model.

SECTION 3: CURRENT STATUS

3.1 Summary of Investigations

The NYSDEC, under the State Superfund Program, normally initiates Remedial Investigation Feasibility Study (RI/FS) projects to address contamination at inactive hazardous waste sites. The purpose of an RI/FS is to define the nature and extent of any contamination resulting from hazardous waste disposal. The RI/FS evaluates the need for remedial action, and proposes an environmentally sound comprehensive remedy. The results of the FS set the stage for the design and construction steps in the remediation process.

At the Owego Heat Treat site, a formal RI/FS has not been performed. However, the investigations and remedial activities completed to date have generally met the requirements of a RI/FS project. The

NYSDEC, with agreement by the State Department of Health, has concluded that a complete RI/FS is not necessary for the site. A summary of the investigations at the site follows:

Soil Investigations

The initial soil gas survey was performed around the perimeter of Building B2 (where spill occurred) as well as within the building. The survey was completed by driving a solid 5/8 inch diameter rod two to three feet into the ground, inserting a soil gas probe into the hole, and using a Photovac TIP photoionization analyzer to monitor the soil gas within the hole. Results of the initial soil gas survey work are shown on Figures 3 and 4 at the end of this document. Three soil samples were taken in the areas of the highest soil gas readings to determine concentrations of contaminants of concern (PCE and breakdown products). Results of those soil samples indicated that concentrations of contaminants were present in the soil at low levels. The low concentrations (up to 10.3 ppm total VOC's) confirmed that the initial cleanup activities were successful.

In May 1989, Owego Heat Treat proposed a complete renovation of Building B2 in order to get their operations back on-line. The building renovation was divided into three phases. Phase I was a soil gas survey inside the building. Phase II was to design and construct an in-situ treatment system for the soils, if necessary and feasible. Phase III was construction of the new floor for the building.

Results of the soil gas survey for this project are shown on Figure 5 at the end of this document. The results generally agree with the earlier soil gas work, with the exception of a higher reading in the northwest corner of the building. This result was attributed to the presence of standing water in the sample area. Overall, results of the soil investigatory work indicate that low level residual contamination remains in the area of Building B2. The investigatory activities did not identify any "hot" spots of contamination requiring excavation or other remedial efforts.

In evaluating the feasibility of an in-situ treatment (vacuum extraction) system, it was determined that the presence of standing water indicated a perched water table underneath the building. This was further confirmed by measurements of groundwater levels in monitoring wells immediately adjacent to the building, which were approximately three to six feet lower in elevation than that of the standing water. It was concluded that in-situ treatment was not feasible. However, prior to reflooring the building, piping was placed in the excavation in case the feasibility of different in-situ treatment methods needed to be evaluated.

Groundwater Investigations

The groundwater investigations completed to date include the installation and sampling of nine monitoring wells, installation and sampling of a recovery well, an aquifer test using the recovery well, and sampling of residential wells. Analytical results from on-site sampling wells are included in Table 1. Off-site residential wells that were sampled are shown on Figure 6. These wells have not been impacted by the contamination and due to the groundwater flow direction are not expected to be impacted in the future. Results of the groundwater investigations are summarized as follows:

1. The unconsolidated deposits are comprised of alluvial deposits of silt, sand, and gravel. These deposits are underlain by a glacial till which is underlain by shale bedrock.

2. The groundwater table is found between 8 and 15 feet below the surface within the alluvial deposits. The average hydraulic conductivity of the alluvial deposits is 1.8x10-4 ft/sec. The saturated thickness of this aquifer is generally between 30 to 40 feet at the site. A second aquifer is found below the till unit at the bedrock/till interface. The till unit serves as a confining layer between the upper and lower aquifers. The till unit is approximately 30 feet thick.

3. The shallow groundwater flows north-northwest in the direction of the Susquehanna River under a hydraulic gradient of approximately 0.003 ft/ft. The groundwater flow velocity was calculated to be 0.13 ft/day (49 ft/yr).

4. Groundwater contamination has been detected in monitoring wells MW-2, MW-6, MW-7, and MW-9. Contamination was also detected in residential well H-1. This well was a shallow hand dug well which was later replaced with a well screened beneath the till unit. The replacement well is non-detect for all contaminates. Figure 7 shows the locations of all on-site wells.

3.2 Summary of Human Exposure Pathways

At present, site conditions do not present a risk to human health. The only potential exposure pathway of concern is use of contaminated groundwater. The plume of groundwater contamination appears to be limited to the Owego Heat Treat property and, based on groundwater flow direction, is not expected to impact any off-site properties. Additionally, residential wells on the company property are monitored on a quarterly basis and have not shown contamination in several years.

The major concern at the site would be future use of the contaminated groundwater aquifer for drinking water/sanitary purposes. Owego Heat Treat has agreed to impose deed restrictions on the site property to eliminate the prospect of future use of groundwater in areas of concern and will continue to monitor groundwater on the site to identify any change from the anticipated attenuation of the contaminants.

3.3 Summary of Environmental Exposure Pathways

There are no significant impacts to the environment outside of groundwater contamination. There is not expected to be any impact on any natural resources at the site, however the monitoring program to be implemented will provide a yearly assessment of the situation.

SECTION 4: ENFORCEMENT STATUS

The NYSDEC and Owego Heat Treat entered into a Consent Order in August of 1991. The Order obligated Owego Heat Treat to design and construct the interim remedial measure (groundwater pump and treat system). Upon issuance of the Record of Decision the NYSDEC will approach Owego Heat Treat to implement themonitoring program and other institutional controls under an additional Order on Consent or through modification of the current Order.

SECTION 5: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in Part 6 NYCRR 375-1.10. These goals are established under the guideline of meeting all standards, criteria, and guidance (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:

- 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 (AOC).

SECTION 6: SUMMARY OF THE EVALUATION OF ALTERNATIVES

Potential remedial alternatives for the Owego Heat Treat site are presented as follows:

6.1: Description of Alternatives

The potential remedies are intended to address the contaminated groundwater at the site and thereby meet remediation goals.

Alternative 1: No Further Action with Enhanced Monitoring and Institutional Controls

This alternative recognizes the remediation of the site completed under the previously completed IRM. It requires continued monitoring to evaluate the effectiveness of the remediation completed under the IRM.

The no further action alternative for this site would involve the installation of an additional two to four groundwater monitoring wells, as well as continued operation of the groundwater pump and treat system. The wells would be installed to more fully delineate the leading edge of the plume. Sampling of all wells which are contaminated would be conducted on a quarterly basis. Monitoring wells which have not shown contamination would be sampled less frequently. Residential wells on the Owego Heat Treat property would be sampled quarterly. To ensure that future development at the site does not result in exposure to contaminated groundwater, Owego Heat Treat would place a deed restriction on the property. An annual evaluation of the effectiveness of this alternative would be performed to determine if remedial objectives will be satisfied.

Present Worth:	$ 248,500.00
Capital Cost:	$ 36,720.00
Annual O&M:	$ 17,000.00

Time to Implement 6 months to 1 year
** Assumes duration of 20 years **

Alternative 2: Enhanced Groundwater Pump and Treat

The Enhanced Groundwater Pump and Treat alternative is the same as the no further action alternative with the addition of another groundwater recovery well. The recovery well would be located at or near the leading edge of the plume of contamination and would utilize the existing air stripping tower to treat contaminated groundwater.

This alternative would result in active treatment of contaminated groundwater which is downgradient of the capture zone of the present recovery well.

Present Worth:	$ 422,500.00
Capital Cost:	$ 105,500.00
Annual O&M:	$ 25,440.00
Time to Implement	6 months - 1 year

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 Environmental Conservation Law Part 6 NYCRR 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 Feasibility Study.

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.

Implementation of alternative 1 would not actively address contaminated groundwater which has migrated beyond the capture zone of the current recovery well. However, alternative 1 has been proven effective in controlling migration of contaminants from the source area and has eliminated the continuing source of contaminants to downgradient areas. Thus, contaminated groundwater beyond the recovery well capture zone would naturally attenuate and eventually would achieve SCGs.

Alternative 2 would result in active treatment of contaminated groundwater which has previously migrated beyond the current treatment system. Alternative 2 would likely achieve SCGs in a shorter duration of time than alternative 1.

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.

Alternative 1 and alternative 2 are equally protective of human health. At present there are no impacts to human health and based on groundwater flow direction, there is no expected future impact. If receptors (drinking water supplies) were located downgradient of the contaminated groundwater plume,

then alternative 2 would offer a greater degree of protection. Owego Heat Treat would place a deed restriction on the property to ensure that future development of drinking water supplies at the site are prohibited until regulatory standards are achieved.

The environmental impact of concern at the site is the contamination of groundwater. Alternative 2 is more protective of the environment in that it would actively treat a greater amount of the contaminated groundwater, and likely result in a shorter cleanup time.

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 length of time needed to achieve the remedial objectives is also estimated and compared with the other alternatives.

Risks to on-site workers may occur during well installation activities. To mitigate these risks, a NYSDEC-approved Work Plan and site-specific Health and Safety Plan (HASP) would be prepared to identify appropriate health and safety measures.

The length of time needed to achieve remedial objectives (compliance with SCGs) is difficult to predict due to the variability of site physical and chemical parameters. A contaminant transport model, which considers site variability, was used to predict the rate at which total VOC concentrations would change at MW-2. The model calculated that groundwater would meet regulatory standards within a period of three years, assuming that contamination at the source is continuously captured by the present recovery well. Data collected since the operation of the treatment system started agrees with the calculated cleanup at MW-2.

If Alternative 1 were chosen, groundwater concentrations downgradient of MW-2 would be expected to decrease due to natural attenuation (degradation,dilution,etc.). However, the decrease may take place over a longer time frame than that predicted at MW-2 due to continued migration of contamination. For instance, at MW-7 concentrations have generally decreased since the groundwater treatment system was turned on, but at a slower rate than at MW-2. This is due to continued contaminant loading (at decreasing levels) from upgradient contamination as it flows into the MW-7 area. As more data is collected, a better estimate of cleanup time can be made.

For alternative 2 the estimated time for compliance with SCGs of the contamination downgradient of the present recovery well capture zone would be expected to be less than that for Alternative 1. This is due to the additional recovery and removal of contaminants from the groundwater.

There is still low-level contamination in the soils underlying Building B2, which would act as a continuing source of groundwater contamination for an unknown time. Operation of the pump and treat system would be necessary until the soils are sufficiently clean that contamination in excess of standards is not occurring. For cost-purposes it is assumed that the treatment system would be operating for 20 years. This estimate has been used for both alternatives.

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 technology of groundwater recovery and treatment (using an air stripper) has been proven effective in both treating groundwater and controlling contaminant migration. Both alternatives can be effective in the long-term with proper maintenance. Both alternatives would ensure protection of human health and the environment.

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.

Both alternatives would limit the mobility and reduce the volume of chemicals in the groundwater at the source area. Alternative 2 would capture and remove more contamination downgradient of the source area.

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 personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc..

Technically, both alternatives could be readily implemented. The technology of groundwater pump and treat is proven reliable and the effectiveness could be easily monitored.

Administratively, both alternatives could be readily implemented. Owego Heat Treat controls site access.

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 2.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is focused upon after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan have been evaluated. The "Responsiveness Summary" included as Appendix A presents the public comments received and the Department's response to any concerns raised. In general, the public was supportive of the selected remedy.

SECTION 7: SUMMARY OF THE SELECTED REMEDY

Based upon the results of investigations performed to date, the effectiveness of the groundwater pump and treat system currently operating, and the evaluation presented in Section 7, the NYSDEC has

selected Alternative 1, No Further Action with Enhanced Monitoring and Institutional Controls , as the remedy for this site.

This selection is based upon the following evaluation: Alternatives 1 and 2 are equally protective of human health. Alternative 2 would be more protective of the environment and would likely meet SCGs in a shorter period of time. However, based on controls which can be put in place (deed restrictions), and the fact that no downgradient resources are threatened, natural attenuation of contamination downgradient of the current treatment system should not result in any adverse impacts. Therefore, alternative 1 can be justified. Alternative 1 should eventually result in attainment of SCGs. Alternative 1 is lower in cost than Alternative 2 and since it equally satisfies the other criteria, it is the selected alternative.

The estimated present worth cost to implement the remedy is $248,500. The cost to construct the remedy is estimated to be $36,720 and the estimated average annual operation and maintenance cost for 20 years is $17,000.

It is anticipated that this action will allow the site to be reclassified from a class 2 to a class 4 site. A class 4 designation recognizes that the site has been properly closed but it requires continued management (i.e. operation of the pump and treat system).

The elements of the selected remedy are as follows:

1. Continued operation of the groundwater pump and treat system.

2. Installation of two to four additional groundwater monitoring wells.

3. Long-term sampling of monitoring wells and residential wells on the site.

4. Deed restriction on the property to prevent development of drinking water supplies utilizing impacted or threatened groundwater.

5. Annual evaluation of the remedy's effectiveness. If the remedy is not achieving goals, implementation of alternative 2 would be considered.

Owego Heat Treat Site
Owego (T), Tioga County, New York
Site No. 7-54-011

RESPONSIVENESS SUMMARY
FOR
PROPOSED REMEDIAL ACTION PLAN
Public Hearing - February 23, 1994
Owego Town Hall

The Proposed Remedial Action Plan (PRAP) was prepared by the New York State Department of Environmental Conservation and issued to the local document repository on February 16, 1994. The PRAP summarizes the nature and extent of contamination at the site, the alternatives evaluated to address the problems identified, and proposes a remedy based on the alternatives evaluated. The proposed remedy for this site is No Further Action with Enhanced Monitoring and Institutional Controls, which entails the following:

1. Continued operation of the groundwater pump and treat system.

2. Installation of two to four additional groundwater monitoring wells.

3. Long-term sampling of monitoring wells and residential wells on the site.

4. Deed restriction on the property to prevent development of drinking water supplies utilizing impacted or threatened groundwater.

5. Annual evaluation of the remedy's effectiveness.

The release of the PRAP was announced via a notice to the mailing list informing the public of the public meeting.

A public meeting was held on February 23, 1994 at Owego Town Hall to gather public comment on the PRAP for the Owego Heat Treat Site, an inactive hazardous waste disposal site being addressed by the State Superfund program. At this meeting the New York Department of Environmental Conservation made a brief presentation of the results of investigations and remediation performed at the site and the PRAP. Comments received at the public meeting are addressed below. No written comments on the PRAP were received. The comment period for this site closed on March 18, 1994.

The following summarizes the comments received at the public meeting and provides the State's response:

COMMENT #1: When was the recovery well turned on?

RESPONSE #1: The recovery well was initially turned on during March of 1993, and except for brief down times (due to repairs, maintenance, etc.) has been in continuous operation.

COMMENT #2: How long will it take to completely clean up the site?

RESPONSE #2: Due to variability of site physical and chemical parameters, it is difficult to predict a cleanup time for the site. Using a contaminant transport model, it has been predicted that the groundwater in the vicinity of MW-2 (well with highest concentrations of contaminant) will meet regulatory standards (5 parts per billion) within three years. Based on data collected since start-up of the air stripping system, the actual decrease in concentrations has been consistent with the model prediction.

For areas downgradient of MW-2, there will be some continued loading of contaminants as groundwater (and the associated contaminants) migrate through the aquifer. Therefore, levels of contamination will likely hold steady or decrease slowly for a period of time. As more data is collected during the monitoring program, it will be easier to predict eventual remediation time for the site. For cost estimating purposes, twenty years has been assumed for achievement of groundwater quality standards.

COMMENT #3: Is what has passed the capture zone of the air stripper of a lesser degree of contamination?

RESPONSE #3: Yes, the levels drop off significantly beyond the capture zone and these levels are expected to continue to decline naturally over time.

COMMENT #4: Will heavy snowfall and rainfall speed up the cleanup process?

RESPONSE #4: Yes, it is expected that snowfall melt and rainfall will leach out the chemicals currently absorbed to the soil.

COMMENT #5: How much is a part per billion? How much is a billion gallons of water?

RESPONSE #5: Many examples were given at the public meeting. Some analogies are attached at the end of this Responsiveness Summary.

COMMENT #6: What is tetrachloroethene and what are the health risks associated with it?

RESPONSE #6: Tetrachloroethene is a common solvent and the health concerns are with long-term exposure to this substance. An information sheet is attached at the end of the Responsiveness Summary.

COMMENT #7: How does this material flow in relation to groundwater flow?

RESPONSE #7: This material, due to the low concentrations found at the site, tends to flow with groundwater's natural flow.

COMMENT #8: Can the levels of contaminants change during wet and dry periods?

RESPONSE #8: Yes, concentrations of contaminants will fluctuate during wet and dry periods. Without additional loading of contaminants, wet periods will usually result in lower concentrations of contaminants due to dilution. In areas where a continuing source is present (contaminated soils) wet periods may cause increased loading of contaminants to groundwater and, therefore, higher concentrations, at least in the vicinity of the source.

COMMENT#9: At what depth are the contaminants found in the groundwater?

RESPONSE #9: The groundwater contamination at this site is generally limited to the upper ten to fifteen feet of the aquifier, which is found 8-15 feet below ground surface.

COMMENT #10: How much material leaked initially?

RESPONSE #10: The amount of material which leaked, resulting in the contamination present at this site, is unknown.

UPDATE
UPDATE
UPDATE

Toxicological Profile for

TETRACHLOROETHYLENE

Draft
For Public Comment

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry

Comment Period Ends:

February 18, 1992

1. PUBLIC HEALTH STATEMENT

This Statement was prepared to give you information about tetrachloroethylene and to emphasize the human health effects that may result from exposure to it. The Environmental Protection Agency (EPA) has identified 1,300 sites on its National Priorities List (NPL). Tetrachloroethylene has been found in at least 439 of these sites. However, we do not know how many of the 1,300 NPL sites have been evaluated for tetrachloroethylene. As EPA evaluates more sites, the number of sites at which tetrachloroethylene is found may change. This information is important for you to know because tetrachloroethylene may cause harmful health effects and because these sites are potential or actual sources of human exposure to tetrachloroethylene.

When a chemical is released from a large area, such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment as a chemical emission. This emission, which is also called a release, does not always lead to exposure. You can be exposed to a chemical only when you come into contact with the chemical. You may be exposed to it in the environment by breathing, eating, or drinking substances containing the chemical or from skin contact with it.

If you are exposed to a hazardous chemical such as tetrachloroethylene, several factors will determine whether harmful health effects will occur and what the type and severity of those health effects will be. These factors include the dose (how much), the duration (how long), the route or pathway by which you are exposed (breathing, eating, drinking, or skin contact), the other chemicals to which you are exposed, and your individual characteristics such as age, sex, nutritional status, family traits, life style, and state of health.

1.1 WHAT IS TETRACHLOROETHYLENE?

Tetrachloroethylene is a man-made substance that is widely used for dry cleaning fabrics and for metal-degreasing operations. It is also used as a starting material (building block) for making other chemicals and is used in some consumer products. Other names for tetrachloroethylene include perchloroethylene, perc, tetrachloroethene, perclene, and perchlor. It is a liquid at room temperature. Some of it evaporates into the air producing a sharp, sweet odor. For more information, see Chapters 3 and 4.

1.2 WHAT HAPPENS TO TETRACHLOROETHYLENE WHEN IT ENTERS THE ENVIRONMENT?

Tetrachloroethylene enters the environment mostly by evaporating into the air during use. It can also get into water supplies and the soil during disposal of sewage sludge and factory waste. Tetrachloroethylene may also get into the air, soil, or water by leaking or evaporating from storage and waste sites. It can last for several months in the air before

it is broken down into other chemicals or is brought back down to the soil and water by rain. Some of the chemicals that are formed may also be harmful.

Much of the tetrachloroethylene that gets into water and soil will evaporate to the air. Some of it can travel through the soil and get into underground drinking water supplies. Tetrachloroethylene that gets into underground water may stay there for many months without being broken down. If conditions are right, bacteria will break down some of it and some of the chemicals formed may also be harmful. Under some conditions, tetrachloroethylene may stick to the soil and stay there. It does not seem to build up very much in animals that live in water, such as fish, clams, and oysters. We do not know if it builds up in plants grown on land. For more information on tetrachloroethylene in the environment, see Chapters 4 and 5.

1.3 HOW MIGHT I BE EXPOSED TO TETRACHLOROETHYLENE?

Humans can be exposed to tetrachloroethylene from environmental and occupational sources and from consumer products. Common environmental levels of tetrachloroethylene (called background levels) are several thousand times lower than levels found in some workplaces. Background levels are found in the air we breathe, in the water we drink, and in the food we eat. The chemical is found most frequently in air and, less often, in water. Tetrachloroethylene gets into air by evaporation from industrial or dry cleaning operations. One study showed tetrachloroethylene was present in 25% of drinking water samples tested in the study. In another study, 14 to 26% of groundwater samples contained tetrachloroethylene. There are no similar studies on how often the chemical is found in air samples, but we know it is widespread in the air. We do not know how often it is found in soil, but it was found in 5% of sediments sampled. Tetrachloroethylene also comes from releases from areas where chemical wastes are stored.

In general, tetrachloroethylene levels in air are higher in cities or industrial areas than in more rural or remote areas. The background levels of tetrachloroethylene in air are far less than 1 part in 1 million parts of air (ppm). You can smell it at levels of 5 ppm in air. The air close to dry cleaning shops and chemical waste sites has levels of tetrachloroethylene higher than background levels. These levels are still less than 1 ppm. Water, both above and below ground, may contain tetrachloroethylene. Levels in water are also usually much less than 1 ppm, but are higher than levels in air. Levels in water near disposal sites are higher than levels in water far away from those sites. Water with tetrachloroethylene pollution may have levels greater than 1 ppm. Background levels in soil are probably 100 to 1,000 times lower than 1 ppm.

You can also be exposed to tetrachloroethylene by using certain consumer products. Products that may contain tetrachloroethylene include auto brake quieters and cleaners,

suede protectors, water repellents, silicone lubricants, and belt lubricants. Other products include specialized aerosol cleaners, ignition wire driers, fabric finishers, spot removers, adhesives, and wood cleaners. Although uncommon, small amounts of tetrachloroethylene have been found in food. Tetrachloroethylene may also be found in the breast milk of mothers who have been exposed to the chemical. For more information, see Chapter 5.

The people with the greatest chance of exposure to tetrachloroethylene are those who work with it. According to estimates from a survey conducted by the National Institute for Occupational Safety and Health (NIOSH) more than 650,000 U.S. workers may be exposed to tetrachloroethylene. The estimated amount that the general population might breathe in per day ranges from 0.04 to 0.2 milligrams. The estimated amount that most people might drink in water is less than 0.006 milligrams per day. These are very small amounts.

1.4 HOW CAN TETRACHLOROETHYLENE ENTER AND LEAVE MY BODY?

Tetrachloroethylene can rapidly enter your body when you breathe air containing it. How much enters your body by this route depends on how much of the chemical is in the air, how fast and deeply you are breathing, and how long you are exposed to it. Tetrachloroethylene may also rapidly enter your body through drinking water or eating food containing the chemical. How much enters your body depends on how much of the chemical you drink or eat. These two routes are the most likely ways people will take in tetrachloroethylene. These are also the most likely ways that people living near areas polluted with the chemical, such as hazardous waste sites, might take in tetrachloroethylene. Since tetrachloroethylene does not pass through the skin to any significant extent, entry into your body by this path is not of much concern.

Most tetrachloroethylene leaves your body rapidly when you breathe out the chemical in your breath. This is true whether you take up the chemical by breathing, drinking, eating, or touching it. Some of the tetrachloroethylene is changed into other chemicals in your body, and these are removed from your body in urine. One of these chemicals, trichloroacetic acid, is also thought to be harmful. Most of the changed tetrachloroethylene is removed in a few days. A small amount of the tetrachloroethylene that you take in is stored in tissues of your body. Part of the tetrachloroethylene that is stored in fat may stay in your body for several days or weeks. For more information on how tetrachloroethylene enters and leaves your body see Chapter 2.

1.5 HOW CAN TETRACHLOROETHYLENE AFFECT MY HEALTH?

When concentrations in air are high--particularly in closed, poorly ventilated areas--single exposures to tetrachloroethylene can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, and possibly unconsciousness and death. Skin

irritation may result from repeated or extended contact with the chemical. As you might expect, these symptoms occur almost entirely in work (or hobby) environments. Some people may be exposed to levels lower than those causing dizziness, sleepiness, and other nervous system effects. The health effects of breathing in air or drinking water with low levels of tetrachloroethylene are not known. The effects of exposing babies to tetrachloroethylene through breast milk are unknown. Results from some studies suggest that women who work in dry cleaning industries may have more menstrual problems and spontaneous abortions than women who are not exposed to tetrachloroethylene. However, we do not know if tetrachloroethylene was responsible for these problems because other possible causes were not considered. The chemical does not seem to cause birth defects in children whose parents are exposed.

Most people can smell tetrachloroethylene when it is present in the air at levels of 5 ppm or more. You can smell tetrachloroethylene in water if there is 0.8 ppm or more of it.

Animal studies, conducted with amounts much higher than those that most people are exposed to, show that tetrachloroethylene can cause liver and kidney damage and liver and kidney cancers. However, it has not been shown to cause cancer in people. The Department of Health and Human Services has determined that tetrachloroethylene may reasonably be anticipated to be a carcinogen. Tetrachloroethylene can be toxic to the fetuses of rats and mice. The only developmental effects seen in the offspring of rats that breathed very high levels of the chemical while they were pregnant were minor changes in the brain and behavior of the offspring. Since this was the only study showing developmental effects, we do not know how meaningful these results are at the present time.

For more information on the health effects of tetrachloroethylene, see Chapter 2.

The Agency for Toxic Substances and Disease Registry has calculated Environmental Media Evaluation Guides (EMEGs) for tetrachloroethylene. EMEGs are derived from Minimal Risk Levels (MRLs) which are calculated from human or animal data for tetrachloroethylene. The MRL(s) are further described in Chapter 2 and in the footnotes to Table 2-1 and 2-3. If a person is exposed to tetrachloroethylene at a level below the EMEG for the period listed below, we do not expect harmful health effects to occur. Because these levels are based only on information currently available, some uncertainty is always associated with them. Also, an EMEG does not imply anything about the presence, absence or level of risk for cancer because the methods for deriving EMEGs do not use any information about cancer. The EMEGs are provided as concentrations in order to allow for comparison to levels people might encounter in air, drinking water, and soil around homes or in other areas where children may play.

Air exposure

- An air EMEG of 0.6 ppm for tetrachloroethylene was derived from human data for exposures of 14 days or less.

- An air EMEG of 0.009 ppm for tetrachloroethylene was derived from animal data for exposures longer than 14 days but less than one year.

Drinking water exposure

Drinking water EMEGs represent the lower end of a range and are protective for both children and adults.

- A drinking water EMEG of 1 ppm for tetrachloroethylene was derived from animal data for exposures longer than 14 days but less than one year.

Soil exposure

Soil EMEGs represent the lower end of a range and are protective for both children and adults. However, this range is not protective for children (pica) who show increased desire for eating non-food items (such as soil).

- A soil EMEG of 5,000 ppm for tetrachloroethylene was derived from animal data for exposures longer than 14 days but less than one year.

1.6 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO TETRACHLOROETHYLENE?

One way of testing for tetrachloroethylene exposure is to measure the amount of the chemical in the breath. This test has been used to measure levels of the chemical in persons living in areas where the air is contaminated with tetrachloroethylene or those exposed to the chemical through their work. This test is only useful, however, if the exposure is recent (less than a week) because tetrachloroethylene rapidly leaves the body. Tetrachloroethylene can also be detected in the blood. In addition, samples of blood and urine can be used to identify breakdown products of the chemical in persons suspected of being exposed to tetrachloroethylene. Some of the breakdown products can be identified in the blood and urine for only short periods after exposure. One product, trichloroacetic acid, can be detected for several days after exposure. Although these tests are relatively simple to perform, most physicians do not have the proper equipment and must rely on special laboratories to collect and test the samples. Because exposure to other chemicals can produce the same breakdown products in the urine and blood, these

tests cannot determine if you have been exposed only to tetrachloroethylene. For more information on where and how tetrachloroethylene can be detected in your body after you have been exposed to it, see Chapters 2 and 6.

1.7 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

The government has developed regulations and guidelines for tetrachloroethylene. These are designed to protect the public from the potential adverse health effects of the chemical. The Environmental Protection Agency (EPA) has recommended limits on how much tetrachloroethylene can be present in drinking water. EPA advises that children should not have more than 2.0 milligrams tetrachloroethylene per liter of water (mg/L) (2 ppm) in 1 day or more than 1.4 mg/L (1.4 ppm) per day for long-term exposure. For long-term exposure in adults, EPA recommends that there should not be more than 5 mg/L (5.0 ppm) in the drinking water. 7/99 - The EPA and (list your State) have a standard of 0.0005 ppm for tetrachloroethylene in public water supplies.
EPA considers tetrachloroethylene to be a hazardous waste. Many regulations govern its disposal. If amounts greater than 1 pound are released to the environment, The National Response Center of the federal government must be told immediately.

The Occupational Safety and Health Administration (OSHA) limits the amount of tetrachloroethylene that can be present in workroom air. This amount is now limited to 25 ppm for an 8-hour workday over a 40-hour workweek, but may be changed to 50 ppm in the near future. OSHA also proposed limiting the peak concentration for short-term exposure to not greater than 200 ppm. NIOSH recommends that tetrachloroethylene be handled as a chemical that might potentially cause cancer and states that levels of the chemical in workplace air should be as low as possible.

1.8 WHERE CAN I GET MORE INFORMATION?

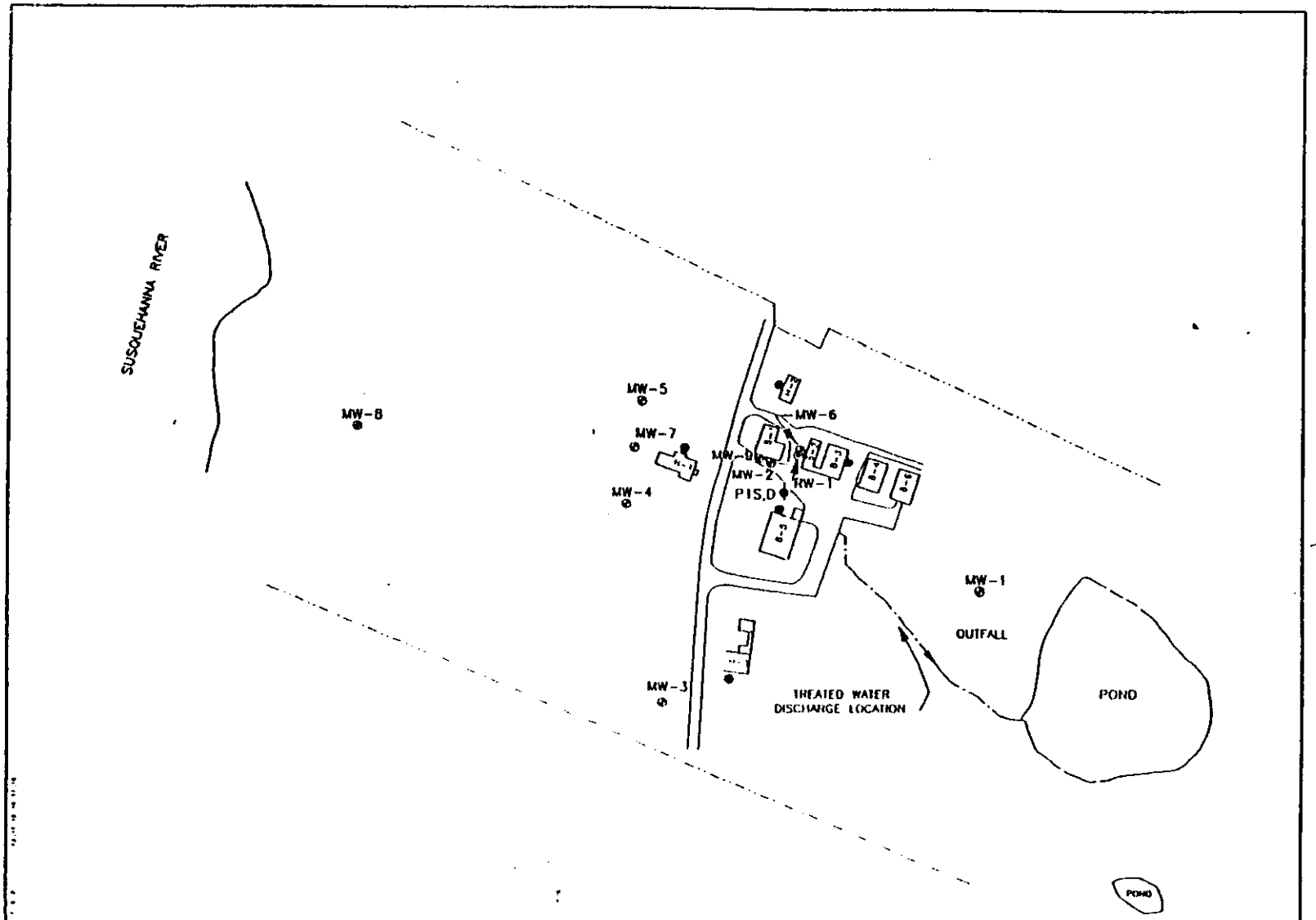
If you have any more questions or concerns, please contact your community or state health or environmental quality department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, E-29
Atlanta, Georgia 30333

This agency can also provide you with information on the location of the nearest occupational and environmental health clinic. These clinics specialize in the recognition, evaluation, and treatment of illnesses resulting from exposure to hazardous substances.

FIGURE 1

OWEGO HEAT TREAT
APALACHIN, NEW YORK



LEGEND

- MONITORING WELL
- RECOVERY WELL
- PIEZOMETER
- SUPPLY WELL
- B-6 MANUFACTURING FACILITY AND WELL ID.
- H-1 HOUSEHOLD AND WELL ID.
- PROPERTY BOUNDARY

SITE MAP

200 0 200

SCALE IN FEET

4100 001 876

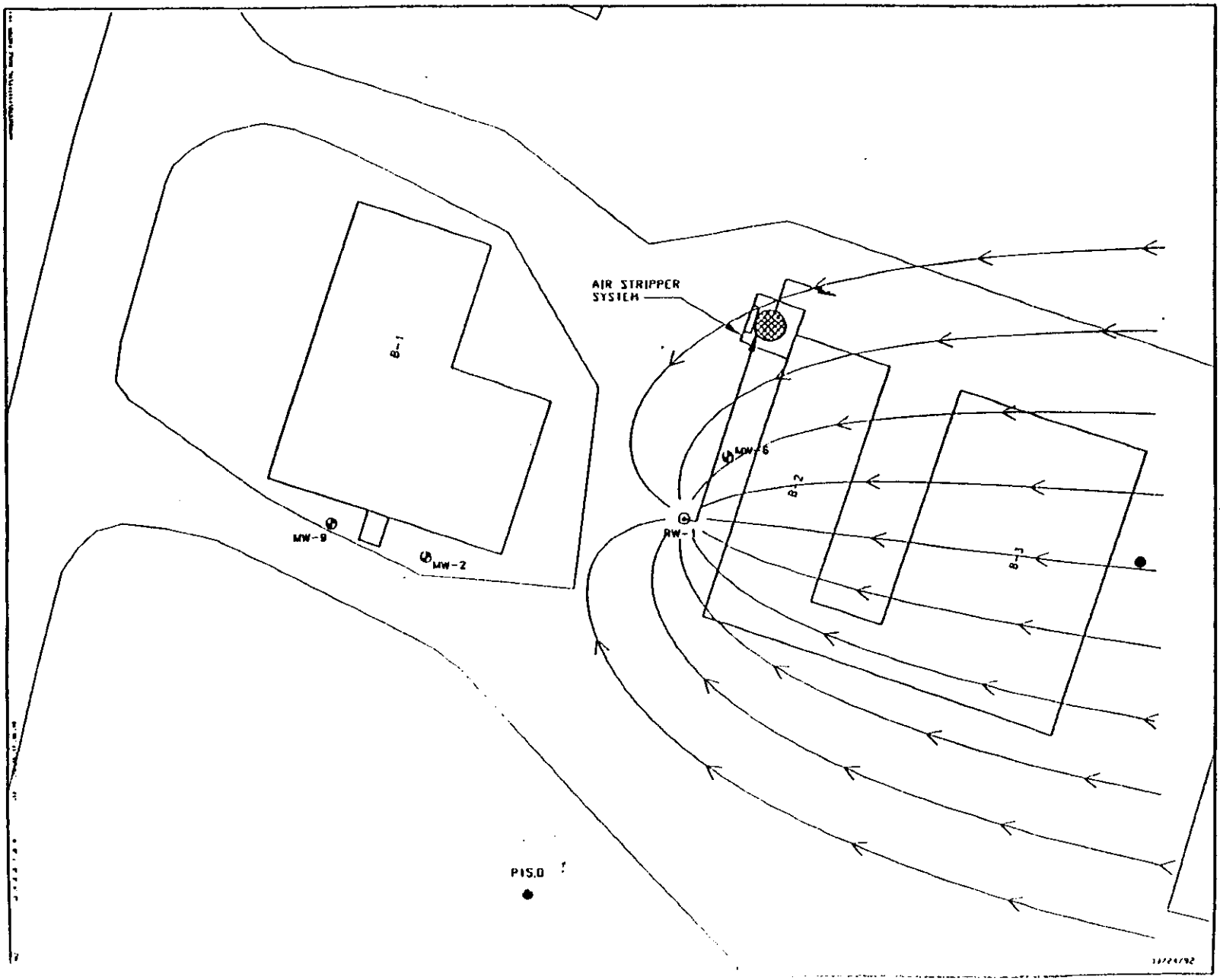


FIGURE 2

OWEGO HEAT TREAT
APALACHIN, NEW YORK

LEGEND

- MONITORING WELL
- RECOVERY WELL
- PIEZOMETER
- SUPPLY WELL
- MANUFACTURING FACILITY AND WELL ID.
- PROPERTY BOUNDARY
- ESTIMATED CAPTURE ZONE
- GROUND WATER FLOW PATH

AIR STRIPPER LOCATION
AND CAPTURE ZONE MAP

20 0 20

SCALE IN FEET

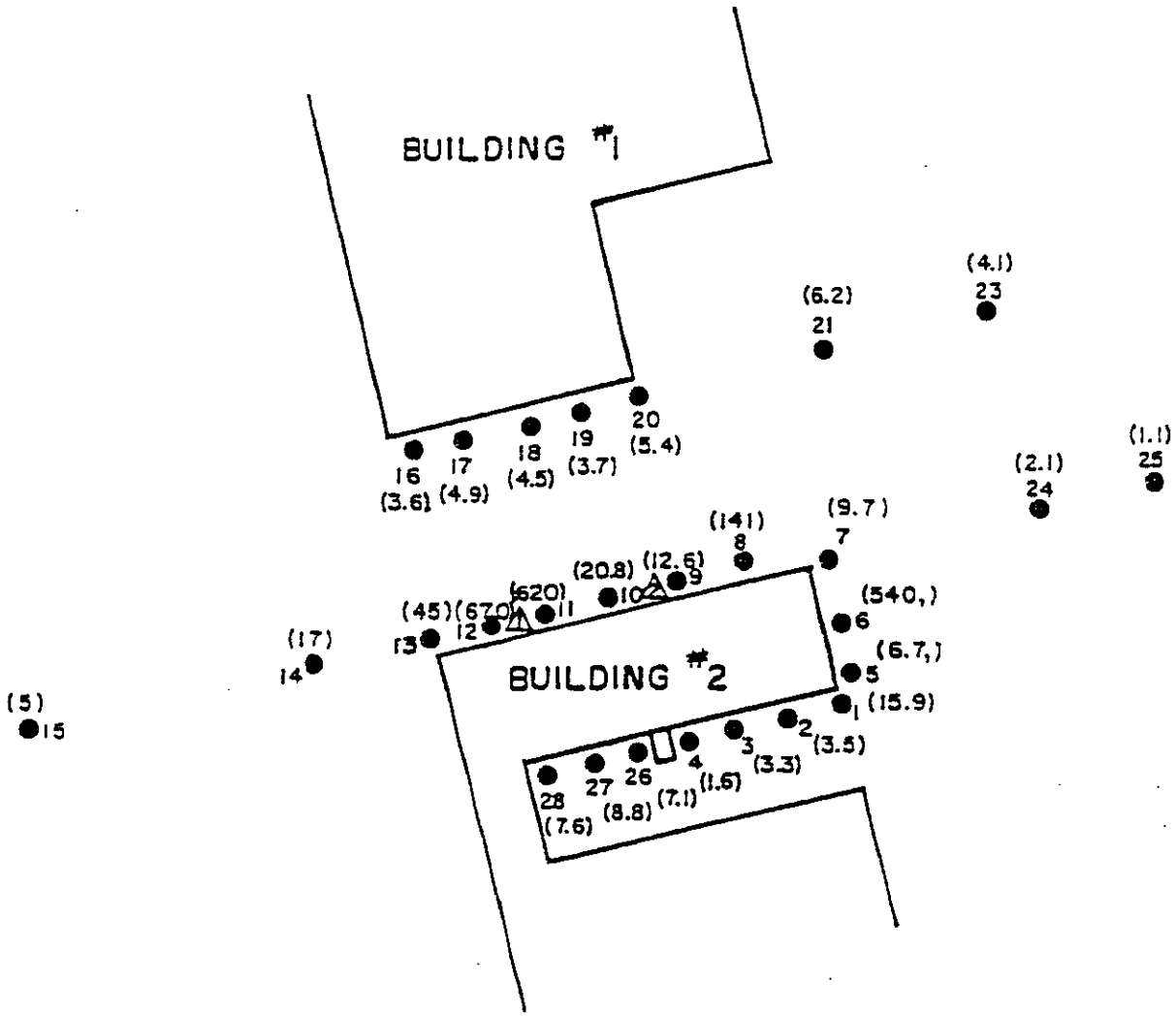
4100.001.876

O'BRIEN & GERE

OWEGO HEAT TREAT, INC.
APALACHIN, NEW YORK

SOIL GAS SURVEY

PERIMETER OF BUILDINGS 1 & 2



LEGEND

- ● - SAMPLING POINT
- (3.5) - PHOTOVAC TIP READINGS (ppm)
- △ SURFACE SOIL SAMPLE

0 30 60

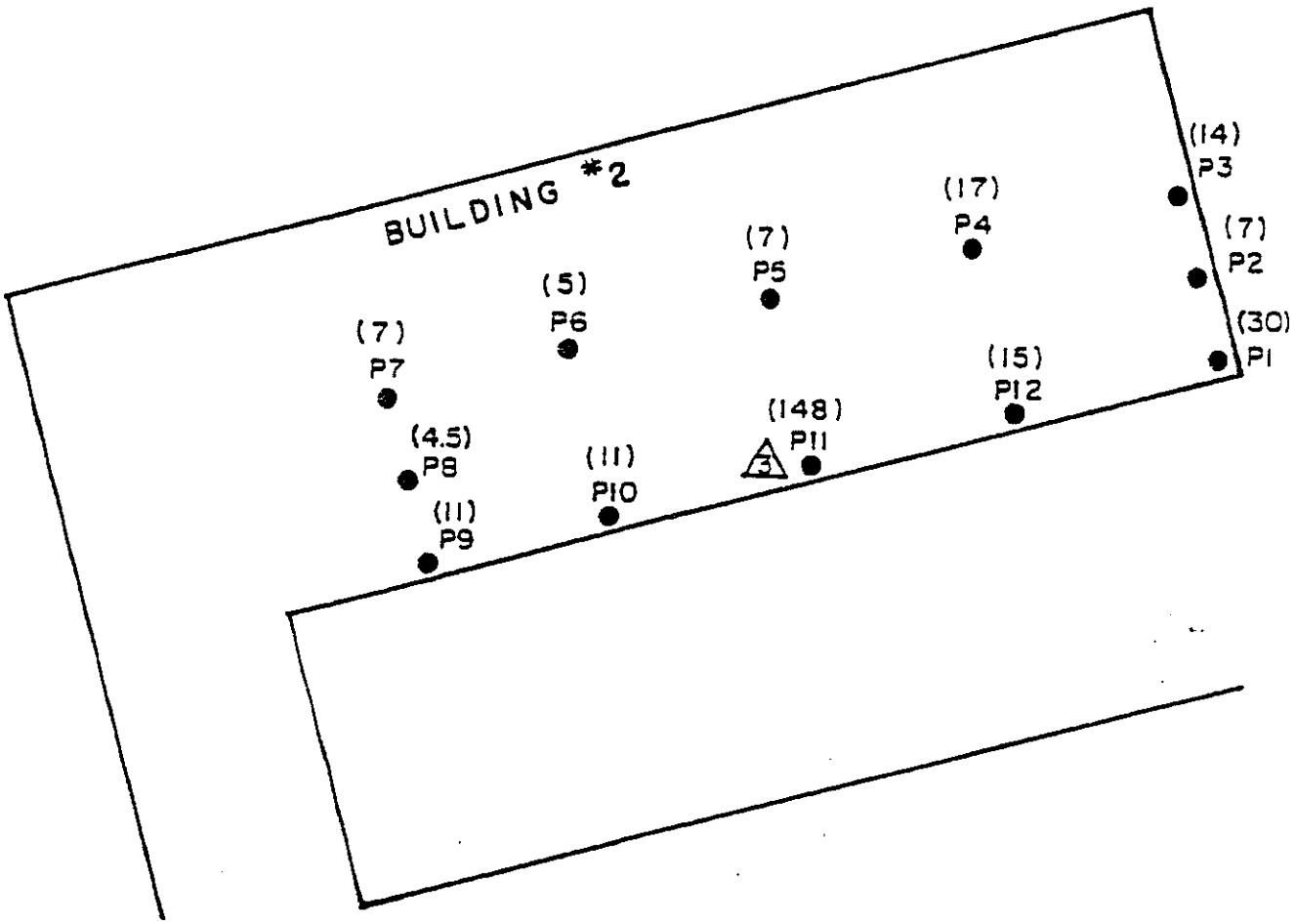
SCALE IN FEET

FIGURE 4

OWEGO HEAT TREAT, INC.
APALACHIN, NEW YORK

SOIL GAS SURVEY

PIT EXCAVATION



LEGEND

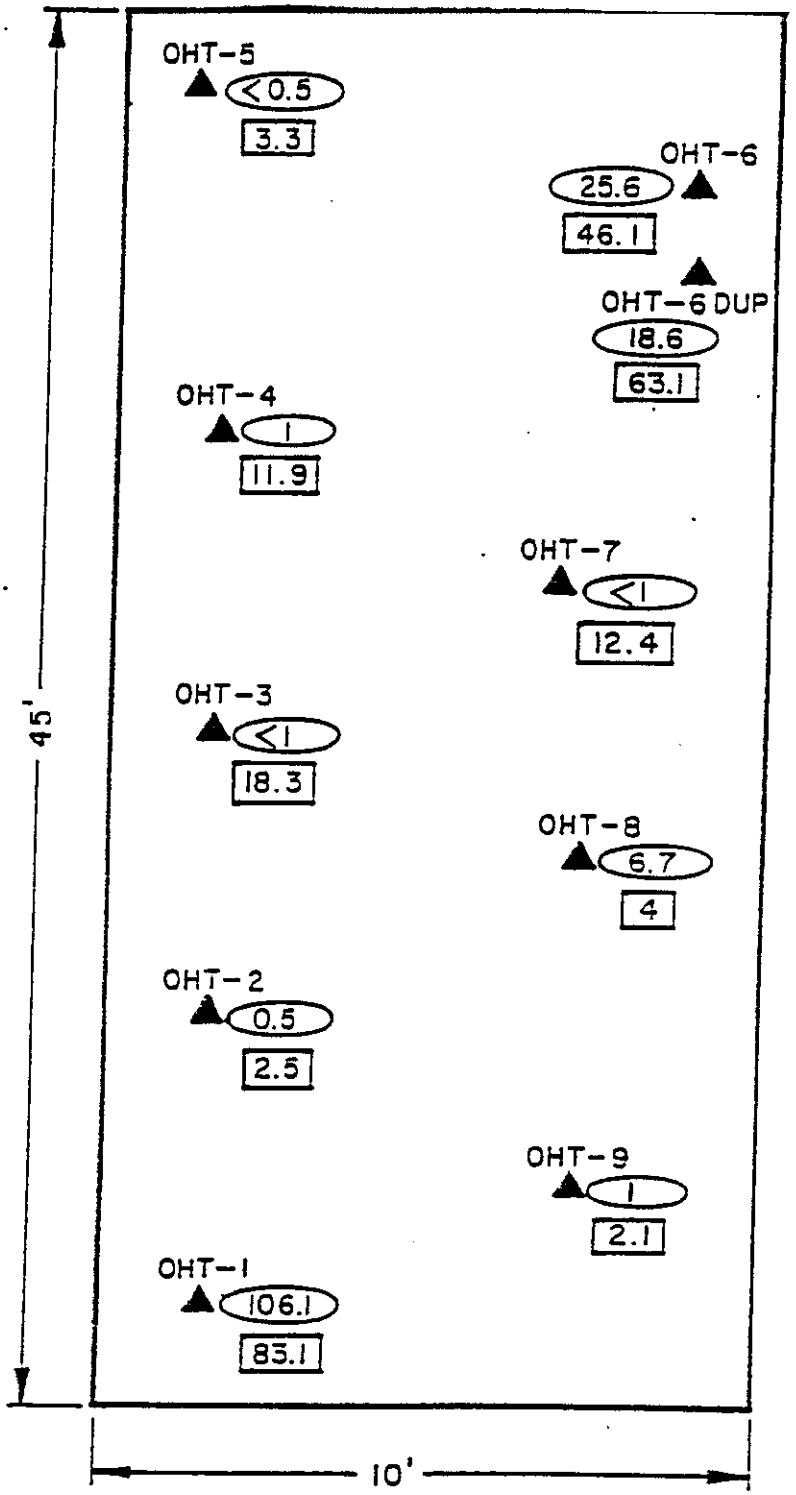
● - SAMPLING POINT

(5) - PHOTOVAC TIP READINGS (ppm)

△3 - SURFACE SOIL SAMPLE

0 10 20

SCALE IN FEET



OWEGO HEAT TREAT, INC.
APALACHIN, NEW YORK

SOIL GAS SURVEY RESULTS
BUILDING B-2 PIT

LEGEND

0.5 TETRACHLOROETHENE CONCENTRATION (ppm)

2.5 TRICHLOROETHENE CONCENTRATION (ppm)

NOT TO SCALE

FIGURE 6

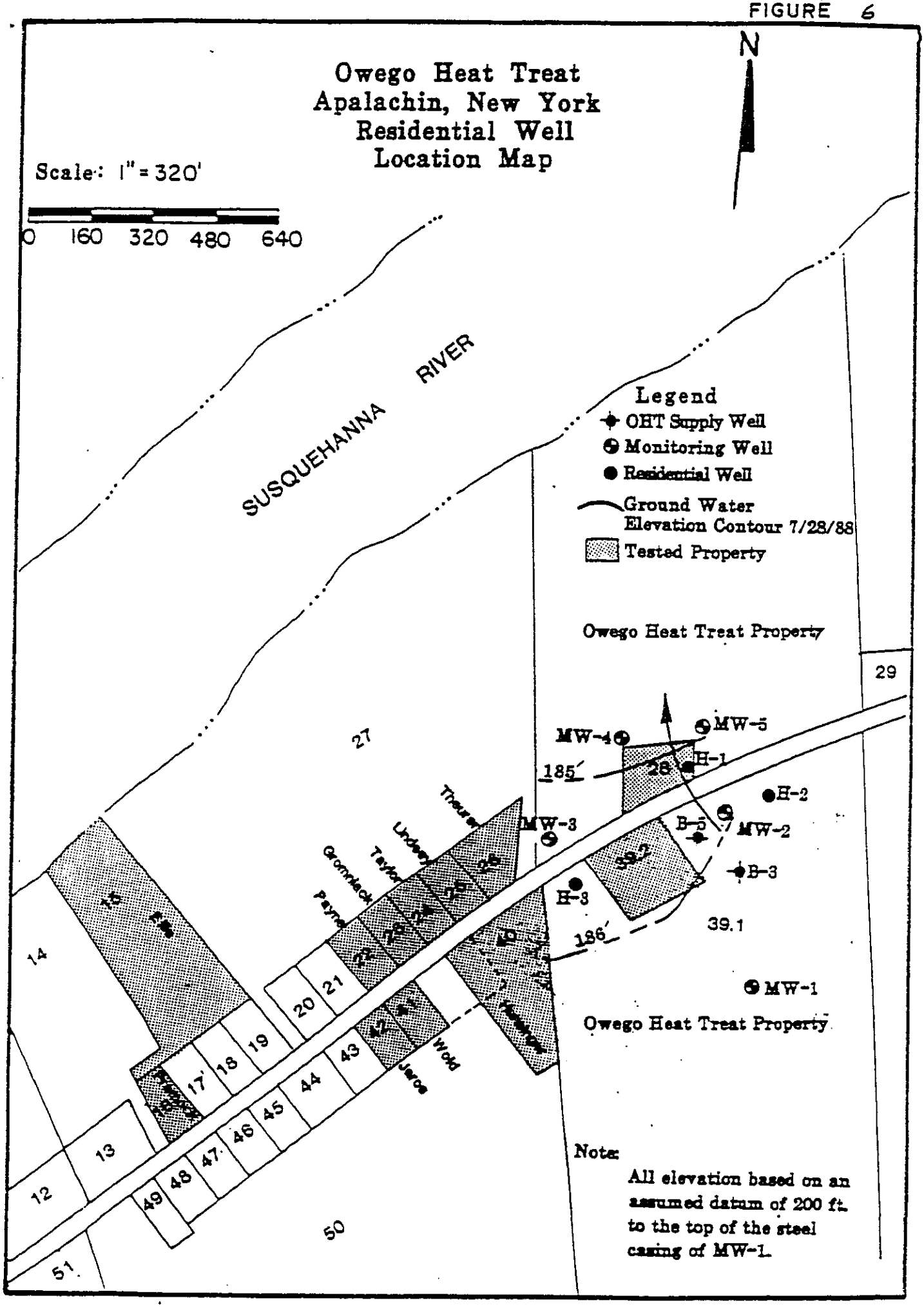
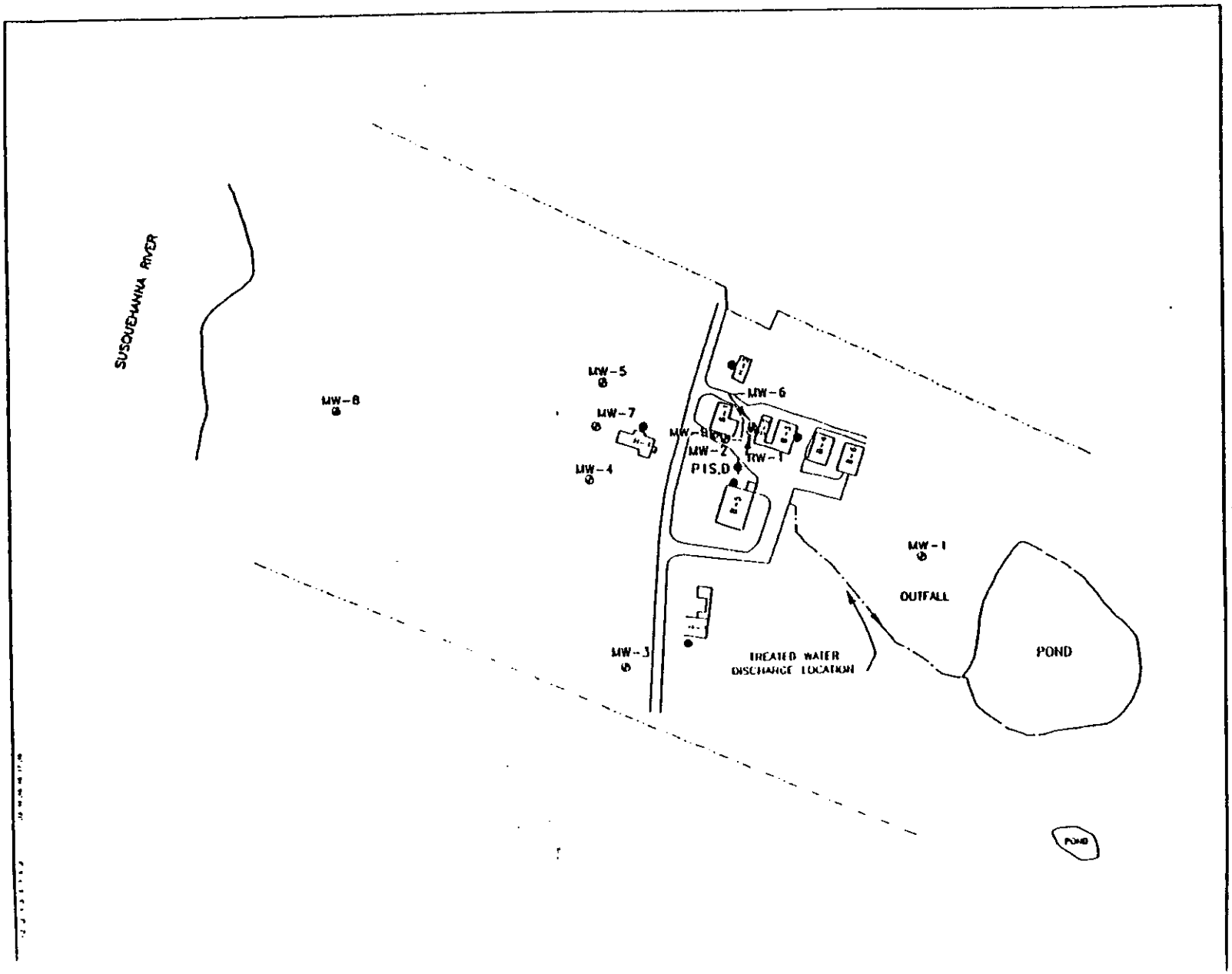

Owego Heat Treat
Apalachin, New York
Residential Well
Location Map
Scale: 1" = 320'
0 160 320 480 640
N
SUSQUEHANNA RIVER
Legend
OHT Supply Well
Monitoring Well
Residential Well
Ground Water Elevation Contour 7/28/88
Tested Property
Owego Heat Treat Property
MW-4
MW-5
H-1
H-2
MW-3
B-5
MW-2
B-3
H-3
MW-1
185'
186'
39.1
27
29
28
14
12
13
50
51
Note:
All elevation based on an assumed datum of 200 ft. to the top of the steel casing of MW-1.

FIGURE 7

OWEGO HEAT TREAT
APALACHIN, NEW YORK



LEGEND

- MONITORING WELL
- RECOVERY WELL
- PIEZOMETER
- SUPPLY WELL
- B-4 MANUFACTURING FACILITY AND WELL ID.
- H-1 HOUSEHOLD AND WELL ID.
- PROPERTY BOUNDARY

SITE MAP

200 0 200

SCALE IN FEET

4100 001.876

TABLE 1

OWEGO HEAT TREAT SITE
GROUNDWATER QUALITY DATA
APALACHIN, NEW YORK

WELL NO.	SAMPLE DATE	VC	t-1,2-DCE	TCE	PCE	c-1-2,DCE	OTHER	TOTAL
MW-1	04/28/88	<1	<1	<1	<1	<1	<1	
&	06/19/89	<1	<1	<1	<1	<1	<1	
MW-3	02/13/90	<1	<1	<1	<1	<1	<1	
&	04/30/90	<1	<1	<1	<1	<1	<1	
MW-4	08/02/90	<1	<1	<1	<1	<1	<1	
&	10/31/90	<1	<1	<1	<1	<1	<1	
MW-5	02/07/91	<1	<1	<1	<1	<1	<1	
	05/02/91	<1	<1	<1	<1	<1	<1	
	07/29/91	<1	<1	<1	<1	<1	<1	
	03/22/93	<1	<1	<1	<1	<1	<1	
MW-2	04/28/88	13	270	2700	780			3763
	06/19/89	62	430	2100	690			3282
	02/13/90	<100	1900	5600	2600			10100
	04/30/90	<100	860	4200	1600			6660
	08/02/90	<100	1800	6000	4000			11800
	10/31/90	200	2500	5600	3200			11500
	02/07/91	<100	540	2000	1300			3840
	05/02/91	<100	1000	2100	1500			4600
	07/29/91	<100	2100	6400	4500			13000
	03/22/93	410	61.3	11900	5460	4740	34.6	22605.9
	04/07/93	521	<50	5850	1480	4290		11620
	05/07/93	<1	38.5	630	630	634	6.6	1939.1
	06/10/93	62.1	<50	7800	6570	1820		16252.1
	07/08/93	<50	<50	2830	1830	334		4994
	09/17/93	28.2	10.7	2110	971	346	7.5	3473.4
	10/14/93	25.4	9.9	2480	1.9	193	3.1	2713.3
	11/12/93	12.4	5.1	1110	374	113	6.1	1620.6
MW-6	06/19/89	<10	41	16	2200			2257
	02/13/90	<1	<1	<1	14			14
	04/30/90	<1	<1	<1	5			5
	08/02/90	<1	<1	<1	3			3
	10/31/90	<1	<1	<1	1			1
	02/07/91	<1	<1	<1	4			4
	05/02/91	<1	<1	<1	<1			
	07/29/91	<1	<1	<1	1			1
	04/22/93	<2	<2	2.5	15.7	<2		18.2
	05/07/93	<1	<1	<1	<1	<1		
	06/10/93	<1	<1	<1	<1	<1		
	07/08/93	<1	<1	<1	<1	<1		
	09/17/93	<1	<1	<1	<1	<1		
	10/14/93	<1	<1	<1	<1	<1		
	11/12/93	<1	<1	<1	<1	<1		
MW-7	02/13/90	<1	92	170	8			270

WELL NO.	SAMPLE DATE	VC	t-1,2-DCE	TCE	PCE	c-1-2,DCE	OTHER	TOTAL
MW-7	04/30/90	<1	87	160	3			250
	08/02/90	1	99	190	2			292
	10/31/90	15	150	380	5			550
	02/07/91	<1	74	150	1			225
	05/02/91	<1	32	110	1			143
	07/29/91	<5	120	530	8			658
	03/22/93	<1	2.8	265	19.5	67		354.3
	05/07/93	<1	<1	310	21.8	84.7		416.5
	10/14/93	<1	<1	207	26.3	38.9		272.2
	11/12/93	<1	<1	228	40.5	42.2		310.7
MW-8	08/23/90	<1	<1	<1	<1	<1		
	10/31/90	<1	<1	<1	<1	<1		
	02/07/91	<1	<1	<1	<1	<1		
	05/02/91	<1	<1	<1	<1	<1		
	07/29/91	<1	<1	<1	<1	<1		
	03/22/93	<1	<1	<1	<1	<1		
MW-9	03/22/93	<1	<1	<1	2.9	<1		2.9
	04/07/93	<1	<1	<1	3.0	<1		3.0
	05/07/93	<1	<1	7.0	6.9	<1		13.9
	06/10/93	<1	<1	<1	1.9	<1		1.9
	07/08/93	<1	<1	<1	2.2	<1		2.2
	09/17/93	<1	<1	<1	1.9	<1		1.9
	10/14/93	<1	<1	<1	2.1	<1		2.1
	11/12/93	<1	<1	<1	<1	<1		
RW	03/31/93	23.3	6.3	84.7	624	182		920.3
	04/06/93	21.6	<5	157	378	235		791.6
	04/08/93	28.9	<1	262	493	296		1079.9
	04/13/93	44.5	3.8	242	654	278		1222.3
	04/20/93	30.2	12.4	319	790	252	1.1	1404.7
	05/18/93	27.4	<2	202	333	125		687.4
	06/22/93	<5	18.1	196	397	112		723.1
	07/20/93	15.6	5.2	218	619	61.7		919.5
	08/25/93	12.5	<1	267	431	139		849.5
	09/08/93	<1	<1	13.8	24.6	9.3		47.7
	10/04/93	18.1	<1	313	529	303	2.9	1166
	11/03/93	7.6	<1	161	408	102		678.6

TABLE 2

Cost of Remedial Alternatives

	Capital Cost	First Year Annual O&M Cost	Present Worth Cost
Alternative 1 No Further Action	$36720.00	$17000.00	$248500.00
Alternative 2 Enhanced Groundwater Pump & Treat	$105500.00	$25440.00	$422500.00