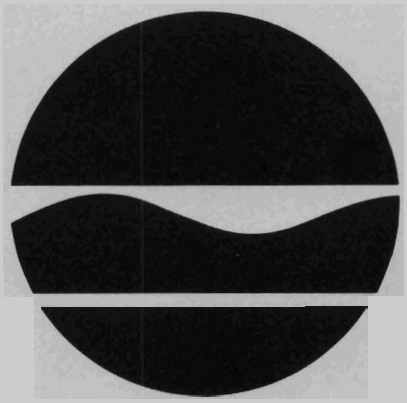
Mahopac Business District Wells

Putnam County, New York
Site Number 3-40-013

New York State Superfund

Record of Decision



August 1990

PREPARED BY:

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 Wolf Road, Albany, New York 12233
THOMAS C. JORLING, *Commissioner*

NEW YORK STATE SUPERFUND
RECORD OF DECISION

MAHOPAC BUSINESS DISTRICT SITE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Mahopac business district site, Town of Carmel, New York

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Mahopac business district site, developed in accordance with the New York State Environmental Conservation Law (ECL), and is consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 USC Section 9601, et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA).

Appendix A of this record lists the documents that comprise the Administrative Record for the Mahopac site. The documents in the Administrative Record are the basis for the selected remedial action.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision, present a current or potential threat to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

- Provide individual carbon treatment units at affected wells.
- Provide alternative water supply from Lake Mahopac.
- Remove contaminated sanitary sewer sediments.
- Review Sanitary Sewer Evaluation Survey and proposed work to determine if any additional work is necessary
- Long-term groundwater monitoring.
- Consideration of pump and treat systems on new or existing wells to contain the plume after a new water supply is installed.

The conceptual plan evaluated in the Feasibility Study consisted of expanding the Mahopac Ridge Water District to the effected area. If during design it becomes apparent that this is not feasible, other Lake Mahopac water sources may be considered.

DECLARATION

The selected remedy is designed to be protective of human health and the environment, is designed to comply with State environmental quality standards and is cost effective. This remedy satisfies the Department's preference for treatment that reduces the toxicity, mobility or volume of hazardous substances, pollutants or contaminants as the principal goal.

4/27
Date

Edward O. Sullivan
Deputy Commissioner
Office of Environmental Remediation

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APPENDICES

I. SITE LOCATION AND DESCRIPTION

The Mahopac business district site is located at the intersection of Routes 6 and 6N in the Village of Mahopac, Putnam County, New York. (Figure 1) The site includes small retail and service businesses, offices and residential apartments on private wells drawing from the local bedrock water bearing zone. In most cases, one well services a number of apartments or businesses.

This document describes the remedial alternatives considered for cleanup, identifies the remedy selected by the New York State Department of Environmental Conservation (DEC) and presents the basis for this selection.

II. SITE HISTORY

Contamination of groundwater in the Mahopac business district was discovered following a gasoline spill at the former U.S Gas Station (currently Carland Auto) during the Fall of 1978. The Putnam County Department of Health sampled several private wells in the business district to determine whether or not gasoline constituents had entered the groundwater. Results indicated the presence of tetrachloroethene and trichloroethene (common dry cleaning solvents) in several of the water samples. Boil water orders were issued and several carbon filtration units have been installed by well owners. The Putnam County Department of Health has periodically sampled private wells in the business district since this first sampling and has established a historical data base.

In 1983 DEC completed a Phase I investigation (site data evaluation), conducted by Ecological Analysts, Inc. The Phase I study developed a preliminary Hazardous Ranking System (HRS) score (Sm=32) which shows a potential for harm to human health and the environment from groundwater or surface water migration. The Mahopac site was nominated for the United States Environmental Protection Agency's (EPA) National Priorities List for federal lead action. EPA declined and referred the site back to New York State for action.

DEC selected the Mahopac site for a Remedial Investigation/Feasibility Study (RI/FS) as the first step towards corrective action under the State Superfund Program and contracted with Wehran Engineering in January 1987 to perform such a study.

III. PUBLIC PARTICIPATION

In August of 1987, DEC and Wehran Engineering developed a public participation program to be implemented during the Superfund Remedial Investigation and Feasibility Study. **The principal objects of this** public participation plan were:

TOPOGRAPHY TAKEN FROM
OSCAWANA LAKE, N.Y., 1956,
CROTON FALLS, N.Y., 1960,
PHOTOREVISED 1981,
MOHEGAN LAKE, N.Y.
1961,
LAKE CARMEL, N.Y., 1960,
PHOTOREVISED, 1981,
U.S.G.S. QUADRANGLE MAPS,
7.5 MIN. SERIES.

SCALE: 1" = 2000'

QUADRANGLE LOCATION

FIGURE 1

SITE LOCATION MAP

MAHOPAC BUSINESS DISTRICT

1. To provide area residents with a clear understanding of the New York State Superfund process. DEC will outline Superfund requirements and explain what Superfund can accomplish. This will provide area residents with a more realistic expectation about the activities, complexities and time involved with site investigations and evaluations.

2. To provide accurate, understandable information concerning all phases of the Mahopac RI/FS project to interested residents. DEC will work closely with County, State, regional and local officials and organizations in Mahopac to identify and fulfill the information needs of the community. Information will be distributed via several media sources, including press releases, direct mailing of fact sheets, meetings and the establishment of local document repositories.

3. To encourage interested citizens and local officials to voice their concerns and to raise issues concerning the project. Throughout the RI/FS process, the community will be encouraged to express their views and to discuss issues of concern with DEC. **Community input will be** solicited at key milestones before key decisions are made. A toll free number (1-800-342-9296) has been established in order to create a direct line to DEC.

4. To maintain good relations with local media to ensure accurate reports of RI/FS activities. An important goal of the Public Participation Plan will be to keep media informed about the project and to obtain accurate newspaper, television and radio coverage of RI/FS activities.

On August 12, 1987, before any field work began, a public meeting was held at the Town of Carmel Town Hall. The purpose of this meeting was to introduce the public to the RI/FS process and the people involved with the study. DEC staff discussed the objectives of the study and a representative from Wehran Envirotech presented details on specific RI/FS tasks.

A second public meeting was conducted on April 17, 1990. DEC staff gave a presentation on the Remedial Investigation results and introduced the topics to be discussed at the State's presentation of the preferred remediation.

On July 19, 1990, the State's Proposed Remedial Action Plan was presented to the public. After a presentation on the site's history and the alternatives considered for remediation, the State answered questions from the public regarding the preferred plan and other alternatives. A stenographic record was prepared on the meeting which has been placed in the administrative record repositories. Also, from this record a responsiveness summary was prepared and is contained in Appendix B of this document.

IV. CURRENT CONDITIONS AT THE SITE

Remedial Investigation Findings

The purpose of the Remedial Investigation (field testing) was to determine the nature, extent and source of contamination and to assess the associated health risks to the public and the environment. To accomplish this for the Mahopac site, a total of 15 groundwater monitoring wells were installed to characterize the extent of groundwater contamination and a number of soil gas, sewer sediment and soil samples were taken to identify any potential or continuing sources of contamination.

Most of the groundwater supply at the site is derived from wells in the bedrock aquifer. Pumping from these bedrock wells induces recharge from the overburden to the bedrock wherever these two units are in hydraulic connection. Fracture permeability and pumping from the network of bedrock supply wells controls groundwater movement beneath the site. Deep bedrock wells provide communication between shallow and deeper water-producing zones, and the interconnection of fractures between wells controls the migration of groundwater laterally across the site.

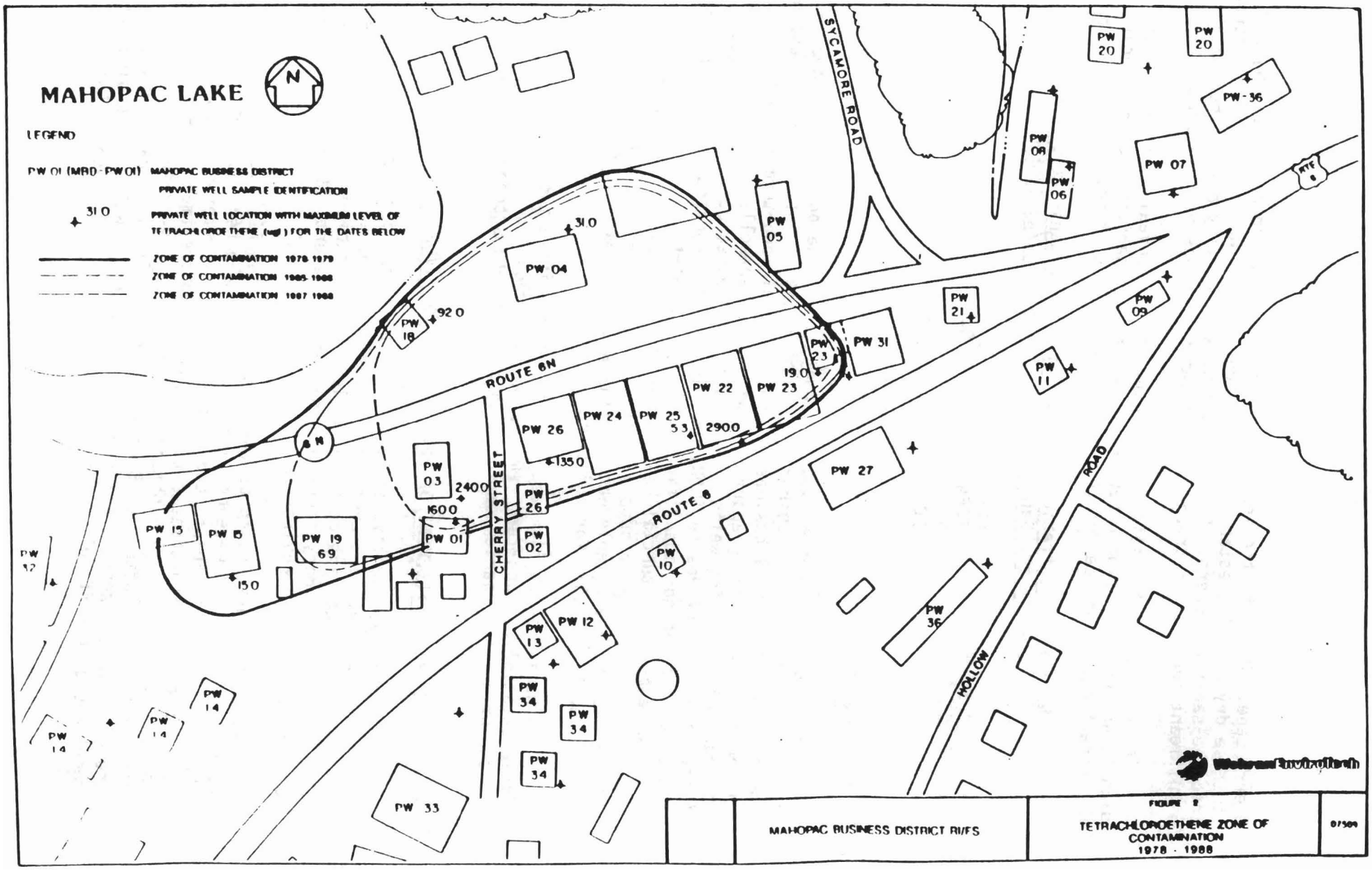
The bedrock withdrawal wells combine and act as a single pumping center in the Mahopac business district. This pumping affects local horizontal and vertical groundwater migration and limits off-site migration. Minimal off-site migration may occur where localized overburden flow discharges to Lake Mahopac or where bedrock fractures are not interconnected with fractures associated with the water supply wells. In these cases the regional direction of groundwater flow to the north is reflected.

Four principal volatile organic compounds were identified in potable groundwater and monitoring wells: tetrachloroethene (PCE), trichloroethene (TCE), 1,1,1-trichloroethane (TCEA) and trans-1,2-dichloroethene (DCE). Vinyl chloride was also detected in several private wells; however, levels were below the New York State Department of Health Drinking Water Standards. The approximate areal extent of the PCE contaminant plume is shown in Figure 2. The vertical extent of contamination was not fully identified during the RI; however, discrete sampling in monitoring well MW-2D detected PCE at a concentration of 25.6 ug/l, 380 feet below the ground surface.

Maximum Concentrations of the Principal Organic Compounds Found in the Groundwater (ug/l) or parts per billion (ppb)

	Sampling Event		
Compound	78-79	84-86	87-89
PCE	315.0	290.0	94.0
TCEA	--	--	7.4
TCE	110.0	64.0	20.0
DCE	--	310	63.0

PCE is and has been the primary chlorinated solvent in use commercially within the Mahopac business district. The source of the observed groundwater contamination has been attributed to historical discharges from three dry cleaning establishments; 1) Loving Care Cleaners of 61 East Lake Boulevard; 2) Mahopac Launderaid also of East Lake Boulevard, and 3) Lake Mahopac Tailor on


MAHOPAC LAKE
N
LEGEND
PW 01 (MBD - PW 01) MAHOPAC BUSINESS DISTRICT PRIVATE WELL SAMPLE IDENTIFICATION
310 PRIVATE WELL LOCATION WITH MAXIMUM LEVEL OF TETRACHLOROETHENE (ug/l) FOR THE DATES BELOW
ZONE OF CONTAMINATION 1978-1979
ZONE OF CONTAMINATION 1985-1988
ZONE OF CONTAMINATION 1987-1988
SYCAMORE ROAD
ROUTE 6N
ROUTE 6
CHERRY STREET
HOLLOW ROAD
PW 01
PW 02
PW 03
PW 04
PW 05
PW 06
PW 07
PW 08
PW 09
PW 10
PW 11
PW 12
PW 13
PW 14
PW 15
PW 18
PW 19
PW 20
PW 21
PW 22
PW 23
PW 24
PW 25
PW 26
PW 27
PW 31
PW 33
PW 34
PW 36
PW-36
310
920
1900
2900
1350
2400
1600
150
69
53
MAHOPAC BUSINESS DISTRICT RI/FS
FIGURE 2
TETRACHLOROETHENE ZONE OF CONTAMINATION 1978 - 1988
01509

Cherry Lane. Prior to the installation of distillation and recycling equipment at these dry cleaning establishments, spent solvent was typically discharged into the sanitary sewers. Since this disposal activity has stopped, a significant decrease in groundwater contamination has been observed.

The results of the soil and sediment studies revealed no areas with significant contamination other than sediments in sanitary sewer manholes. No current active sources of contaminants were identified.

Maximum Concentrations of the Principal Organic Compounds Found in the Sanitary Sewer Sediment ug/kg (ppb)

PCE	1,100,000
TCEA	170,000
TCE	220,000
DCE	570,000

V. RISK ASSESSMENT

The potential human exposure pathway is via the potable groundwater supply. Exposure can be characterized as potential intermittent ingestion by customers of the retail businesses and potential long-term chronic exposures of individuals living in apartments with affected wells. A number of the groundwater monitoring wells and private wells exceeded the applicable New York State Department of Health (DOH) Drinking Water Standards for one or more of the organic compounds identified in the groundwater. This exceedence of the MCLs represents a potential health risk above acceptable levels for individuals using the potable water supply. The lifetime cancer risk from exposure to 94 ug/l PCE in the potable water supply was calculated at 3.95×10^{-4} for adults and 1.47×10^{-3} for children.

The human health risk assessment has identified the need for implementation of long-term remedial action, reducing the level of exposure to the principal organic compounds to the required standard of 5 ug/l.

VI. OBJECTIVES AND DEVELOPMENT OF REMEDIAL ALTERNATIVES

The primary objective of the remedial actions developed is to 1) provide a safe water supply, 2) prevent the migration of the contaminants and remediate the aquifer by reducing contaminant levels in potable water to the standards (5 ug/l for the primary contaminants) and 3) prevent future releases of such contaminants to the environment.

It is apparent, based on the findings of the RI, that if the private wells in the Mahopac were no longer pumped some other means of preventing the spread of contaminants and remediating groundwater should be employed. Containment, in situ treatment, or pumping and treatment were considered. However, groundwater flow patterns in bedrock are very irregular, following complex fracture patterns. Because of the complex flow paths and depth of the contaminated zone, containment (e.g., a cutoff wall surrounding the zone) would be difficult to design and implement. Because of the complex

flow patterns, delivery of substances for chemical or biological treatment to contaminated zones and recovery of treated groundwater to monitor the effectiveness of treatment would also be difficult.

Groundwater pumping and treatment probably offers the best chance of containing and treating contaminated groundwater. Activated carbon can be effective in removing PCE, TCE, TCEA and DCE (USEPA, 1981, EPA/HWRL, October, 1985; Dobbs, 1980). The contaminants of concern can also be removed by using air stripping. The Henry's Constants of PCE, TCE, TCEA and DCE are 0.0287, 0.0117, 0.0092 and 0.0053 atm. m^3. $mole^{-1}$, respectively (USEPA, 1981). Compounds with Henry's Constants greater than 0.003 atm. m^3. $mole^{-1}$ are generally considered amenable to removal by air stripping (EPA/ HWRL, 1985).

VII. DESCRIPTION AND EVALUATION OF ALTERNATIVES

Six alternatives (Alternative 1 through 6) were developed for remediation of the site. The following is common to all remedial Alternatives except the No-Action Alternative:

In order to prevent recontamination of groundwater, sanitary sewer sediments in the business district will be removed and the sewers subjected to a Sanitary Sewer Evaluation Survey (SSES) to evaluate their integrity. Lines would be repaired or replaced as needed to prevent recontamination of groundwater from future accidental discharges to the sewer by the dry cleaning establishments. Waste disposal by the dry cleaners will be monitored to ensure there are no significant discharges of solvents to the sewer. Long-term groundwater monitoring for volatile organic compounds (VOCs) will be performed at existing affected wells, selected adjacent unaffected wells, and selected bedrock monitoring wells.

DESCRIPTION OF ALTERNATIVES

A.1 - No-Action - Consists of periodic monitoring of the groundwater. The No-Action Alternative is automatically carried through the detailed analysis as a comparison to the other alternatives.

A.2 - Delivered Water Supply/Groundwater Treatment - This alternative would involve supplying water to the establishments/residences known to be affected. Due to the increased health risk via dermal exposure and inhalation, water would be delivered for all uses. This would continue until the standards were met at the affected wells. Because the private wells will no longer be pumped under this alternative, pumping and treating the groundwater would be necessary to prevent the spread of contaminants.

A-3 - Individual Well Treatment Systems - This alternative involves installing activated carbon treatment units at the individual wells known to be affected from the 1987-1988 Remedial Investigation or subsequent sampling. Monitoring the effectiveness of the treatment systems would be done on a regular basis and spent carbon would be disposed and replaced as needed. The present groundwater pumping pattern would be maintained for contaminant and treatment would be done by use of the carbon filters.

A-4 - New Groundwater Supply with Treatment - This alternative involves construction of the new groundwater supply well located in the business district, a centralized treatment system to remove VOCs and a distribution system to supply potable water to the establishments/residences known to be affected. Centralized groundwater treatment could be accomplished by carbon adsorption or air stripping. The one centralized supply well, properly placed, could provide contaminant containment and treatment.

A.5 - Mahopac Lake Water Supply/Groundwater Treatment - This alternative involves utilizing Mahopac Lake as a potable water supply and constructing a conventional surface water treatment system and a distribution system to the establishments/residences known to be affected. As with A.2 groundwater treatment would be required to prevent migration of the contaminants.

A.6 - New York City Water Supply/Groundwater Treatment - This alternative involves tapping into New York City's nearby water supply system and constructing a distribution system to the establishment/residences known to be affected. As with A.2 and A.5 groundwater treatment would be necessary to prevent migration of the contaminants.

Screening of Alternatives

The six alternatives developed were subjected to screening for effectiveness and implementability. Effectiveness is the extent a remedy will eliminate short and long term threats to public health and the environment. Short-term refers to the construction and implementation period. Long-term refers to the period after the remedial action is in place and effective. Implementability considers the technical and administrative feasibly of the remedy as well as the availability of services and material.

Under the No-Action Alternative, the community would not be protected from using water containing contaminants at levels above the Drinking Water Standards allowed by the New York State Department of Health. The threat to the environment will be minimal if the current pattern of pumping individual wells is maintained. However, there is no method of insuring this.

The remaining Alternatives A.2 through A.6 all provide for a safe water supply and are effective in eliminating threats to public health in the long term.

Alternatives A.2, A.4, A.5 and A.6 all result in the local supply wells no longer being drawn from and thus rely on the pumping of a new well or wells to contain the contaminant plume and treat the groundwater. The necessary additional hydrogeologic studies, design and implementation of these alternatives is anticipated to take between two and three years. Alternatives A.2, A.4, A.5 and A.6 are all considered untimely and can be associated with short-term risks to the community.

Alternative A.3 (individual carbon units) can be implemented in a matter of months and is considered protective of public health in the short term, and in the long term if constant monitoring of the filters is maintained. It is also considered effective in protecting the environment if the current pattern of pumping individual wells contains the plume as it has in the past; however, there is no method of insuring this.

All of the alternatives are considered implementable. The technologies are commercially available and competitive bids can be obtained from multiple vendors. There may be some problems with finding space for storage tanks under Alternative A.2 (delivered water supply). It will also be difficult to find available space for pump and treat systems and extensive administrative coordination would be required for the discharge of treated groundwater within New York City's water shed area. Other administrative difficulties include the creation of a water supply agency (Alternatives A.4, A.5 and A.6) and utilizing a known contaminated groundwater source as a new water supply (Alternative A.4). A.4 would not likely receive DOH approval as a new water supply since there are other clean sources of water readily available.

In summary, the alternatives that provide an alternative water supply were considered ineffective in the short term. All alternatives are considered implementable, with administrative and potential construction difficulties, particularly A.2, A.4 and A.6.

VIII. THE SELECTED REMEDY

After careful consideration of all reasonable alternatives, DEC and Wehran Envirotech Eng. Inc. propose parts of Remedial Alternatives A.3 and A.5:

- Provide individual carbon treatment units at affected wells. This action is currently in progress.
- Provide alternative water supply from Lake Mahopac.
- Remove contaminated sanitary sewer sediments.
- Review Sanitary Sewer Evaluation Survey and proposed work to determine if any additional work is necessary.
- Long-term groundwater monitoring.
- Consideration of pump and treat systems on new or existing wells to contain the plume after a new water supply is installed.

Rationale for Selection

In selecting the remedial action, alternatives that are effective and implementable are assessed against the following seven criteria;

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks from exposure pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

2. Compliance with standards addresses whether or not the remedy will meet cleanup standards or provides grounds for invoking a waiver.

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

4. Reduction of toxicity, mobility or volume is the anticipated performance of the treatment technologies proposed.

5. Short-term effectiveness addresses the period of time needed to achieve protection, and any adverse impacts on human health and the environment during the construction and implementation period until cleanup goals are achieved.

6. Ability to implement is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. Cost includes estimated capital, operation and maintenance cost, and net present worth costs.

The No-Action Alternative is not considered protective of human health but may be protective of the environment if future pumping of individual wells continues to prevent migration. It will not comply with standards nor will it reduce the volume, mobility or toxicity of the contaminants. The estimated cost of regular quarterly monitoring is $43,200 per year; which at a 3% interest rate over 20 years has a present worth of $640,017.

Objective 1) Provide a Safe Potable Water Supply

As noted in the preliminary screening, implementation of a new water supply will take several years and is associated with short term risks. The individual carbon filtration units of Alternative 3 (A.3) can be quickly implemented. The technology is commercially available and competitive bids can be obtained from multiple vendors. Design and installation of the treatment systems can be implemented in a matter of months. Carbon adsorption can reliably meet drinking water standards thus eliminating human ingestion, inhalation and dermal exposure to contaminant levels above standards. The estimated capital costs of the filtration units is $153,400. The estimated annual operation and maintenance (O&M) costs of the carbon units is $92,400. If another source of water is not provided, this cost would be incurred annually until contaminant levels consistently drop below the drinking water standards. For cost comparison purposes it was assumed that this would be 20 years. At a 3% discount rate the O&M costs of the filter units over 20 years would have a present worth of $1,368,924.

The Town of Carmel is currently refurbishing a Lake Mahopac water source servicing the Mahopac Ridge area. The incremental cost associated with expansion of this system, to include the affected area of the business district, was estimated to have a present worth of $740,833; which includes all capital costs and O&M costs (20 years at 3% discount rate). Based on these estimates, it is cost effective to expand the water system to avoid long term operation and maintenance costs of the filters and provide a permanent safe water supply to affected residences. Development of other sources of water (new wells) were estimated to cost two to three times that of the expansion of the Lake Mahopac supply and would have considerable administrative and construction difficulties.

Objective 2) Prevent Migration of the Contaminants and Remediate the Aquifer

The current private well pumping in the business district has effectively contained the contamination plume. However, changes in water use by local residences, such as the anticipated installation of a municipal water supply, would dramatically change the hydrogeologic conditions of the site. Carbon filters on existing wells (Alternative 3) would only contain the plume for the short term. During design of the new water system and installation of the carbon filters, additional studies will be performed to estimate the effect of changes in the hydrogeologic conditions on the plume migration and the feasibility of containing the plume and remediating the aquifer by other means. A preliminary cost estimate of these necessary studies has a present worth of $200,000. The pump and treat system to cleanup the aquifer has an estimated present worth of $1,066,812 (includes O&M for 10 years at 3%).

Objective 3) Prevent Future Releases of Contaminants to the Environment

Proper precautions will be taken to prevent adverse impacts on human health and the environment during the removal of sanitary sewer sediments or any necessary repairs to the sanitary sewer, thereby insuring short-term effectiveness. Off-site treatment and disposal of sediments will significantly reduce the toxicity or mobility of the contaminants. All of these components can be implemented. The necessary technologies are commercially available and competitive bids can be obtained from multiple vendors. Results of monitoring waste disposal practices and groundwater will indicate the long-term effectiveness of the remedies employed and insure long-term protection of human health and the environment by compliance with standards.

Estimated costs for the above components have a total present worth of $557,000 and are broken down in detail in the next section. Note that the annual groundwater monitoring costs were also included in the Operation and maintenance costs of the carbon filters. Less monitoring costs will be incurred once the new water supply is operational and this is reflected in the cost summary.

Conceptual Design and Additional Testing

The wells to be treated were selected on the basis of exceedence of standards from either Wehran 1987-1988 sampling or Putnam DOH 1989 sampling. Wells that are not currently contaminated but are within the zone of contamination will have treatment units designed but not installed unless monitoring indicates it is necessary. Each well to be treated was grouped into one of three general usage rate categories based on estimations derived from building officials and code administrators (BOC) International Plumbing Code fixture unit ratings and assumptions regarding fixture units for each building served. In this analysis, water for consumption and sanitary use was considered for treatment. Treatment is also recommended for other usage, such as the commercial laundry wash water, a minimal exposure route. Table 1 summarizes the usage and costs associated with individual treatment units of the proposed remedy.

Each carbon adsorption treatment system would be a point of entry system which would consist of two carbon units connected in series, with sampling taps on the effluent piping to the first unit, the influent piping to the second unit, and the effluent piping from the second unit. Header piping would be provided to allow for conversion of the second unit to become the primary unit after carbon replacement servicing. The carbon adsorption system would be connected directly after the hydroneumatic tank for each well system.

TABLE 1

MAHOPAC BUSINESS DISTRICT RI/FS
ESTIMATED USAGE AND COSTS OF INDIVIDUAL TREATMENT SYSTEMS

Well Designation	User	General Usage Rate (GPM)	Construction Costs (1/90 $)	Annual Operation Costs (1/90 $)
PW01	Lake Mahopac Tailor	10	5,000	1,000
PW02	Carland Auto	10	5,000	1,000
PW03	Petro Plaza	10	5,000	1,000
PW04	Robert Miller, Esq et al Lake Mahopac Inn Century 21 Creative Design Carvel Ice Cream Cacciatori Pizzeria	20	8,000	2,000
PW14	Old Stone Professional Building (5 medical offices, 1 CPA office) and 6 apts.	45	15,000	7,000

TABLE 1 Continued

Well Designation	User	General Usage Rate (GPM)	Construction Costs (1/90 $)	Annual Operation Costs (1/90 $)
PW15	Ken Anthony Plaza Mahopac Physical Therapy Restoration Plus Woman's Touch Vacant store Anthony Associates Ken Lauro Real Estate Hairplace & Co. Gift Box Florist Mahopac Music Center	20	8,000	2,000
PW18	Mahopac Marine Corp. 1 apt.	10	5,000	1,000
PW19	Lakeside Apts. 10 efficiency apts.	45	15,000	7,000
PW22	Mahopac Launderaid Mahopac Shoe Store	10*	5,000	1,000
PW23	Mexican Express Mahopac Deli	20	8,000	2,000
PW24	Mahopac Pharmacy 2 apts.	20	8,000	2,000
PW25	Loving Care Cleaners L&L Decorators 12 apts.	45	15,000	7,000
PW26	LakeSide Deli Mad Mac's Carmelo's Barber Shop Tanberg Vacant Store 2 apts.	20	8,000	2,000
PW31	Skippers Inn Tony's Barber Shop Touch of Class Hair Salon Paperback Trader Gold & Silver Exchange	20	8,000	2,000
		TOTAL	$118,000	$38,000/year

*Usage would be 30 gpm with laundry wash water included.

In order to prevent possible future contamination of the groundwater, the sanitary sewer sediments will be removed. The sewer line consists of approximately 2,000 feet of eight-inch diameter pipe. The entire length of sewer would be cleaned using a hydraulic water jet which would deliver clean water from a tank truck at approximately 65 gpm and 2,000 psi. Work would be limited to the sewer section connecting two sequential manholes. The high pressure water would be injected at the upstream manhole and collected via a vacuum truck line at the manhole immediately downstream. A baffle would be set up at this downstream manhole to prevent downstream migration of re-entrained sediment. The sediment and water mixture would then be treated and disposed of as required based on analytical testing.

It is assumed for cost estimating that the collected waste would be classified as hazardous and would, because of land disposal restrictions, be transported by a licensed hauler, to a permitted hazardous waste treatment/disposal facility for incineration or solidification. Based on the assumption that the sewer sediment has an average depth of three inches throughout the 2,000 feet of sewer, and an average depth of six inches in the manholes, it is estimated that approximately 20 cubic yards of screened sediment will be removed from the sewer system. Based on the assumption that the screened sediment will weigh 125 pounds per cubic foot, the total weight of sediment requiring disposal will be approximately 34 tons. It is anticipated that this sewer cleaning will take five to eight working days to complete.

Disposal of spent solvents by the dry cleaning establishments will be monitored to ensure that they are not placed in the sanitary sewer where they can contaminate sediments and recontaminate groundwater. Regular inspection of any manifests or records held by the dry cleaners with respect to their spent solvent disposal will be carried out by the DEC regional staff on a yearly basis. This will help ensure that the spent solvents are properly disposed.

Groundwater monitoring will continue under this proposed remedy to ensure that the zone of contamination does not extend beyond its present limits. Quarterly sampling and analysis for EPA 500 Series VOCs, should be performed on raw and treated samples at the wells receiving individual treatment units, wells previously included for analyses by the Putnam County Department of Health and all bedrock monitoring wells installed during the 1987-88 RI/FS. Table 2 shows which wells will be analyzed during the period before the water supply is provided.

The expansion of Mahopac Ridge water supply will consist of increasing the capacity of the supply line and pumps and constructing a water main distribution system to the Mahopac business district. Hookups will be provided to the effected wells. Figure 3 illustrates the conceptual design of the distribution system used for cost estimating purposes.

TABLE 2

MAHOPAC FEASIBILITY STUDY
GROUNDWATER MONITORING WELL SAMPLING

Well Designation	Raw	Treated
PW01	X	X
PW02	X	X
PW03	X	X
PW04	X	X
PW13	X	N/A
PW14	X	X
PW15	X	X
PW18	X	X
PW19	X	X
PW21	X	N/A
PW22	X	X
PW23	X	X
PW24	X	X
PW25	X	X
PW26	X	X
PW31	X	X
**MW06I	X	N/A
**MW02D	X	N/A
**MW01I	X	N/A
**MW02I	X	N/A
**MW03I	X	N/A
**MW05I	X	N/A

**Wells to be sampled periodically after installation of a new water supply to the area.

TABLE 3

COST SUMMARY OF
PROPOSED REMEDIATION

Capital Costs

Carbon Adsorption Systems	$ 118,000
+ 30% Contingency & Engineering	35,400
Sewer Cleaning and Sediment Treatment	164,000
+ 25% Contingency & Engineering	41,000
Municipal Water Supply	480,793
+ 25% Contingency & Engineering*	97,043
Groundwater Treatment System	755,000
	$1,691,266

Annual Operating and Maintenance Costs

Carbon Replacement	$38,000 (2 years)
Groundwater and Supply Well Monitoring during Filtration	54,400 (2 years)
Municipal Water Supply	11,000 (18 years)
Groundwater Monitoring after Water Supply	25,600 (18 years)
Groundwater Treatment	60,000 (10 years)

Present Worth

PW = $1,691,266 + $38,000 (2 years at 3%) + $54,400 (2 years at 3%)
$11,000 (18 years a 3%) + $25,600 (18 years at 3%) +
$60,000 (10 years at 3%)

PW = $2,883,263**

*On water distribution system only
**Includes $151,000 present worth for O&M of municipal water supply

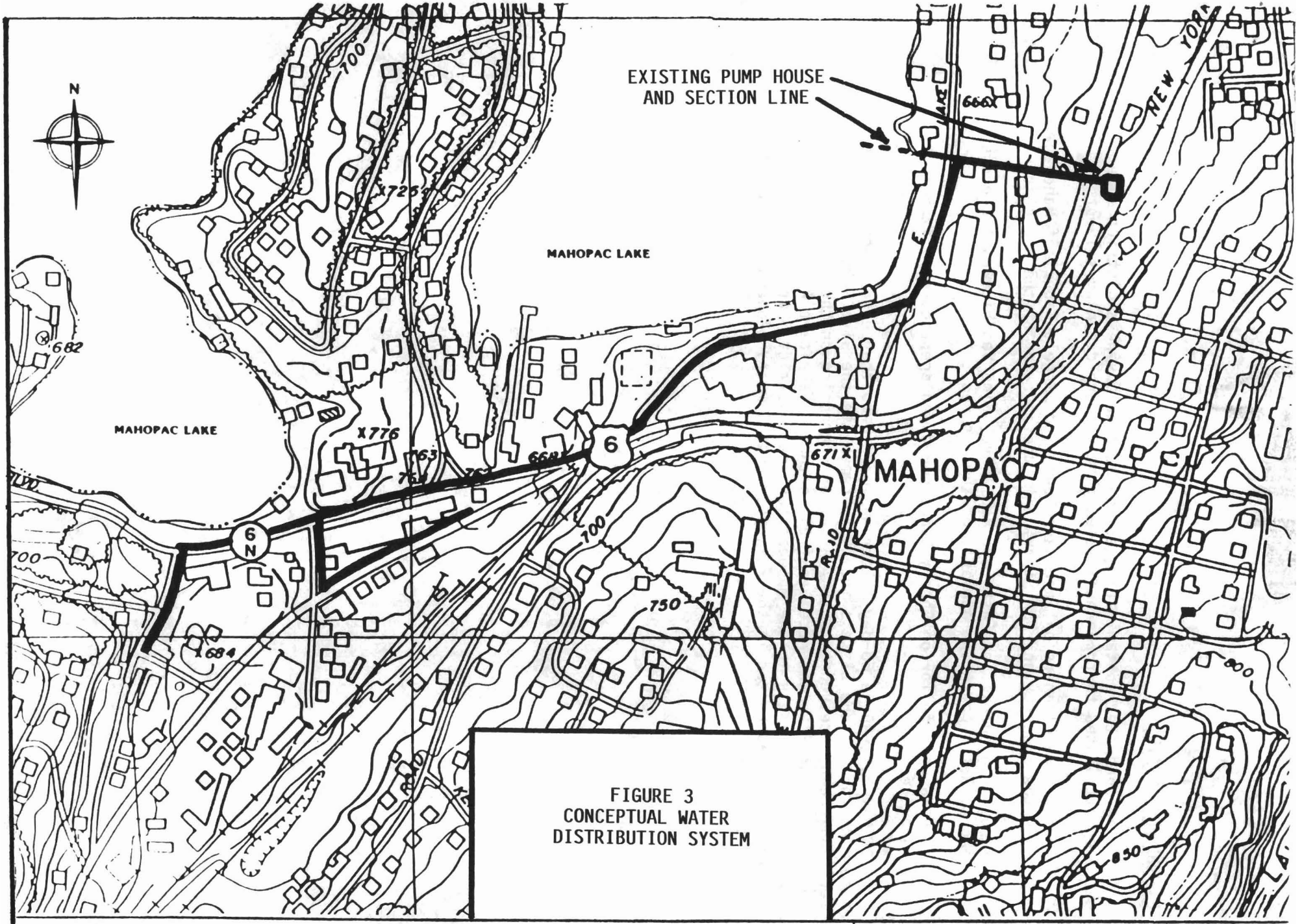


FIGURE 3
CONCEPTUAL WATER
DISTRIBUTION SYSTEM

Scale 1:4800

00 0 400 800 1200 1600 2000 FEET

Contour Interval 10 Feet (With 5 ft. Supplemental Contours)

MAHOPAC BUSINESS DISTRICT RI/FS

IX. ENFORCEMENT STATUS

The groundwater contamination at the Mahopac business district site has been attributed to three businesses that use dry cleaning solvents:

1. Loving Care Cleaners on East Lake Boulevard, Angelo Fabbri of Mahopac owns the property and Don Starkman is the operator of the business.

2. Mahopac Launderaid on East Lake Boulevard, Gino Vesshi owns the property and R. Astrolog is the operator of the business.

3. Lake Mahopac Tailor on Cherry Lane, owned and operated by Elizabeth Lacovone.

On May 3, 1990, a 60-day letter was mailed to the persons noted above informing them of the State's intent to remediate the site. No formal reply has been received to date. A letter commenting on the State's Proposed Remedial Action Plan was received from Northeast Fabricare Association on behalf of dry cleaners in the Mahopac business district. Comments made in the letter are addressed in the Responsiveness Summary (Appendix B) of this document.

APPENDIX A

List of Documents in the Administrative Record

1. "Preliminary Investigation of the Mahopac Business District Village of Mahopac, Putnam County, New York, Phase I, Summary Report," Ecological Analysts, Inc., November 1983.

2. "Technical Proposal for a Remedial Investigation/Feasibility Study of the Mahopac Business District Site," Wehran Engineering P.C., September 1986.

3. "Contract for a Remedial Investigation/Feasibility Study of the Mahopac Business District Site," Wehran Engineering P.C., January 1987.

4. Public Participation Plan for the Mahopac Business District Site," Wehran Engineering P.C., July 1987.

5. "Remedial Investigation Work Plan, Quality Control Plan and Health and Safety Plan for the Remedial Investigation of the Mahopac Business District Site," Wehran Engineering P.C., November 1987.

6. "Interim Report, Mahopac Business District RI/FS Sanitary Sewer and Water Supply Surveys and Sampling and Analysis of Private Well," Wehran Engineering P.C., March 1989.

7. "Remedial Investigation Report for the Mahopac Business District Site," Volumes I, II, III, and IV. Wehran Engineering P.C., February 1990.

8. "Feasibility Study Report for the Mahopac Business District Site," Wehran Engineering P.C., March 1990.

9. "Proposed Plan for Remediation of the Mahopac Business District Site," New York State Department of Environmental Conservation, July 1990.

APPENDIX B

RESPONSIVENESS SUMMARY

The New York State Department of Environmental Conservation (NYSDEC) held a public meeting or July 19, 1990 at the Town of Carmel Town Hall to discuss the findings of the Mahopac Business District Site RI/FS. Present at the meeting were representatives from NYSDEC, Putnam County Department of Health, Wehran Engineers P.C., Town of Carmel and concerned citizens.

The RI/FS reports and the Proposed Remedial Action Plan were made available for public view by June 15, 1990 at the following locations:

* NYSDEC Region 3 Office, New Paltz, New York
* Mahopac Public Library, Mahopac, New York
* Putnam County Department of Health, Carmel, New York
* Carmel Town Hall, Mahopac, New York

SUMMARY OF PUBLIC CONCERNS AND NYSDEC RESPONSES

Questions or statements Q.1 and Q.2 were submitted by Northeast Fabricare Association on behalf of the dry cleaners in the Mahopac Business District. The dry cleaners have been identified as potentially responsible parties. All other questions are from the stenographic record of the July 19, 1990 public meeting.

Q.1 Of the four VOC's listed, only one, PCE, is a solvent used by dry cleaners. While all of the compounds found, including PCE, have industrial and product applications, only PCE can be used by the fabricare industry. The other VOC's would have no place in a dry cleaning plant.

Ans. The results of the sanitary sewer and water supply surveys indicate that tetrachloroethene (PCE) is and has been the primary chlorinated solvent in use commercially within the Mahopac Business District. Other contaminants found at the site, Trichloroethene (TCE), Trans-1,2-Dichlorethene (DCE) and Vinyl Chloride are successive degradation products of PCE. In time, PCE will breakdown into these other contaminants.

Q.2 Since the VOC's found in the Mahopac groundwater sampling are common solvents used by many industries and are found in a number of consumer and industrial products, it would take many hours of investigation to identify the source(s) of this contamination. The proposed remediation action plan only identifies the dry cleaners as the source, without logical documentation of this assertion.

Ans. The intent of the proposed remedial action plan document is to summarize the State's preferred remedy of the site. Additional documentation regarding the investigation and its conclusions are contained in the Administrative record. Approximately 5,000 field and technical hours were spent on the investigation of this site.

Q.3 Being a resident within the Mahopac Ridge Water District, I would like to know how the proposed expansion will affect me.

Ans. The State's preferred remedy consists of expanding the Mahopac Ridge Water District to the affected area. The capital costs involved with obtaining this source and distributing it to the affected area will be paid for by the State Superfund Bond Act. The operation and maintenance costs of this system will become the responsibility of the Town of Carmel, distributed amongst the water district users. Since the capital costs are not paid by the Mahopac Ridge Water District, the added user fees from the affected area will more than compensate for the additional operation and maintenance costs. This in effect will reduce your water fees.

Q.4 Who will be included in the expansion of the water district?

Ans. Currently there are 15 wells affected by the contamination. These wells provide water for 80 residences or businesses, who will be included in this expansion. This number may change based on additional monitoring of this area. Also the Town or water district may modify or expand the State's plan at their own expense to hookup additional users along the distribution system.

Q.5 What have the affected residence been doing about their water problem in the past?

Ans. The Putnam County Health Department has issued boil water orders to the affected residence or business well owners. Some have been boiling the water used for drinking or using bottled water. Others have installed filtration units on their water systems.

Q.6 Have other sources of water, other than the Mahopac Ridge water supply, been considered?

Ans. Yes. Consideration was given to developing a new groundwater source, expansion of the nearest New York City water supply and shipping water by trucks. All of these alternatives were estimated to cost two to three times that of expanding the Mahopac Ridge water supply. Developing a new water source from Lake Mahopac has not been evaluated fully. However, if the expansion of Mahopac Ridge turns out to be infeasible, this option would be explored in more detail.

Q.7 How will Mahopac Ridge Water District be compensated for the State's hookup to its source?

Ans. The water district is currently renovating the suction line and pump house of its source. The State will compensate for the additional capacity being installed, necessary for supplying the affected residence and businesses. Details of this and how the new users will contribute to maintaining the system will be developed during design.

Q.8 How will the contaminated water currently in the ground be treated?

Ans. Additional hydrogeologic studies will be necessary to detail the plan. After the new water supply is installed the hydrogeologic conditions will change dramatically and must be re-evaluated to design an effective pump and treat system. Pumped water will be treated using either an air stripper or activated carbon filtration, or a combination of both. The water would then most likely be discharged to Lake Mahopac.