Received 6/19/95
Updated 6/21/95

FEASIBILITY STUDY REPORT

ABALENE PEST CONTROL
MOREAU, NEW YORK

NYSDEC Site Number 546035

Orkin Exterminating Company, Inc.
Atlanta, Georgia

June 1995
1368012

MALCOLM PIRNIE, INC.
Four Corporate Plaza
Albany, New York 12203

MALCOLM PIRNIE

MALCOLM PIRNIE, INC.
ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

June 20, 1995

Mr. Russell Mulvey
New York State Department of
Environmental Conservation
P.O. Box 296
Ray Brook, NY 12977-0296

Re: Abalene Pest Control, Moreau, New York

Dear Mr. Mulvey:

As you requested in our telephone conversation today, enclosed are three revised pages to the Feasibility Study for the above-referenced site which was submitted to you on June 16, 1995. Pages ES-2 and 1-5 have been modified to refer to monitoring well MW-5 as an "intermediate/deep" well instead of an "intermediate" well. Page 5-2 has been modified to include a bullet item "Removal of fencing".

If you have any questions, please call me at (518) 869-7257.

Very truly yours,

MALCOLM PIRNIE, INC.

Bruce R. Nelson

Bruce R. Nelson, C.P.G.
Senior Project Hydrogeologist

jcf
Enclosure

c: Joe Malinowski, Orkin (w/enclosure)
Patricia Barmeyer, Esq., King & Spalding (w/enclosure)
Mary Nyiri, NYSDEC (w/enclosure)
Alan Grant, NYSDEC (w/enclosure)
Gary Litwin, NYSDOH (w/enclosure)
Maureen Leary, Esq., NYSDOL (w/enclosure)

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FOUR CORPORATE PLAZA WASHINGTON AVENUE EXTENSION ALBANY, NY 12203-5496 518-869-7257 FAX 518-869-4411

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June 16, 1995

Mr. Russell Mulvey
New York State Department of
Environmental Conservation
P.O. Box 296
Ray Brook, NY 12977-0296

Re: Abalene Pest Control, Moreau, New York

Dear Mr. Mulvey:

On behalf of Orkin Pest Control, Malcolm Pirnie, Inc. is pleased to submit three copies of the Feasibility Study Report for the above-referenced site. This document has been revised to include responses to comments presented in your June 1, 1995 letter.

If you have any questions, please call me at (518) 869-7257.

Very truly yours,

MALCOLM PIRNIE, INC.

Bruce R. Nelson

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FEASIBILITY STUDY REPORT

ABALENE PEST CONTROL
MOREAU, NEW YORK

NYSDEC Site Number 546035

Orkin Exterminating Company, Inc.
Atlanta, Georgia

June 1995
1368012

MALCOLM PIRNIE, INC.
Four Corporate Plaza
Albany, New York 12203

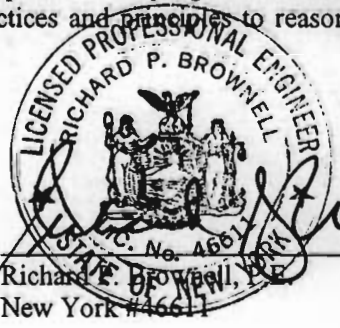
ABALENE PEST CONTROL
MOREAU, NEW YORK
NYSDEC SITE NUMBER 546035

FEASIBILITY STUDY REPORT

ORKIN EXTERMINATING COMPANY, INC.
PROJECT NO: 1368012

JUNE 1995

To the best of our knowledge, the information contained in this document is factual and represents our professional opinion and understanding of the site conditions. The conclusions and recommendations set forth herein represent Malcolm Pirnie, Inc.'s reasonable professional judgment, based on available information and the application of sound engineering practices and principles to reasonably protect health and the environment.



Richard P. Brownell, P.E.
New York #46611

MALCOLM PIRNIE, INC.

4 Corporate Plaza
Washington Avenue Extension
Albany, New York 12203

EXECUTIVE SUMMARY

The purpose of this Feasibility Study Report for the former Abalene Pest Control site is to identify and evaluate remedial alternatives (Ras) which are consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the New York State Department of Environmental Conservation (NYSDEC) 6 NYCRR Part 375, Inactive Hazardous Waste Disposal Site Remedial Program. Also to be evaluated as part of this Feasibility Study are New York State Standards, Criteria and Guidance (SCGs) including Technical and Administrative Guidance Memoranda (TAGMs).

The Abalene Pest Control site is located at the intersection of Reservoir Road and U.S. Route 9 in the Town of Moreau, Saratoga County, New York. The property is approximately 34,000 square feet in size and has a six to eight-foot high chain-link fence along its perimeter. There are three wood framed buildings on the property (office, storage shed and barn) which were previously used during the formulation and storage of pesticides.

Abalene Pest Control owned and operated a pesticide formulation and storage facility at the site from 1975 until 1986. On December 31, 1986, Orkin Pest Control (Orkin) purchased the site. Orkin ceased all operations at the site in early 1988.

On March 30, 1987, the New York State Department of Environmental Conservation (NYSDEC) discovered that pesticide wastes had been buried in a disposal pit to the north of the barn. As an emergency response action, the NYSDEC Region 5 Spill Response group hired a contractor to excavate the wastes under the supervision of the NYSDEC.

Several phases of site investigations have been conducted at the site. The results of the these investigations are contained in the Final Site Investigation Report (Malcolm Pirnie, August 1994). Based on the results of the site investigation a Health Risk Assessment for Soils and Groundwater (HSWMR, August 1994) was completed. Both documents were approved and accepted by New York State and form the basis for this Feasibility Study.

In summary the highest soil concentrations of pesticides and herbicides were detected in on-property surface soil samples from (0.0 to 0.5 feet). NYSDEC soil cleanup guidelines (NYSDEC Technical and Administrative Guidance Memorandum (TAGM) Determination of Soil Cleanup Objectives and Cleanup Levels, 1994) are exceeded in the

majority of the on-property surface soil samples. Average pesticide/herbicide concentrations in the on-property soils decrease in each successive vertical sampling interval (4.0 to 6.0 feet; 9.0 to 11.0 feet, 14.0 to 16.0 feet; and 22.0 to 24.0 feet). Groundwater from on-property and off-property deep sand and glacial till/bedrock monitoring wells did not indicate the presence of any pesticides/herbicides. Sampling and analysis of groundwater from some of the shallow and one intermediate/deep sand (MW-5) monitoring wells indicated the presence of low levels of pesticide/herbicide compounds in groundwater samples from four on-property (MW-1, MW-3, MW-4, and MW-5) and one off-property (MW-6S) monitoring well. With one exception, sampling and analysis of groundwater from residential wells conducted as part of the Site Investigation did not detect any pesticides/herbicides. Selected off-property residential wells presently are fitted with carbon filtration systems and are sampled regularly in coordination with the DOH. The effect of these filtration systems is to interrupt the exposure pathway, as a result no further remedial action is required for groundwater.

Following a review of the of the available data and based on the results of the Health Risk Assessment, several remedial alternatives were developed to meet the site's Remedial Action Objectives (RAOs). Each alternative was evaluated as to the extent to which it eliminated significant threats to the public health and the environment through reduction in toxicity, mobility and volume of the hazardous wastes at the site. The selected alternative for the site, Alternative 4B, has been determined to meet the RAOs and be the most cost effective remedial alternative for the site. The key elements of Alternative 4B are as follows:

- Institutional controls: Deed restrictions.
- Abandonment of on-property wells.
- Grouting in-place of the septic tanks.
- Excavation and removal of the underground gas tank.
- Decontamination, demolition, and off-site disposal of the above-grade building structures.
- Excavation and off-site disposal of the upper two feet of soil from the former disposal pit.
- Excavation and off-site disposal of surface soils from four on-property "hot spot" areas.

- Excavation of off-property surface soils along the northeastern property boundary and placement of these soils in the area of the former disposal pit.

- Excavation and on-site placement of off-site soils from outside the northwest and south property boundaries. Additional radial "spot" excavations from the areas of WSS-4, WSS-6 and RRSS-2 would be performed similarly.

- Placement of a geotextile over the northeastern portion of the site and capping this area with one foot of topsoil.

- Placement of one-half foot of topsoil over the remainder of the property.

- Vegetate the topsoil cap.

Implementation of Alternative 4B, in combination with ongoing inspection and maintenance, provides for the overall protection of human health and the environment by limiting exposure to soils on and off the property which contain the highest levels of pesticides/herbicides and which may contain pesticides/herbicides in excess of the TCLs.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

TABLE OF CONTENTS (Continued)

LIST OF FIGURES (Continued)

LIST OF TABLES

TABLE OF CONTENTS (Continued)

LIST OF TABLES (Continued)

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 PURPOSE AND ORGANIZATION OF REPORT

The purpose of this Feasibility Study Report for the former Abalene Pest Control site is to identify and evaluate remedial alternatives (Ras) which are consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the New York State Department of Environmental Conservation (NYSDEC) 6 NYCRR Part 375, Inactive Hazardous Waste Disposal Site Remedial Program. Also to be evaluated as part of this Feasibility Study are New York State Standards, Criteria and Guidance (SCGs) including Technical and Administrative Guidance Memoranda (TAGMs).

Section 1, Introduction, of the Feasibility Study Report provides background on the former Abalene Pest Control site and summarizes the findings and conclusions of the Final Site Investigation Report (Malcolm Pirnie, 1994) and the Health Risk Assessment for Soils and Groundwater (HSWMR, 1994).

Section 2, Identification and Screening of Technologies, develops the Remedial Action Objectives (RAOs) for the site by each medium of interest. General Response Actions (GRAs) are developed which are medium-specific classifications of action which will achieve the RAOs. Finally, the GRAs are subdivided into remedial technologies which are screened for their appropriateness for the site.

Section 3, Development of Alternatives, develops the remedial technologies in more detail. The remedial technologies are evaluated for effectiveness and implementability. Following the development, the technologies are screened and assembled into a series of Remedial Alternatives.

Section 4, Detailed Analysis of Alternatives, provides a detailed analysis of the Ras presented in Section 3. In accordance with TAGM 4030, seven criteria are used to evaluate the Ras.

Section 5, Recommended Remedial Alternative, provides the rationale for selecting the recommended remedial alternative.

1.2 BACKGROUND INFORMATION

1.2.1 Site Description

The Abalene Pest Control site is located at the intersection of Reservoir Road and U.S. Route 9 in the Town of Moreau, Saratoga County, New York, Figure 1-1. The property is approximately 34,000 square feet in size and has a six to eight-foot high chain-link fence along its perimeter. There are three wood framed buildings on the property (office, storage shed and barn) which were previously used during the formulation and storage of pesticides. All buildings are within the fenced boundary except for a portion of the shed as shown in Figure 1-2. The surrounding land use is both residential and commercial. The site is relatively flat with little or no storm water run-off.

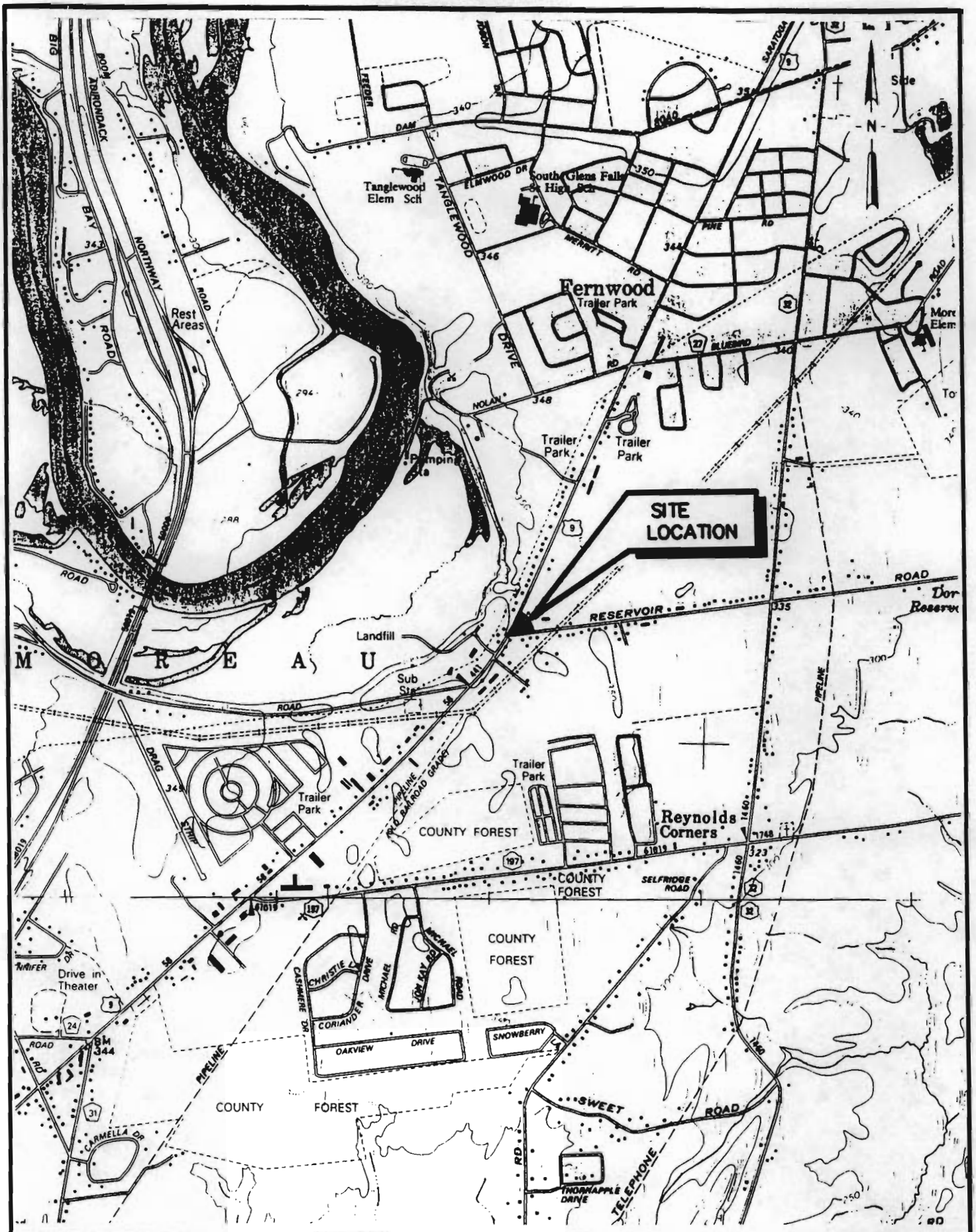
The geology in the vicinity of the site is characterized by a surficial sand unit to a depth of approximately 55 to 60 feet. This is underlain by a silty clay glaciolacustrine unit, ranging in thickness from 11 to 28 feet. The silty clay unit is underlain by glacial till, ranging in thickness from 24 to 38 feet. The till is underlain by shale bedrock. The depth to bedrock in the vicinity of the site is approximately 110 to 120 feet. The glaciolacustrine and glacial till confining unit is present in all locations where boreholes were drilled to the top of bedrock. The depth from the ground surface to the water table is approximately 25 feet throughout the site.

1.2.2 Site History

Abalene Pest Control owned and operated a pesticide formulation and storage facility at the site from 1975 until 1986. On December 31, 1986, Orkin Pest Control (Orkin) purchased the site. Orkin ceased all operations at the site in early 1988.

On March 30, 1987, the New York State Department of Environmental Conservation (NYSDEC) discovered that pesticide wastes had been buried in a disposal pit to the north of the barn. As an emergency response action, the NYSDEC Region 5 Spill Response group hired a contractor to excavate the wastes under the supervision of the NYSDEC.

Subsequent to the NYSDEC's excavation of the pit, Abalene Pest Control hired Swanson Environmental, Inc. (Swanson) which arranged for the staging and off-property disposal of the pesticide/herbicide containers excavated by the NYSDEC contractor, personal protective equipment (PPE) and sampling equipment left on-property.



SOURCE: U.S.G.S. 7.5 MIN. GLENS FALLS QUAD. 199 & GANSVOORT QUAD. 1991

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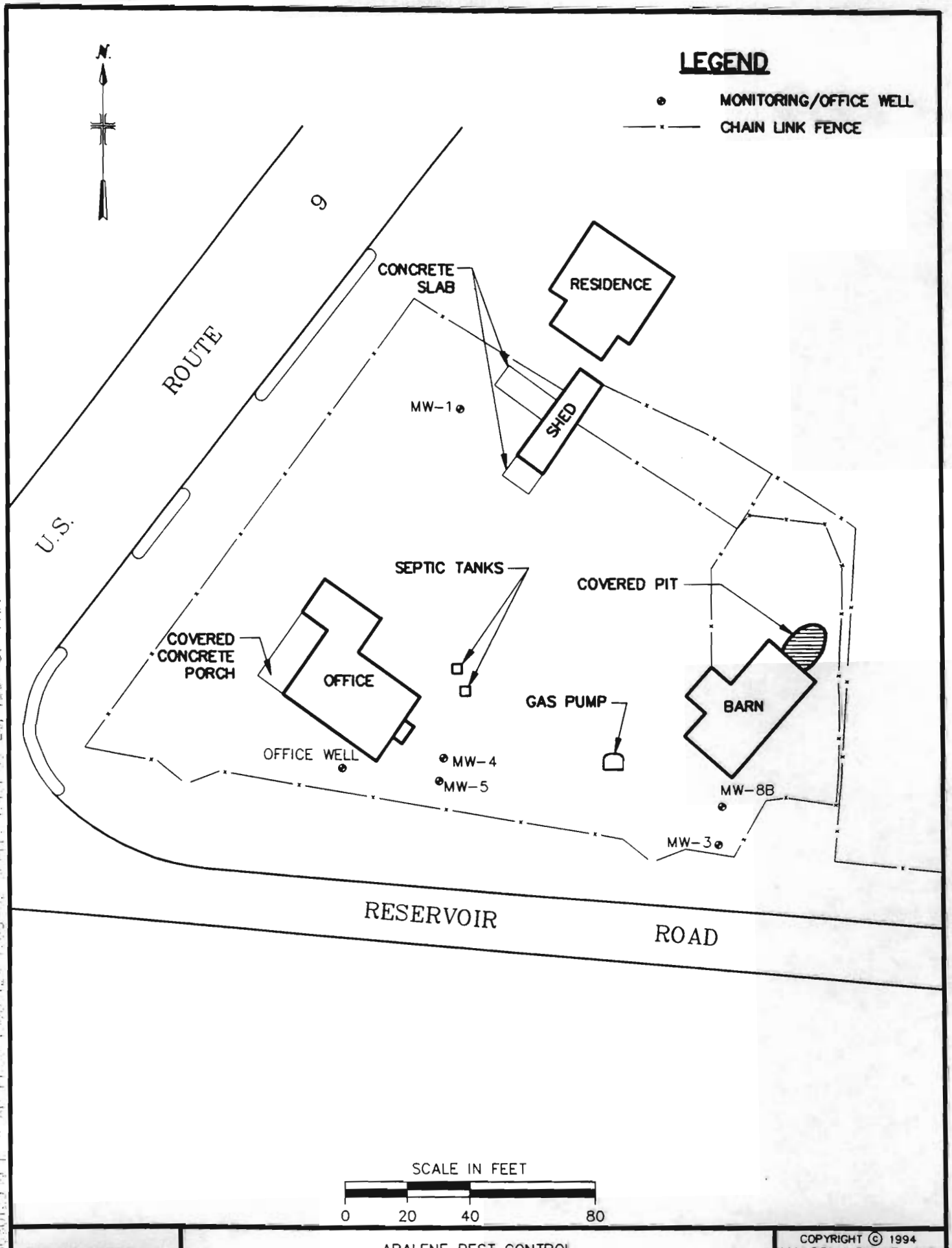
ABALENE PEST CONTROL
MOREAU, NEW YORK

SITE LOCATION MAP

FIGURE 1-1



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MOREAU, NEW YORK

SITE MAP

FIGURE 1-2

Swanson also collected and analyzed soil samples. Based on this initial scope of work, Swanson was retained to investigate the extent of pesticides/herbicides in the soil and groundwater. The results of this work were reported by Swanson on October 12, 1987 in a report entitled, "Report on Interim Remedial Action, Soils and Groundwater Investigation."

In May 1987, Swanson was contracted by Orkin to conduct off-property sampling and analysis of several residential water supply wells surrounding the site. Residences with wells yielding water with low concentrations of pesticides were fitted with carbon filtration units and supplied with bottled water. In subsequent years, carbon filtration units have been installed by Orkin on additional homes at the request of property owners. The periodic sampling of raw water and maintenance of the carbon filtration units is a continuing activity. In addition to this sampling the NYSDOH has been collecting water supply samples from selected residential wells since April 3, 1987.

An interim remedial measure (IRM) to address the waste disposal pit was performed by Fred C. Hart Associates in May 1988. According to the NYSDEC, stockpiled soils were placed in the lined pit, a liner was placed on top, followed by clean sand, which was mounded over the area. The whole area was then covered by another liner.

The Abalene Pest Control site is classified by the NYSDEC as a Class 2 – Inactive Hazardous Waste Disposal Site (Site No. 546035). Pursuant to a Consent Order, the NYSDEC has required that a Site Investigation/Remedial Alternative Evaluation be undertaken at the site in order to define the potential risks and to select an appropriate remedial action. On behalf of Orkin, Groundwater Technology prepared a Site Investigation/Remedial Alternative Evaluation Work Plan, which was submitted and approved by the NYSDEC in early 1992.

In June 1992, Malcolm Pirnie, Inc. was retained by Orkin to implement the activities outlined in the approved Work Plan. The field activities required in the approved Work Plan were conducted in 1992. Malcolm Pirnie reported the results in a document entitled, "Interim Report and Supplemental Sampling And Analysis Plan," (Malcolm Pirnie, February 1993). However, third-party data validation could not confirm the results of the organic analyses. As a result, Malcolm Pirnie proposed supplemental sampling in the Interim Report and Supplemental Sampling and Analysis Plan. This document was later revised and approved by the NYSDEC (Malcolm Pirnie, August 1993). The supplemental sampling and analysis was conducted during the fall of 1993.

The results of the site investigation are contained in the Site Investigation Report (Malcolm Pirnie, August 1994) and the Health Risk Assessment for Soils and Groundwater (HSWMR, August 1994). Both of these documents have been reviewed, approved and accepted by New York State. The site investigation and risk assessment are summarized below. More complete discussions are contained in the above-referenced documents.

On September 21, 1994 the New York State Department of Health (NYSDOH) collected surface soil samples from three residential properties along the southern boundary of Reservoir Road. The analytical results for these samples are presented in Appendix A and discussed below.

On December 19, 1994, while the Feasibility Study was in draft, United States Environmental Protection Agency (USEPA) regulations concerning Universal Treatment Standards (UTS), 40CFR Parts 148 et. al, became effective. This change in the Federal regulations affected the costs of potential off-site disposal of soils from the Abalene Pest Control Site. Prior to the UTS, the soils could be disposed of in a hazardous waste landfill. Due to the specific treatment levels included in the UTS regulations, incineration is the disposal method which is now effectively required for these soils. In this FS, the estimated cost of Remedial Alternatives which include off-site disposal are based on the cost of incineration.

In April 1995, Orkin Pest Control collected surface soil samples (0 to 6 inches) from a total of 22 on- and off-property locations. The objective of this sampling was to better define the lateral extent of possible soil removal target areas. The samples were analyzed by immunoassay (SW-846 Methods 4042 and 4041) for DDT and chlordane. The results of these analyses and a sample location map are presented in Appendix B.

1.2.3 Nature and Extent of Contamination

The highest soil concentrations of pesticides and herbicides were detected in on-property surface soil samples from (0.0 to 0.5 feet). NYSDEC soil cleanup guidelines (NYSDEC Technical and Administrative Guidance Memorandum (TAGM) Determination of Soil Cleanup Objectives and Cleanup Levels, 1994) are exceeded in the majority of the on-property surface soil samples. Average pesticide/herbicide concentrations in the on-property soils decrease in each successive vertical sampling interval (4.0 to 6.0 feet; 9.0 to 11.0 feet, 14.0 to 16.0 feet; and 22.0 to 24.0 feet). The number of soil samples which exceeded the NYSDEC guidelines also decreases with increasing depth. With one

exception, the NYSDEC soil cleanup guidelines were not exceeded in samples from the 22.0 to 24.0 foot interval. This vertical distribution indicates that vertical leaching of compounds is limited and does not commonly extend to the water table. As discussed below, low-levels of pesticides/herbicides have been detected in groundwater samples from some wells in the vicinity of the site. The highest concentration of pesticides/herbicides for each subsurface sampling interval is in the vicinity of the former disposal pit. Concentrations of pesticides/herbicides decrease by an order of magnitude between successive vertical sampling intervals in the former pit.

Sampling and analysis of groundwater from on-property and off-property deep sand and glacial till/bedrock monitoring wells did not indicate the presence of any pesticides/herbicides. Sampling and analysis of groundwater from some of the shallow sand monitoring wells and one intermediate/deep sand monitoring well (MW-5) indicated the presence of low levels of pesticide/herbicide compounds in groundwater samples from four on-property (MW-1, MW-3, MW-4, and MW-5) and one off-property (MW-6S) monitoring well. With one exception, sampling and analysis of groundwater from residential wells conducted as part of the Site Investigation did not detect any pesticides/herbicides. Sampling and analysis detected 2,4-D (2.6J µg/l) in a sample from one residential well. NYSDOH split sample for this location reportedly contained chlordane (0.67 µg/l). Due to its inadequate yield, this well was subsequently abandoned and replaced with a deeper well completed in the surficial sand. Resampling by Malcolm Pirnie and the NYSDOH of this deeper well did not detect any pesticides in the groundwater. The historical monitoring data for the residential wells collected prior to the Site Investigation demonstrate that the number of analytes, concentrations, and frequency have decreased with time. This indicates that on-going infiltration of precipitation from 1987 to the present is associated with a decrease in groundwater concentrations. This is due to the low solubility and large partition coefficients of the pesticides/herbicides. The existing carbon filtration systems provide back-up protection to off-property groundwater well users.

The results of air analyses from the perimeter of the property do not indicate the presence of pesticides above the method detection limit.

Water samples collected from the on-property septic tank during the initial site investigation activities in 1992 indicate the presence of low levels of pesticides. The maximum concentration detected was 32.2 ug/l. Dichlorobenzenes were also detected in the water in the septic tank at concentrations ranging from 3.8 ug/l to 6.4 ug/l. An analysis of

a sludge sediment sample indicates the presence of high concentrations of pesticides ranging from 27,400 ug/kg to 114,920 ug/kg. Dichlorobenzenes were also detected at higher concentrations than seen in the water samples. The higher concentrations detected within the septic tank sludge sediments are believed to be due to the high organic content of the material, "binding" the pesticides to the sediments.

1.2.4 Chemical Fate and Transport

The routes of transport of the chemicals from the site are limited due to the nature of the chemicals of concern and the physical nature of the site. The chemicals are typically low in solubility and have high partition coefficients, making their mobility low. The high partition coefficient of the chemicals is consistent with the higher concentrations of the chemicals within the surface soils and the decreasing concentrations with depth. The site is relatively flat. There is little or no storm water run-off due to the site topography and the sandy surface soils which increase infiltration rates. The potential mobility of the surface contamination is also limited by the presence of a gravel surface layer across the site which reduces erosion and wind-borne particulate transport. Off-property groundwater transport of the chemicals is limited, as discussed above, and is due to the low solubility and high partition coefficients.

While the pesticides and herbicides are retained within the soils, they undergo several processes which change their chemical properties and chemical fate. These mechanisms of change include abiotic and biological transformations. The most important transformation mechanism for this site is believed to be biological, since the highest concentrations of the chemicals are within the shallow root zone.

1.2.5 Human Health Risk Assessment

Based on a comparison with the Target Concentration Limits (TCLs) that were calculated using the direct exposure assumptions outlined in the Health Risk Assessment, the concentrations of the indicator chemicals which were detected in on-property surface soils represent a potential human health risk under specific present or future use conditions. However, based on carcinogenic risk (1.0 E-05), only the maximum concentration of chlordane detected in on-property surface soils would exceed the calculated TCL value. Therefore, measures taken to address this analyte in on-property surface soil would greatly reduce estimated risks for the site. Off-property surface soils, based on the assumptions

outlined in the Health Risk Assessment, indicate that carcinogenic risk (1.0 E-05) is only a concern for the mean and maximum concentrations for chlordane and dieldrin, both of which exceed the TCLs calculated for these indicator chemicals. Measures taken to address these chemicals in off-property surface soil would greatly reduce estimated risks.

The off-property residential soil samples collected by the NYSDOH on September 21, 1994 did not contain pesticides at concentrations which are of concern. As stated in the NYSDOH letter to the residents, "The concentrations we found are within the range of background levels in developed areas. Because of the widespread use of these compounds it is common to find small amounts of them in soils. The soils found on your property present no more threat to human health than any typical residential soil."

On-property subsurface soils, based on the assumptions outlined in the Health Risk Assessment, indicate that carcinogenic risk (1.0 E-05) for the maximum concentration of chlordane exceeds the calculated TCL value. Therefore, measures taken to address this analyte in on-property subsurface soil would greatly reduce estimated risk.

Concentrations of the sole indicator analyte, chlordane, detected in groundwater off-property were compared with federal and New York State guidelines. The mean and maximum concentrations of chlordane do not exceed federal or New York State MCLs, though the New York State GA standard was exceeded.

On-property groundwater currently is not used as a potable water supply, and is at a depth of approximately 25 feet below the ground surface. Therefore, there is no exposure route for the chemicals in the on-property groundwater. Off-property activated carbon filters have been installed on the domestic water supplies; interrupting the pathway that could result in exposure to chlordane in the off-property groundwater. Since the perimeter air sampling did not detect any analytes, there is no evidence of a potential risk to human health via the air pathway.

1.2.6 Ecological Risk Assessment

Based on a review of the analytical data, the depth to groundwater, the distance of the site from the nearest potential discharge location, the low turbidity of discharging groundwater, and potential dilution of groundwater once discharged, it appears that little or no risk is present from the chemicals of concern in groundwater at the site.

For surface soils, the pesticides chlordane, DDD, DDE and DDT were chosen as constituents of potential concern. Based on the ecological risk assessment, a possible

concern exists from the presence of chlordane, DDD and DDE in surface soil, and a probable concern exists from the presence of DDT in surface soils. However, due to the very low frequency of detection of DDD in surface soil, it is unlikely that this compound will have a significant effect on wildlife inhabiting the site or surrounding areas. An additional risk may be present to wildlife through the consumption of on-property vegetation, since these compounds are known to accumulate in vegetation.

The herbicides which were detected in surface soils at the site were not chosen as constituents of potential concern due to their low frequency of detection and their low toxicity to wildlife (other than through vegetation) relative to the concentrations detected. The presence of gravel on most of the site is currently restricting the growth of vegetation, while the herbicides in the surface soils may limit the establishment and growth of vegetation as well.

2.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

2.1 INTRODUCTION

In this section, the Remedial Action Objectives (RAOs) and General Response Actions (GRAs) are developed. Target Concentration Limits (TCLs) from the health risk assessment are summarized and included. The GRAs are broken down into technologies which are then screened for applicability to the former Abalene Pest Control site. The results of the screening are summarized in tabular form.

2.2 REMEDIAL ACTION OBJECTIVES

The proposed remedial action objectives for each medium of interest (i.e., surface water, air, groundwater, and soil) are as follows.

2.2.1 Surface Water

Since there is little or no stormwater run-off from the site due to its flat topography and sandy surface soils, surface water is not considered to be a medium of concern. Therefore, no remedial action is required for stormwater at or surrounding the site. Stormwater remediation will not be addressed further in this Feasibility Study Report.

2.2.2 Air

Since no chemicals have been detected in the air surrounding the site, air is not considered to be a medium of concern for the site. Therefore, no remedial action is required for air at the site and air is not addressed further in this Feasibility Study Report.

2.2.3 Groundwater

The Health Risk Assessment resulted in the following conclusions for the groundwater on-property and off-property.

- Maximum and mean chlordane concentrations in on-property groundwater exceeded federal and state MCLs and the NYS Class GA standard. The

maximum concentration of lindane exceeded all three standards, whereas the mean concentration only exceeded the NYS Class GA standard.

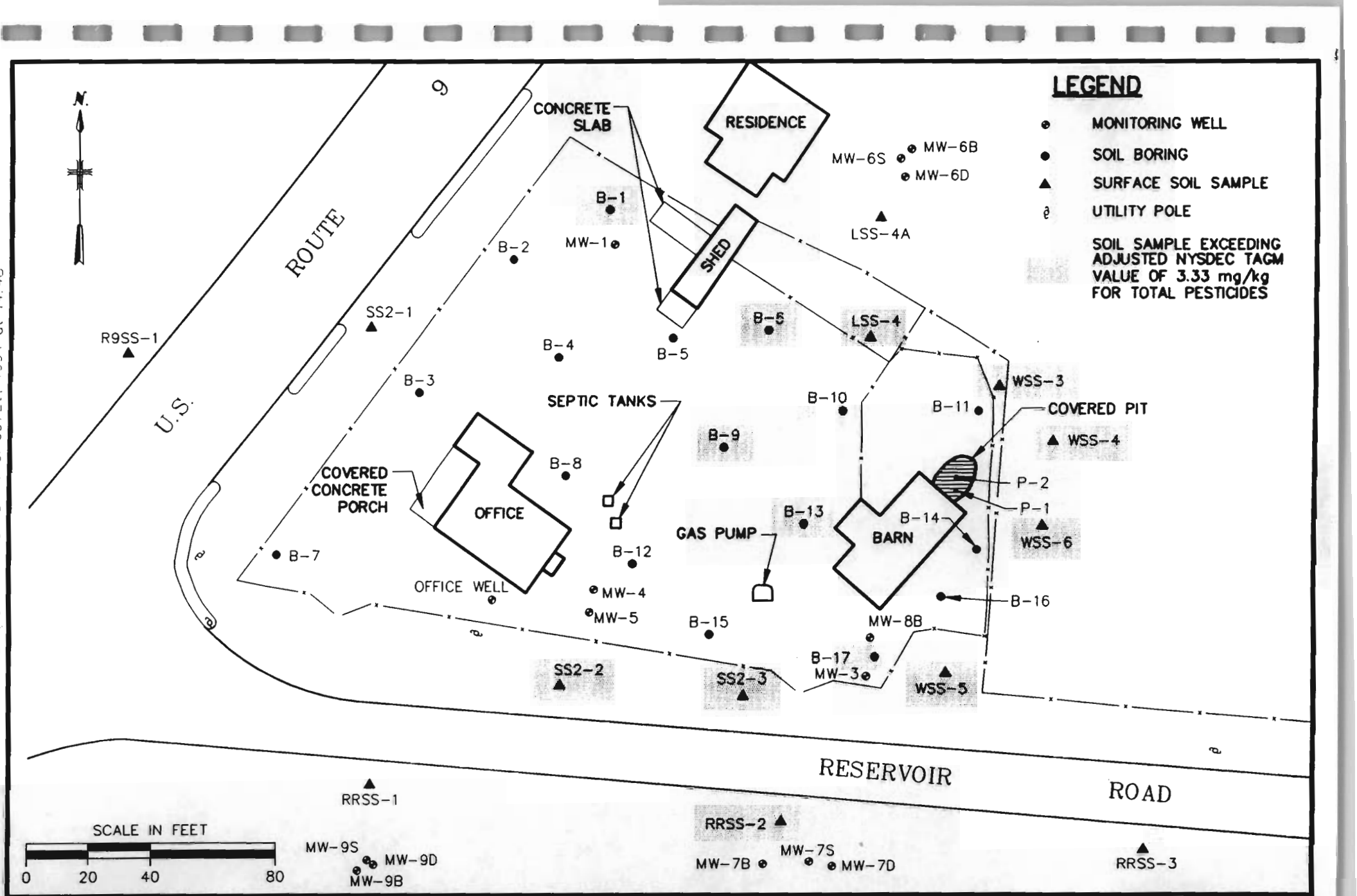
- Chlordane was the only chemical of concern detected in the off-property groundwater during the Site Investigation. Maximum and mean chlordane concentrations in off-property groundwater exceeded only the NYS Class GA Standard. Other state and federal standards, were not exceeded.

Analytical data for samples from nearby residential water supplies, collected since 1987, indicate that concentrations of pesticides in the groundwater have declined over time. The highest chemical concentrations were reported in 1987 and 1988. The decline in the concentrations in the groundwater off-property may be due to the discontinued use of the septic system, cessation of truck washing activities, and the excavation of the former disposal pit area. Based on the observed decline in concentrations and the extended period of time during which infiltrating precipitation has been in contact with the on-property soils, an increase in groundwater concentrations is unlikely.

In January 1994, the NYSDEC issued revised TAGM HWR-94-4046, "Determination of Soil Cleanup Objectives and Cleanup Levels." The soil cleanup TAGMs are based on the Water-Soil Equilibrium Partition Theory which is used to estimate the concentration of a chemical which can be present in the soil and not result in an exceedance of groundwater quality standards. The soil cleanup TAGMs are based on the values derived from this soil-water partition model or from risk-based concentrations in soil, whichever is more conservative. TAGMs provide technical and administrative guidance and are not promulgated regulations.

TAGM 4046 provides recommended soil cleanup guidance for specific pesticides/herbicides as well as for total pesticides. The TAGM values for specific pesticides vary and the TAGM for total pesticides is 10 mg/kg. These TAGM values are based on an assumed organic content of the soil of 1 percent. As discussed in the Site Investigation Report (Malcolm Pirnie, 1994), the TAGM values for this site have been adjusted based on site specific total organic analyses. The adjusted TAGM values and the other Chemical Specific Standards, Criteria and Guidance Values (SCGs) are presented in Table 2-1. Table 2-2 shows the Scenario II recommended TCLs concentration limits. Figures 2-1, 2-2, 2-3, 2-4 and 2-5 present surface soil through the 22.0 to 24.0 foot intervals sample locations which exceed the TAGM for total pesticides.

Since the termination of site operations, the site has been exposed to precipitation and infiltration for over seven years, and the groundwater sampling results provide



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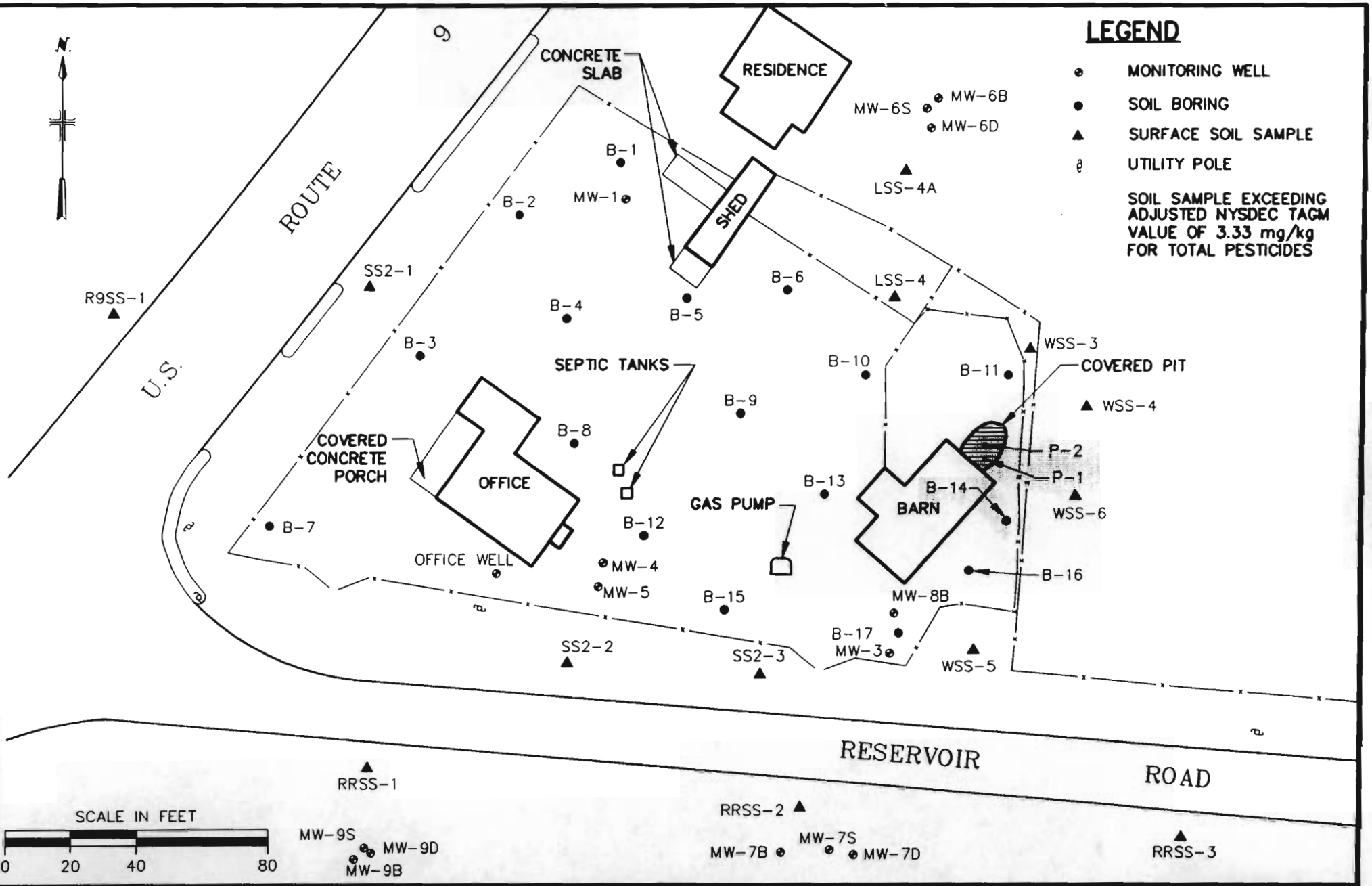
MOREAU, NEW YORK

SURFACE SOIL SAMPLES EXCEEDING TAGM VALUE FOR TOTAL PESTICIDES

FIGURE 2-1



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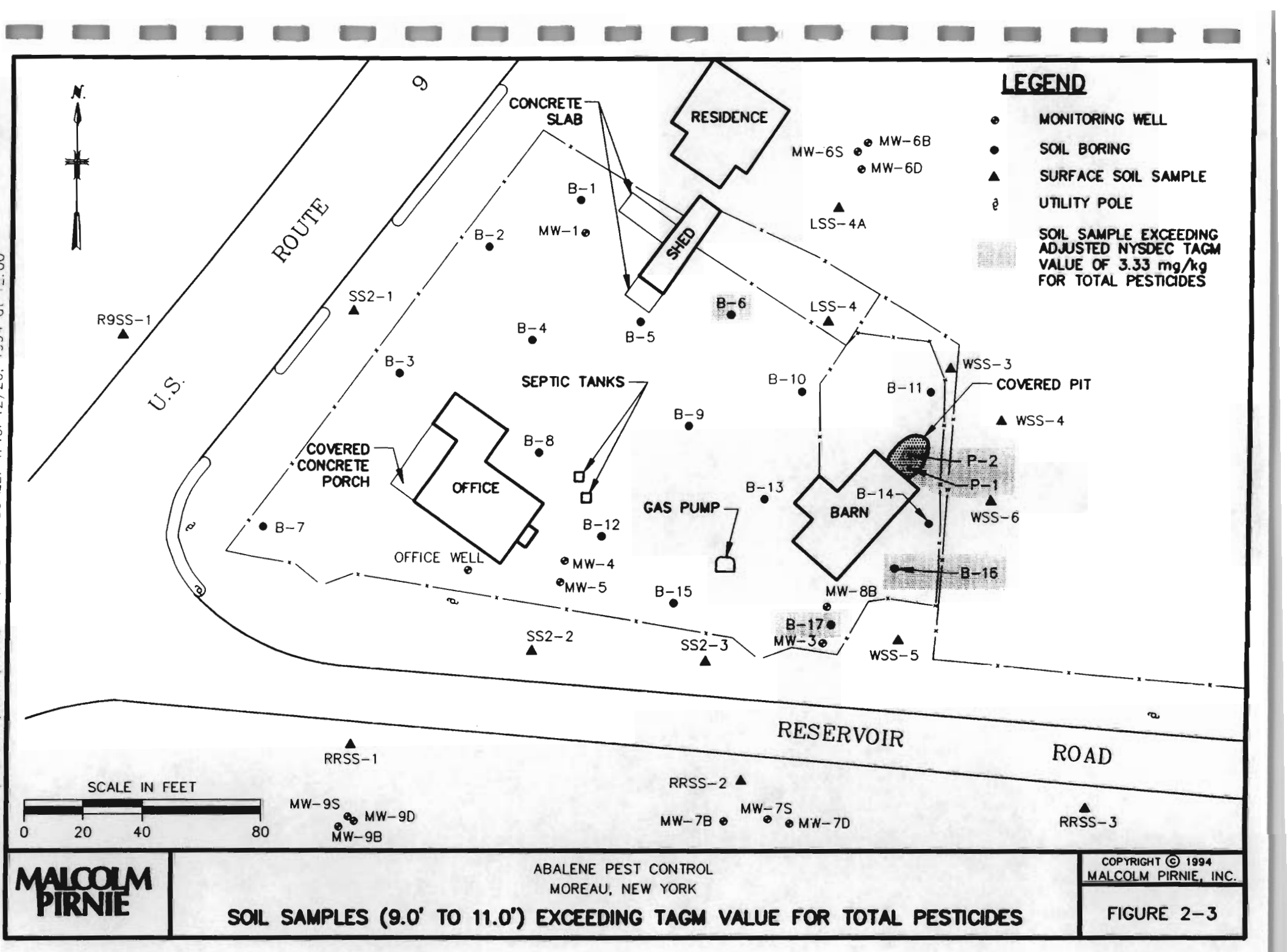
SOIL SAMPLES (4.0' TO 6.0') EXCEEDING TAGM VALUE FOR TOTAL PESTICIDES

FIGURE 2-2



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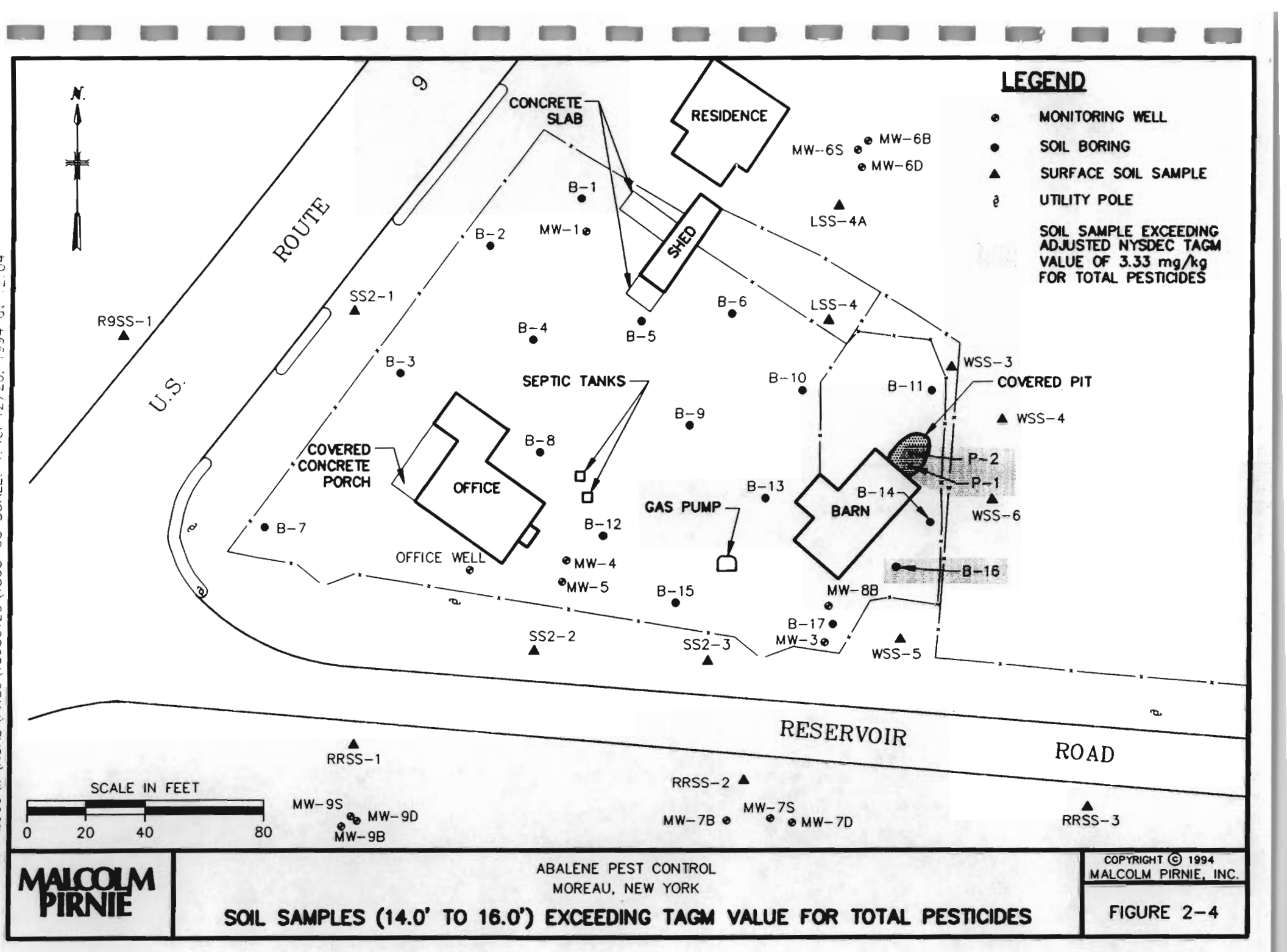
SOIL SAMPLES (9.0' TO 11.0') EXCEEDING TAGM VALUE FOR TOTAL PESTICIDES

FIGURE 2-3



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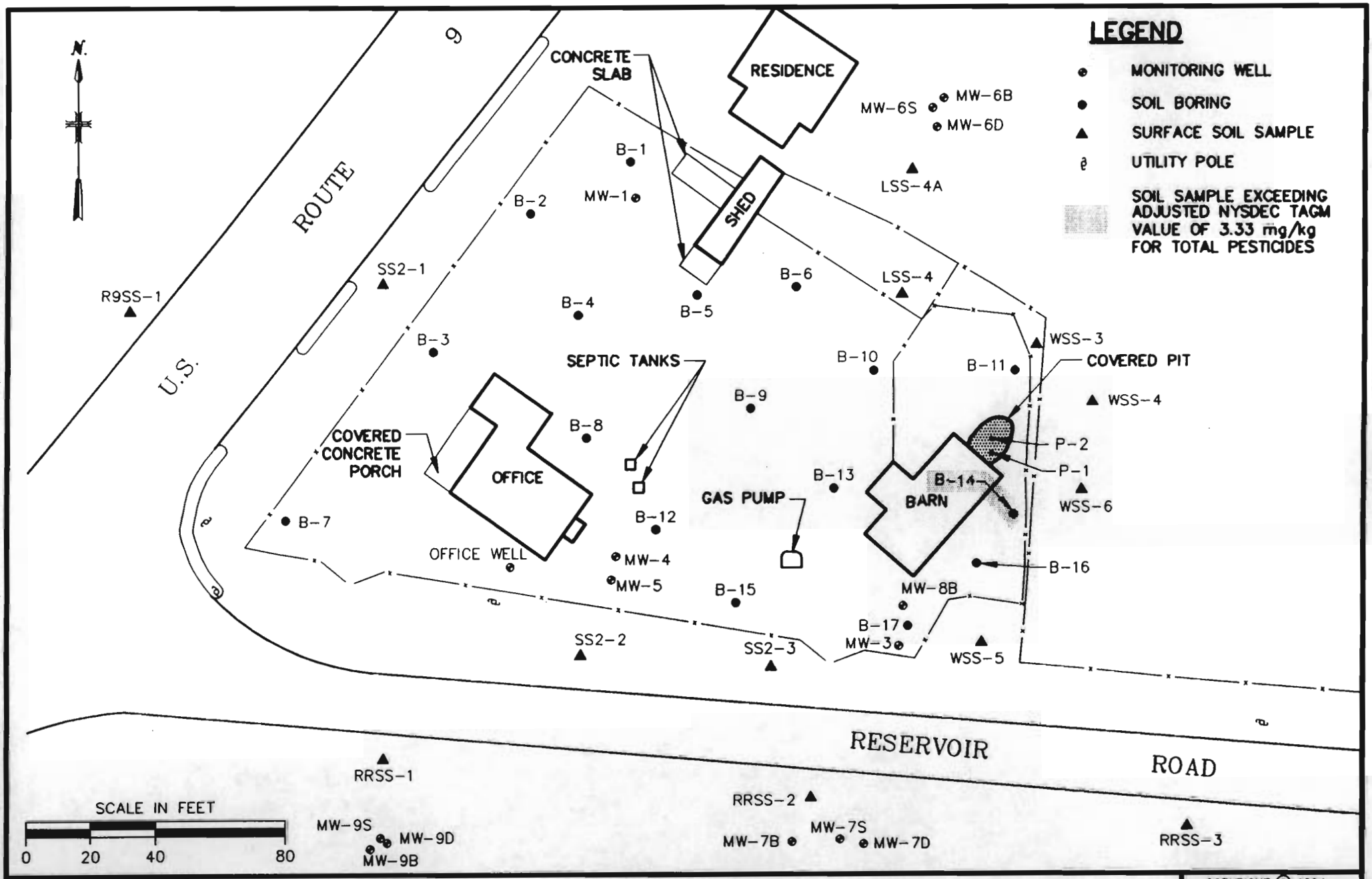
SOIL SAMPLES (14.0' TO 16.0') EXCEEDING TAGM VALUE FOR TOTAL PESTICIDES

FIGURE 2-4



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SOIL SAMPLES (22.0' TO 24.0') EXCEEDING TAGM VALUE FOR TOTAL PESTICIDES

FIGURE 2-5

TABLE 2-1
CHEMICAL SPECIFIC STANDARDS, CRITERIA AND GUIDANCE VALUES

PARAMETER	FED MCL (ug/l)	NYSDEC CLASS GA (ug/l)	NYS DRINKING WATER (ug/l)	NYS TAGM SOIL CONCENTRATION * (mg/kg)
Total Pesticides				3.33×10^{0}
EPA Method 8080				
Aldrin		ND	5	1.3×10^{-2}
g-BHC (Lindane)	0.2	ND	0.2	2.0×10^{-2}
Bromacil		4.4	50	
Chlordane	2	0.1	2	1.8×10^{-1}
4-4'DDD		ND	5	9.6×10^{-1}
4-4'DDE		ND	5	7.0×10^{-1}
4-4'DDT		ND	5	7.0×10^{-1}
Dieldrin		ND	5	1.4×10^{-2}
Endosulfan I			50	3.0×10^{-1}
Heptachlor	0.4	ND	0.4	3.0×10^{-2}
Heptachlor epoxide	0.2	ND	0.2	6.6×10^{-3}
Methoxychlor	40	35	40	
Mirex		5	5	
EPA Method 8141				
Chlorpyrifos (Dursban)			50	
Malathion		7.0	50	
Ronnel			50	
EPA Method 8318				
Baygon			50	

TABLE 2-1 (Cont'd.)
CHEMICAL SPECIFIC STANDARDS, CRITERIA AND GUIDANCE VALUES

PARAMETER	FED MCL (ug/l)	NYSDEC CLASS GA (ug/l)	NYS DRINKING WATER (ug/l)	NYS TAGM SOIL CONCENTRATION * (mg/kg)
EPA Method 8150				
2,4-D	70	4.4	50	1.66×10^{-1}
2,4,5-T		35	50	6.33×10^{-1}
2,4,5-TP	50	0.26	10	2.33×10^{-1}
Dichloroprop			50	
Dinoseb	7	1	50	
MCPA		0.44	50	
EPA METHOD 8270				
Pentachlorophenol	1	1	1	3.3×10^{-1}
EPA Method 7060				
Arsenic	50	25	50	75×10^{-1} or SB
EPA Method 6010				
Zinc	5000 ++	5000	5000	2.0×10^{1} or SB
Lead	15 action level	25	15 action level	SB
EPA Method 9010				
Cyanides, Total	200	100		SB
EPA Method 8010				
1,2-Dichloroethane	5	5	5	3.3×10^{-2}

ND - Non-detectable concentration
* - Based on a soil organic carbon content of approximately 0.33 percent.
++ - Secondary MCL
SB - Site Background

TABLE 2-2
SCENARIO II RECOMMENDED TARGET CONCENTRATION LIMITS FOR SOILS

Indicator Chemicals	On-property Surface Soils (mg/kg)	Off-property Surface Soils (mg/kg)	On-property Subsurface Soils (mg/kg)
Aldrin	6.2		6.2
Chlordane	25	0.47	25
4,4'-DDD		2.6	200
4,4'-DDE	200	1.8	200
4,4'-DDT	200	1.8	200
Dieldrin	7.1	0.038	7.1
Heptachlor	23		23
Lead	790	790	790
Lindane			88

Note: Based on oral and dermal contact only.
The Lead TCL was calculated according to the USEPA Uptake/Biokinetic Model.
No TCLs for the compounds left blank were determined as discussed in the Site Health Risk Assessment.

empirical, site-specific data as opposed to theoretical projections made in accordance with the TAGM 4046. The Health Risk Assessment for the site has also developed Target Concentration Limits (TCLs) for chemicals of concern in soil. These TCLs address potential health risks associated with the site. Thus, the Final Site Investigation Report and Health Risk Assessment are site-specific whereas the TAGM values are not.

The routes of exposure based on current groundwater usage have been interrupted. The on-property groundwater currently is not used for a potable water supply. Its depth of approximately 25 feet below the ground surface makes any potential exposure due to future site activities extremely unlikely.

Off-property groundwater is currently used for a potable water supply. However, the route of potential exposure for the off-property groundwater supplies has been interrupted due to the installation of activated carbon filters and the supply of bottled water to the surrounding residences. A monitoring program for the residential water supply wells is being conducted in coordination with the NYSDOH. Since exposure to the chemicals within the groundwater on-property is unlikely, due to its depth, and the exposure pathway for off-property groundwater has been interrupted, due to the use of carbon filtration units and the supply of bottled water, no further remedial action is required for groundwater at the site.

As discussed in Section 1.2.3, low-levels of pesticides, exceeding Class GA Standards, have been detected in samples from several shallow sand, on-property groundwater monitoring wells. However, monitoring of off-property residential supplies indicates that exceedances of Class GA Standards are not presently occurring. Appendix C is a summary of groundwater quality data for residential supplies in the vicinity of the former Abalene Pest Control Site. As shown in Appendix C, the concentrations of pesticides in off-property groundwater samples has decreased since monitoring began in 1987. In fact, during the last three rounds of sampling, only one off-property residential supply contained a pesticide above the Class GA Standards. The sample from this residence, which has not previously contained any, contained 0.018 µg/l of DDT. The Class GA Standard for DDT is Not Detected (ND). The New York State Drinking Water Standard is 5 µg/l. In accordance with the NYSDOH agreement, this well was resampled and no pesticides were detected. Therefore, groundwater and its remediation will not be addressed further in this Feasibility Study Report. However, if the selected Remedial Alternative for the former Abalene Pest Control Site includes removal or stabilization of on-property soils, that Remedial Alternative may be even more protective of groundwater.

2.2.4 Soil

The routes of exposure for the soils at the site vary depending on their depth below the ground surface. Therefore, the Health Risk Assessment calculated exposure to on-property surface soils and subsurface soils at depths of up to six feet. The exposure to off-property surface soils was also evaluated. The remedial action objectives for each of these soil categories are addressed in the following three sub-sections.

2.2.4.1 On-property Surface Soils

Based on health risk calculations, a total of six indicator chemicals were identified as chemicals of concern. These chemicals are aldrin, chlordane, 4,4'-DDT (and degradation product), dieldrin, heptachlor, and lead. The Target Concentration Limits (TCLs) calculated for these compounds were based on:

- No exposure to general population (adults or children) due to interruption of the exposure pathway.
- Some potential occupational exposures to adults who may be exposed to soils during construction activities which would breech the cover.
- Exposure to soil was assumed to occur for 250 days/year for 0.25 year of a 70 year lifetime.

TCLs are as follows:

Aldrin	6.2 mg/kg
Chlordane	25 mg/kg
4,4'-DDE	200 mg/kg
4,4'-DDT	200 mg/kg
Dieldrin	7.1 mg/kg
Heptachlor	23 mg/kg
Lead	790 mg/kg

The exposure to these compounds and the Target Concentration Limits were based on assumptions that the site would be covered and capped, that deed restrictions would control future site activities, and that the cap would receive ongoing maintenance and oversight. The areas on-property which exceed the TCLs for the surface soils are shown on Figure 2-6. To meet the health risk assessment goals and the TCLs as presented in the approved Health Risk Assessment Report, the remedial action objectives for the surface

soils on-property should provide for interrupting the potential exposure pathway. The remedial alternatives for the on-property surface soils are discussed in Section 3.3.

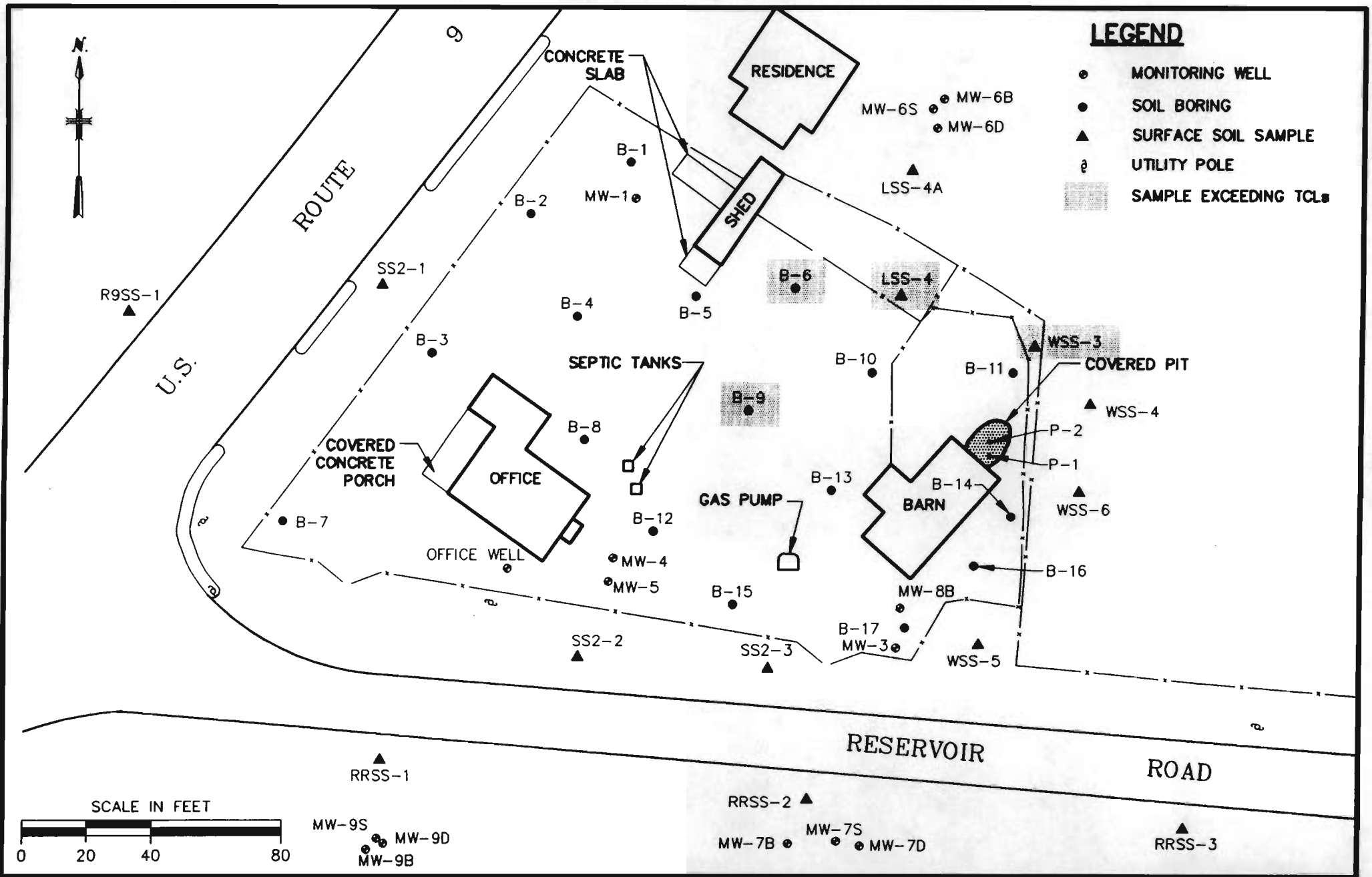
2.2.4.2 On-property Subsurface Soils

During the health risk assessment for the site, the exposure potential for the subsurface soils, defined as the soils from 0.5 to 6 feet below the ground surface, was evaluated. The scenario evaluated for this depth interval was for future building/construction activities on site. The TCLs developed for this depth interval were calculated for the results of the samples collected from 4 to 6 feet. The sample which exceeds the TCLs for the subsurface on-property soil is shown on Figure 2-7.

Based on health risk calculations, a total of seven indicator chemicals were identified as chemicals of concern. These chemicals are aldrin, chlordane, 4,4 DDT (and degradation products), dieldrin, heptachlor, lindane, and lead. The TCLs calculated for these compounds were based on the same exposure potential as described for on-property surface soils, and are as follows:

Aldrin	6.2 mg/kg
Chlordane	25 mg/kg
4,4'-DDE	200 mg/kg
4,4'-DDT	200 mg/kg
4,4'-DDD	200 mg/kg
Dieldrin	7.1 mg/kg
Heptachlor	23 mg/kg
Lindane	88 mg/kg
Lead	790 mg/kg

Therefore, to meet the TCLs as presented in the approved Health Risk Assessment Report, the remedial action objectives for the on-property subsurface soils should provide for interrupting the potential exposure pathway. The remedial alternatives for the on-property subsurface soils are discussed in Section 3.3.



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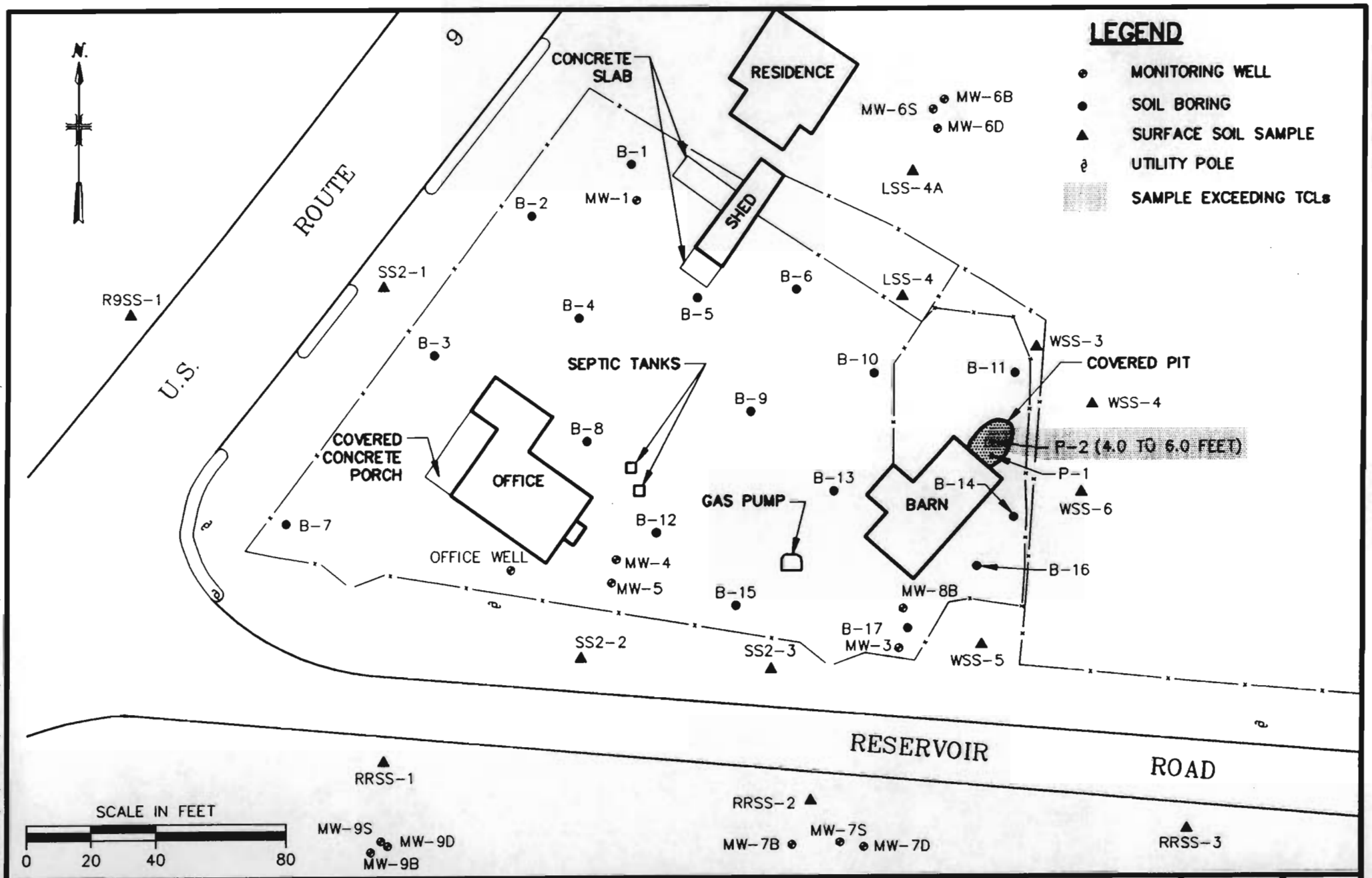
ON-PROPERTY SURFACE SOIL SAMPLES EXCEEDING TARGET CONCENTRATION LIMITS (TCLs)

FIGURE 2-6



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ON-PROPERTY SUBSURFACE SOIL SAMPLES EXCEEDING TARGET CONCENTRATION LIMITS (TCLs)

FIGURE 2-7

2.2.4.3 Off-property Surface Soils

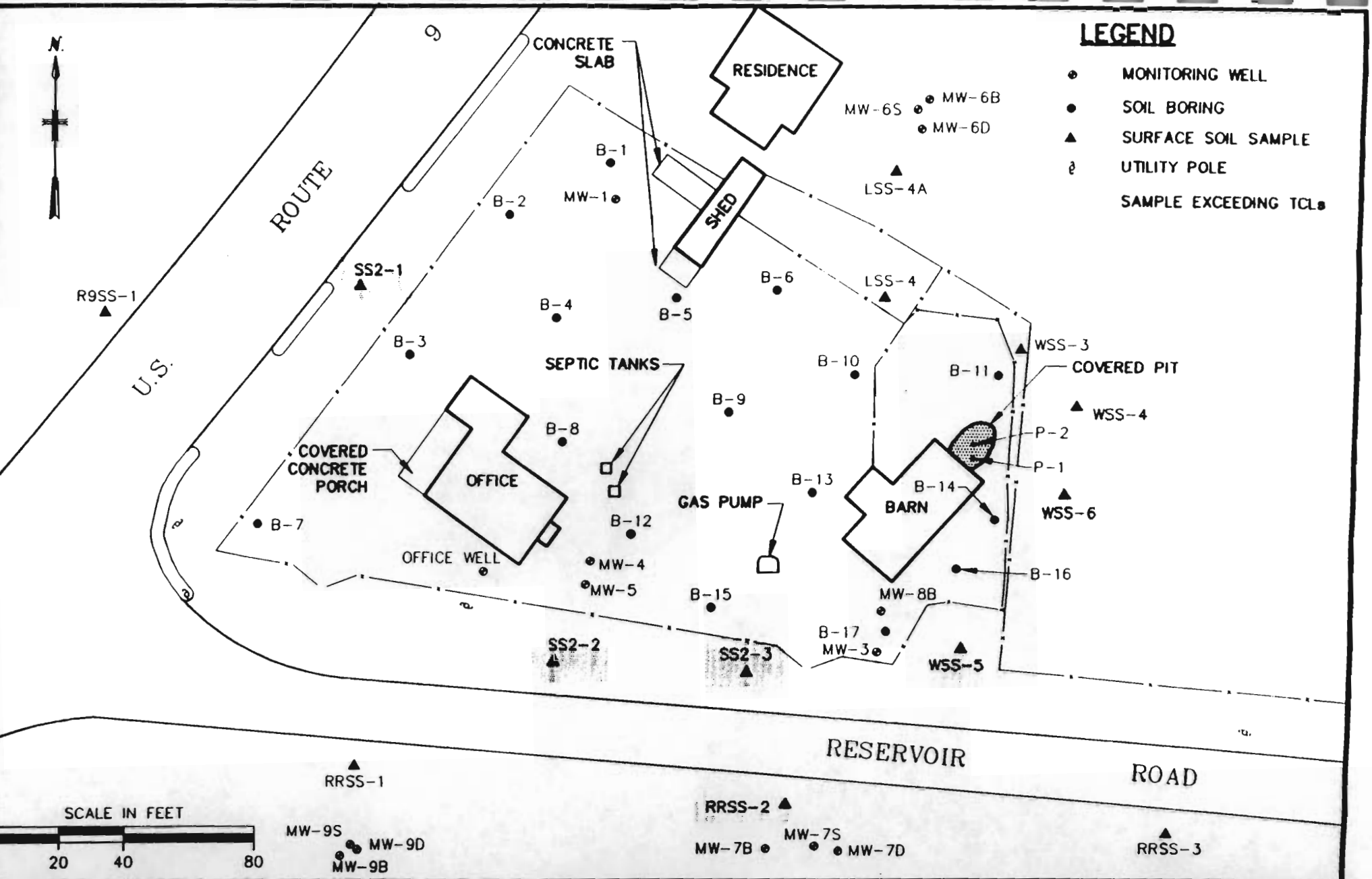
Based on health risk calculations a total of four indicator chemicals were identified as chemicals of concern. These chemicals are chlordane, 4,4 DDT (and degradation products), dieldrin, and lead. The recommended TCLs were calculated for these compounds based on residential exposures to adults and children (age-adjusted factors). Exposure to the soils was assumed to occur 350 days/year for 30 years. The TCLs are as follows:

Chlordane	0.47 mg/kg
4,4'-DDE	1.8 mg/kg
4,4'-DDT	1.8 mg/kg
4,4'-DDD	2.6 mg/kg
Dieldrin	0.038 mg/kg
Lead	790 mg/kg

The off-property surface soil samples exceeding the health risk TCLs are shown on Figure 2-8. Remedial action objectives for the off-property surface soils should provide for interruption of the potential exposure pathway. The remedial alternatives for off-property surface soils are discussed in Section 3.3 of this report.

2.3 GENERAL RESPONSE ACTIONS

The General Response Actions (GRAs) are medium-specific classifications of action which will achieve the RAOs. GRAs are developed for all RAOs on a media-specific basis. Section 2.2 indicates that the soil is the only medium of concern at the former Abalene Pest Control site. As shown in Figures 2-1 through 2-8 both surface soil and subsurface soil exceed the TCLs and SCGs at selected locations on-property. Some off-property surface soil samples exceed the TCLs and one exceeds the SCG for total pesticides. The RAO in each of these cases is to interrupt the potential exposure pathway for human contact with the soil. A number of GRAs have been developed which will minimize contact with the contaminants of concern. A general description of the GRAs is presented below.



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OFF-PROPERTY SURFACE SOIL SAMPLES EXCEEDING TARGET CONCENTRATION LIMITS (TCLs)

FIGURE 2-8

2.3.1 Soil

To accomplish the RAOs for soil on the property, human contact with the soil must be physically prevented. This can be accomplished by placing a physical barrier over the soil in-situ, excavating and disposing of the soil, or cleaning the soil to an acceptable level. Each GRA addresses one or more of these methods.

2.3.1.1 Institutional Controls

Institutional controls are actions taken which do not directly affect the contaminated media but will serve to greatly reduce the probability of incidental or unintentional contact with the site contaminants. These controls include physical barriers such as fences and legal barriers such as deed restrictions that will prevent the use of the site in a manner inconsistent with the RAOs.

2.3.1.2 Containment

This GRA will involve covering the site in a manner which will eliminate the possibility of direct exposure to site contaminants under normal conditions by interposing a clean physical barrier between the contaminants and anyone who may have contact with the site. This is accomplished by capping the site with either a soil or hard-surface material.

2.3.1.3 Removal and Off-property Treatment/Disposal

This GRA involves eliminating the possibility of exposure by excavating and removing the contaminated materials from the site. Clean fill would be brought in to backfill the site and return it to its original grade. The excavated materials would be tested and transported to a permitted treatment and/or disposal facility where they would be disposed of either directly or after treatment. Treatment and disposal would use established methods at permitted facilities.

2.3.1.4 On-property Treatment Processes

On-property treatment methods would accomplish the RAOs by reducing the concentration of the contaminants using a treatment technology capable of either treating the soils in-situ, or treating the soils in a mobile treatment unit placed on the site.

2.3.1.5 On-property Stabilization

Stabilization will reduce the probability of contact with large surface areas of soil if the site is disturbed. Since stabilization does not reduce or remove contaminants present, this GRA would need to be combined with other GRAs to prevent contact with the solidified materials.

2.3.2 Appurtenant Structures

The former Abalene Pest Control site includes several appurtenant structures which warrant the establishment of specialized GRAs to address their disposition. These include the existing structures on the site, an underground petroleum storage tank, two septic tanks, a former drinking water well, and monitoring wells. GRAs for these items are as follows.

2.3.2.1 Former Office Well(s) and On-property Monitoring Wells

To eliminate possible damage to these wells during remedial action which might allow the vertical migration of surface soils, the GRA is to decommission and abandon these wells.

2.3.2.2 Buildings

Three structures, two wood framed and one concrete block, currently exist on the site. One of the structures (the former office building) has a basement. To eliminate contact with these structures they will be demolished and disposed of off-site in a permitted disposal facility. They may be cleaned prior to demolition.

2.3.2.3 Tanks

A total of three underground tanks, two septic tanks and one petroleum tank, are present on the site. For the petroleum tank, the GRA is to excavate and dispose of the tank. For the septic tanks, the GRA is to first empty the tanks and dispose of their contents off-site. Then the tanks would either be excavated and disposed of off-site or filled and abandoned in-place.

2.4 REMEDIAL TECHNOLOGY SCREENING

2.4.1 Screening Criteria

The GRAs can be broken down into remedial technologies which may be appropriate for remediation of the former Abalene Pest Control site. The technologies were screened based on overall applicability of the technology to the site, as determined by the contaminants to be remediated, and the overall size and layout of the site. Table 2-3 provides the results of the remedial technology screening. The technologies for soil and structures are listed separately. A brief description of the remedial technology, indicating how it will meet the RAO of breaking the exposure pathway for human contact with the soil is presented. Comments on the screening are given and it is noted whether or not the technology is retained for consideration and inclusion in any of the remedial alternatives.

2.4.2 Screening Summary

In general, there are a number of conventional, well proven remedial technologies available which are able to meet the RAOs for this site. These technologies were retained for consideration and possible inclusion in the remedial alternatives (Ras). Those technologies which were not retained for further consideration were generally innovative technologies that have not been proven sufficiently for the site contaminants. (SITE Program Technology Profiles, 6th Ed, EPA/540/R-93/526, November 1993). The size and contamination level of this site are not sufficient to warrant a pilot test of these technologies, so they are not further considered. These include bioremediation, soil washing, and thermal desorption. The remaining technologies will be assembled into alternatives and evaluated in the following sections. A summary of the technologies which will be included in the alternatives is as follows:

A. Soil:

1. institutional controls
2. capping
3. solidification with a cement-based material
4. excavation and off-property treatment/disposal.

TABLE 2-3

GENERAL RESPONSE ACTION
SCREENING TABLE

Technology	Description	Screening Comments
A. SOIL		
1. Capping	Covering the site with a layer of clean material to prevent human and animal contact with soils containing pesticides/ herbicides.	Readily implementable and effective. Retained for consideration.
2. Excavation and Removal	Excavation of areas containing pesticides/ herbicides for transport to an off-site treatment and disposal area followed by backfill with clean material.	Readily implementable and effective. Costly to implement on a large scale. Retained for consideration.
3. On-site Treatment		
a. Biological In-situ	Enhancement of biodegradation of soils containing pesticides/herbicides by addition of micro-organisms water, air, and nutrients.	Effectiveness of this process for on-site chemicals has not been adequately demonstrated. The SITE Technology Profiles (6th Ed., Nov. 1993) do not describe any demonstration projects which use strictly biological processes for treatment of pesticides. Biological treatment is generally difficult to control and there may be a considerable acclimation period during startup before effective treatment occurs. Since the total quantity of material to be treated is small, startup could consume a substantial percentage of the total material to be treated. Because its

TABLE 2-3 (Cont'd.)

GENERAL RESPONSE ACTION
SCREENING TABLE

Technology	Description	Screening Comments
a. Biological In-situ (cont'd.)		effectiveness has not been shown and implementation would be difficult for the quantities of material to be treated, biological treatment is not retained for further consideration.
b. Soil Washing	Removal of pesticides/herbicides from soil with an aqueous surfactant or chelate containing solution.	Effectiveness of this process for on-site chemicals has not been adequately demonstrated. SITE Demonstration projects to date (SITE Technology Profiles, 6th Ed., Nov. 1993) have addressed primarily oil, PCPs, and PAHs. The available processes are complex involving a number of unit operations which generate secondary waste streams that contain the removed contaminants, and are normally treated in a biological reactor. The total process can be large, requiring up to 0.5 acres to set up and run at typical rates of 20 tons or more per hour. The quantity of soil to be remediated, the small size of the site, and the biological unit operations make this system difficult to effectively implement. For these reasons and the fact that it does not have demonstrated effectiveness on the site contaminants, it is excluded from further consideration.

TABLE 2-3 (Cont'd.)

GENERAL RESPONSE ACTION
SCREENING TABLE

Technology	Description	Screening Comments
c. Thermal	Use of a portable incinerator or thermal desorption unit to process and remove or destroy pesticides/herbicides on soil.	Thermal desorption processes are large and complex due to the fact that the contaminants removed from the soil are transferred first to a vapor and then to a liquid or solid stream which must then be treated or disposed of. It would be difficult to accommodate and implement such a system on this small site (one system in the SITE demonstration program consisted of seven semi-trailers and two large conveyors). Incineration processes are also complex and produce an exhaust which requires treatment for the removal of acid compounds before it can be discharged to the atmosphere. Because of the small size of the site, it would be difficult to prevent movement of airborne contaminants or acid gases off-site in the event of a release due to operational problems which may occur during either thermal desorption or incineration. This is of concern due to the proximity of residences to the site. The small total quantity of material to be treated from the site, combined with the above concerns makes implementation of these technologies impractical on the site. They are not retained for consideration.

TABLE 2-3 (Cont'd.)

GENERAL RESPONSE ACTION
SCREENING TABLE

Technology	Description	Screening Comments
d. Stabilization	Soils containing pesticides/herbicides are stabilized by mixing with a cement-based material to reduce opportunity for migration and contact.	Implementation may not be cost-effective on small site. Some increase in volume of contaminated material. Retained for consideration.
4. Institutional Controls		
a. Fencing	Construction of a fence to limit public access.	Readily implementable. Retained for consideration.
b. Deed Restrictions	Establishment of specific restrictions in property deed to limit future use of site.	Readily implementable. Retained for consideration.
B. ON-SITE STRUCTURES		
1. Buildings Demolition and Disposal	Demolish and dispose of existing building structures. Disposal may be on- or off-site. Parts of buildings may be cleaned before disposal.	Readily implementable and effective. Retained for consideration.
2. Petroleum Storage Tank: Excavation and Disposal	Excavate and dispose of tank using accepted UST excavation procedures.	Readily implementable and effective. Retained for consideration.
3. Septic Tanks		
a. Excavation and Disposal	Remove and dispose of liquid from tanks and excavate and dispose of tanks.	Readily implementable and effective. Retained for consideration.
b. Abandon	Remove and dispose of liquid from tanks and abandon in-place by filling with grout.	Readily implementable and effective. Retained for consideration.

B. Structures:

1. buildings: cleaning, demolition, and disposal.

2. petroleum storage tank: excavation and disposal.

3. septic tanks: disposal of water/sludge and abandonment in place.

4. monitoring wells: decommissioning and abandonment.

Section 3 presents a development and screening of the alternatives and Section 4 presents a detailed analysis of the remaining alternatives.

3.0 DEVELOPMENT OF ALTERNATIVES

3.1 INTRODUCTION

In this section the remedial technologies for soil, buildings, tanks, and the wells are developed in more detail. Since the elements of this site remediation are fairly discrete, each remedial technology will be assessed separately for effectiveness and implementability. Following the development, the technologies will be screened and assembled in a series of RAs which will effect the RAOs for the site.

3.1.1 Effectiveness Evaluation

Each alternative will be evaluated as to the extent to which it will eliminate significant threats to public health and the environment through reductions in toxicity, mobility and volume of the hazardous wastes at the site. Both short-term and long-term effectiveness has been evaluated for each alternative. Short-term effectiveness refers to the construction period for the alternative. All of the technologies evaluated are considered complete following construction, so there is no implementation period for any of the alternatives. Long-term effectiveness refers to the period after the remedial action is in place and effective.

3.1.2 Implementability Evaluation

The technical and administrative feasibility of constructing, operating and maintaining each remedial alternative will be evaluated. Technical feasibility refers to the ability to construct, reliably operate and meet technical specifications or criteria, and the availability of specific equipment and technical specialists to operate necessary process units. It also includes any required operation, maintenance, replacement and monitoring of technical components of an alternative after the remedial action is complete. Administrative feasibility refers to compliance with applicable rules, regulations and statutes and the ability to obtain approvals from other offices or agencies, the availability and capacity of treatment, storage and disposal services.

3.2 REMEDIAL TECHNOLOGY ASSESSMENT

In this section, each remedial technology is described and assessed individually for effectiveness and toxicity reduction. This assessment will provide a basis on which to combine the technologies into remedial alternatives.

3.2.1 Vegetate Site

This technology would consist of a four-inch layer of topsoil placed over the site followed by hydro-seeding with a grass mixture to establish an erosion resistant covering. If necessary, minimal grading may be undertaken prior to the topsoil placement to achieve a continuous vegetation cover.

The effectiveness of this measure would be good in the short term as it would significantly reduce the possibility of casual contact of people with the contaminated soil, which is the RAO for this site. Long term effectiveness would largely depend on how well the topsoil layer was installed and the adequacy of regular maintenance.

This technology is readily implemented with locally available resources. It requires no specialized equipment to construct or maintain and can be monitored by personnel with a minimum of training.

3.2.2 Topsoil Cap

This action involves regrading the soil on the site to provide for positive drainage and an eight-inch thick layer of topsoil with a smooth transition into the existing grade around the perimeter of the site. Approximately 900 cubic yards of trucked in topsoil would be placed. Contaminated soil would not be removed from within the property boundary. Approximately 400 cy of soil excavated from around the perimeter of the property would be moved to the middle of the site and regraded such that the center of the site is elevated, thus providing positive drainage. Seeding of the site, to establish vegetative cover, would be done after final grading.

The effectiveness of a an eight-inch thick topsoil cover for accomplishing the RAO would be excellent in both the short and long term. In the short term, standard dust suppression measures can be used to control construction impacts. The long-term effectiveness of the cap for meeting the RAO will be excellent. The depth of the cover would minimize the potential for minor erosion or other events to expose the underlying

soils. A minimum amount of regular maintenance during the post closure-period, i.e. mowing, would serve to maintain the integrity of the cap and hence its effectiveness. The exposure pathway from surface contact would be interrupted as is recommended by the Health Risk Assessment.

The toxicity and volume of the chemicals would not be reduced, however there would no longer be direct exposure. The mobility of the chemicals is already low. The potential mobility of the chemicals is slightly reduced because the existing surface soils would no longer be exposed to erosion by rain and wind, and infiltration through the on-property soils would be reduced by improved drainage on the site.

3.2.3 Asphaltic Cap

An asphaltic cover comprised of 4.5 inches of binder course and 1.5 inches of surface course could be constructed over the entire site. This type of cover is termed "full depth asphalt concrete". Soil excavated from around the perimeter of the property would be moved to the middle of the site and regraded such that the center of the site is elevated, providing positive drainage. The subgrade would be a prepared gravel sub-base that it is firm, dust-free and dry, or just slightly damp when paving operations are started.

The effectiveness of an asphalt cap for accomplishing the RAO would be excellent in both the short and long term. In the short term, standard dust suppression measures can be used to control construction impacts. The long-term effectiveness of the cap for meeting the RAO would be excellent. The strength and low permeability of the cover would minimize the potential for erosion or other disturbance to expose the underlying soils. A minimum amount of regular maintenance during the post closure-period would help to maintain the integrity of the cap and hence its effectiveness. The exposure pathway from surface contact would be interrupted as is recommended by the Health Risk Assessment.

The toxicity and volume of the chemicals would not be reduced. The mobility of the chemicals is already low. The mobility of the chemicals would be reduced because the surface soils would no longer be exposed to erosion by rain and wind, and infiltration through the on-property soils would be minimized by the low permeability of the asphaltic cap.

3.2.4 Geomembrane Cap

3.2.4.1 NYCRR Part 360 Cap

A composite cap system of the type specified for solid waste landfills in NYCRR Part 360 could be constructed to provide an impermeable barrier above the existing surface soil. The components of this cap, from the top surface downward are as follows:

- Vegetative cover (grass)
- 6 inch topsoil layer
- 12 inch buffer soil
- 12 inch drainage soil
- Geomembrane, 40 mil
- Geotextile
- Regraded existing soil sub-base

This two and one-half foot thick cap system would provide a smooth transition into the existing grade around the perimeter of the property. Contaminated soil would not be removed from the site. Approximately 900 cy of soil excavated from around the perimeter of the property would be moved to the middle of the site and regraded such that the center of the site is elevated, thus providing positive drainage. Seeding of the site, to establish vegetative cover, would be done after final grading.

The effectiveness of a NYCRR Part 360 cap would be excellent in both the short and long term for accomplishing the RAO. In the short term, standard dust suppression measures and monitoring can be used to monitor and control construction impacts. The long-term effectiveness of the cap for meeting the RAO would be excellent. The cover would minimize the potential for erosion or other events to expose the underlying soils. A minimum amount of regular maintenance during the post-closure period would serve to maintain the integrity of the cap and hence its effectiveness. The exposure pathway from surface contact would be interrupted as is recommended by the Health Risk Assessment.

The toxicity and volume of the chemicals would not be reduced. The mobility of the chemicals in the soil is currently low. The potential mobility of the chemicals would be reduced because the surface soils would no longer be exposed to erosion by rain and wind, and infiltration through the on-property soils would be practically eliminated by the low-permeability layers in the Part 360 cap.

3.2.4.2 Limited Geomembrane Cap

A geomembrane liner with a 24-inch barrier protection layer could be installed over the area of the former disposal pit. The effectiveness of this cap would be similar to the NYCRR Part 360 cap but cover a smaller area.

3.2.5 Excavation and Removal

3.2.5.1 Former Disposal Pit Area

Excavation and off-property disposal of soils from the site, particularly in the area of the former disposal pit could be done to reduce the on-property volume of soils which contain pesticides/herbicides at the former Abalene Pest Control site.

Based on information including interviews with site witnesses, photographs of the pit area excavation, and historical maps, the width of the excavated disposal pit was less than the northeast wall of the barn which is 19.5 feet wide. A map (C.T. Male, 1987) indicates that it was approximately 12.5 feet wide along its northwest-southeast dimension along the northeastern wall of the barn. The excavated disposal pit extended approximately 10 feet to the northeast from the northeastern wall of the barn. The depth of the excavated pit was approximately seven to eight feet. As shown in Figure 3-1, based on the analytical results for soil samples collected from the two borings through the former disposal pit (P-1 and P-2), the concentrations of total pesticides/herbicides decrease with depth and approach 1 mg/kg at a depth of approximately 15 feet. No soil sample below the depth of 4.0 to 6.0 feet exceeded the TCLs. Based on this information, excavation and off-property disposal of soil from an area approximately 15 by 15 feet to a depth of 15 feet would likely remove most of the chemical containing soils in the backfilled, former disposal pit. The estimated volume of soil from excavation of this area is approximately 125 cy. Figure 3-2 presents the possible limits of excavation associated with the area of the former disposal pit. For purposes of this Feasibility Study Report it is assumed that the excavated soils would be treated and disposed of off-property in a permitted facility.

This remedial alternative assumes that the excavated area will be backfilled with clean soil. The excavated area as well as the remainder of the site will be capped with topsoil and vegetated.

In conjunction with the excavation of the former disposal pit, the off-property soils which exceed the TCLs could be excavated and placed on-property prior to capping, as

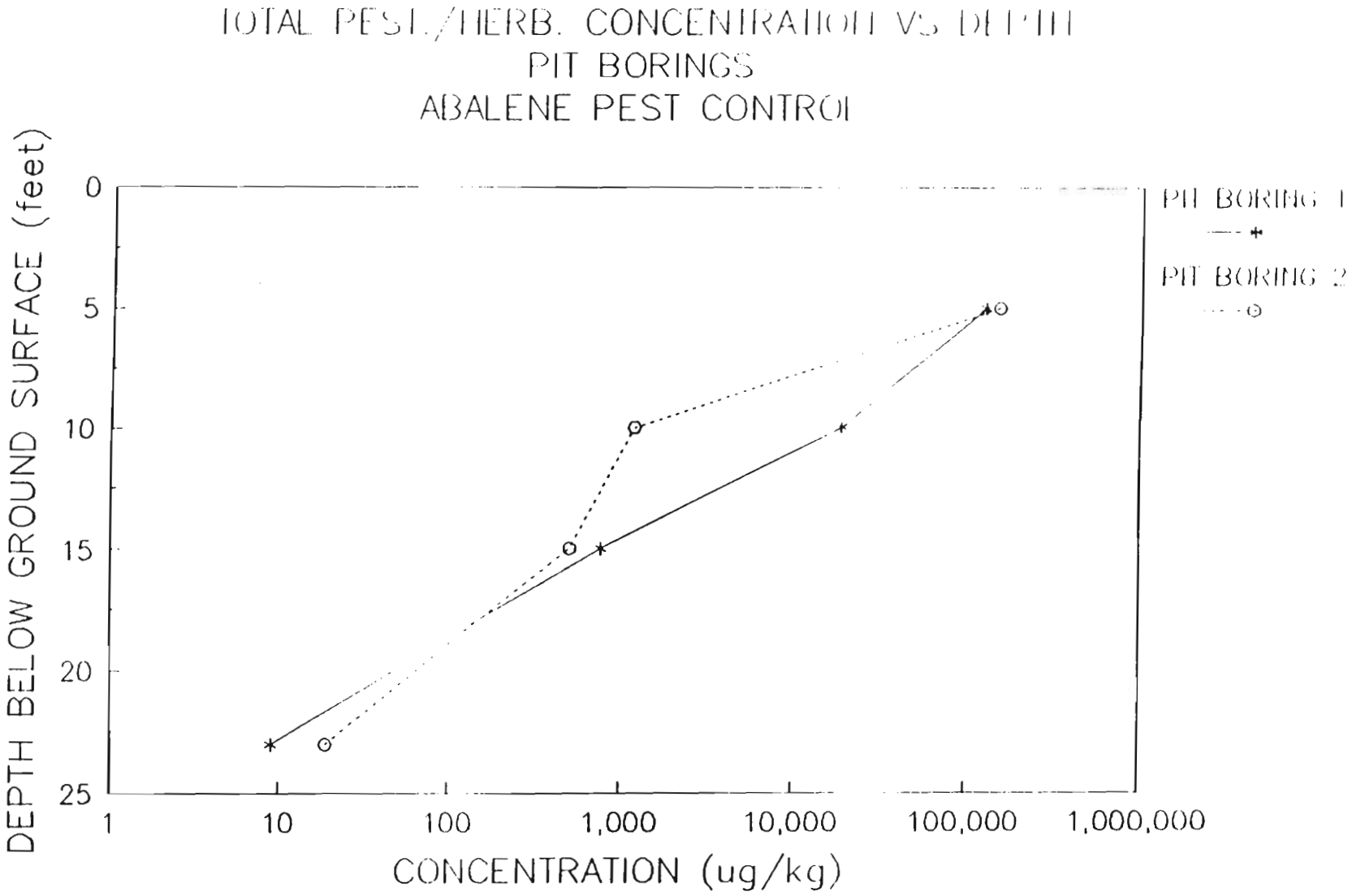
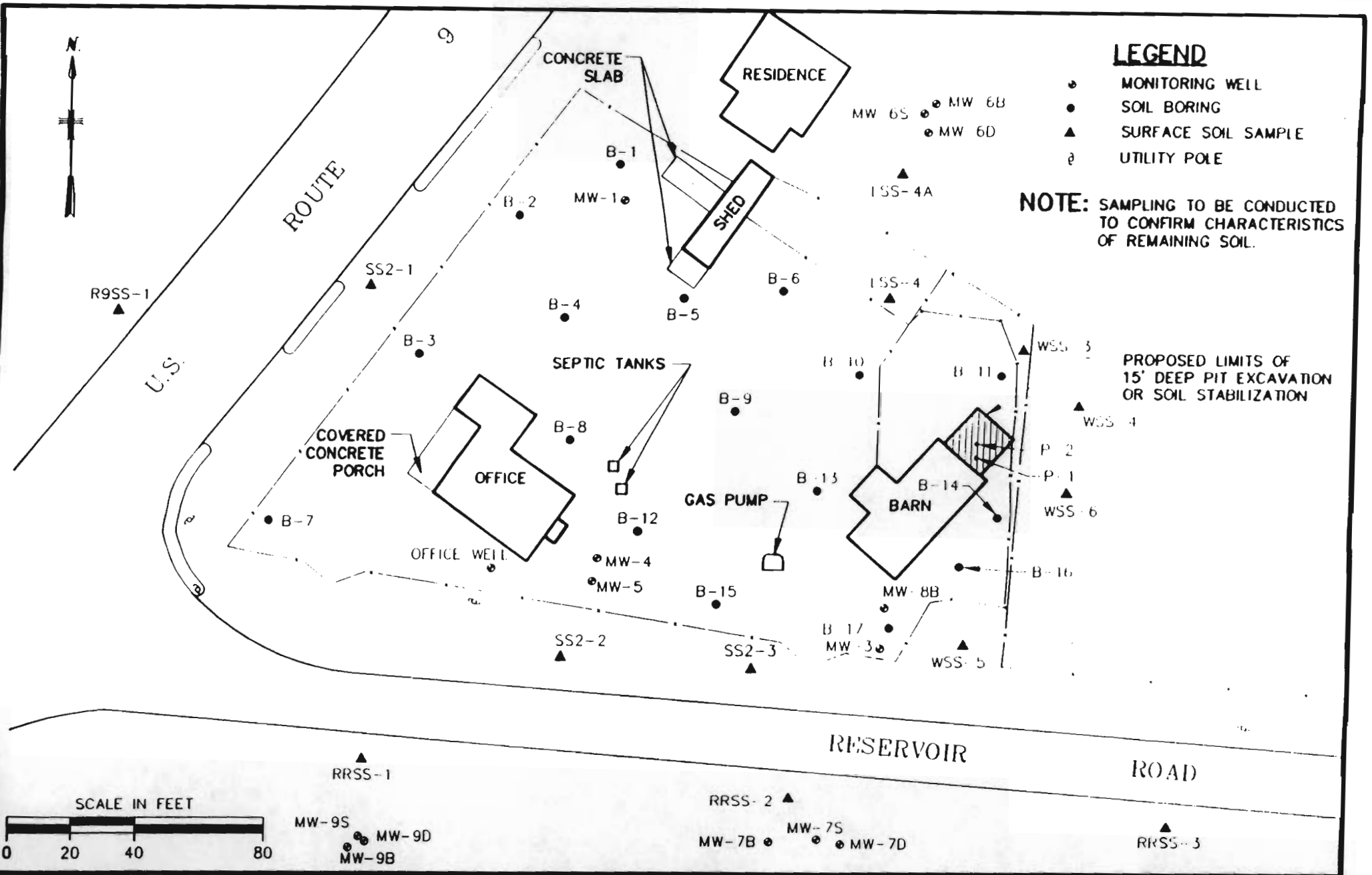

TOTAL PEST./HERB. CONCENTRATION VS DEPTH
PIT BORINGS
ABALENE PEST CONTROL
DEPTH BELOW GROUND SURFACE (feet)
0
5
10
15
20
25
1
10
100
1,000
10,000
100,000
1,000,000
CONCENTRATION (ug/kg)
PIT BORING 1
PIT BORING 2

FIGURE 3 - 1



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PROPOSED LIMITS OF EXCAVATION/SOIL STABILIZATION OF FORMER DISPOSAL PIT

FIGURE 3-2

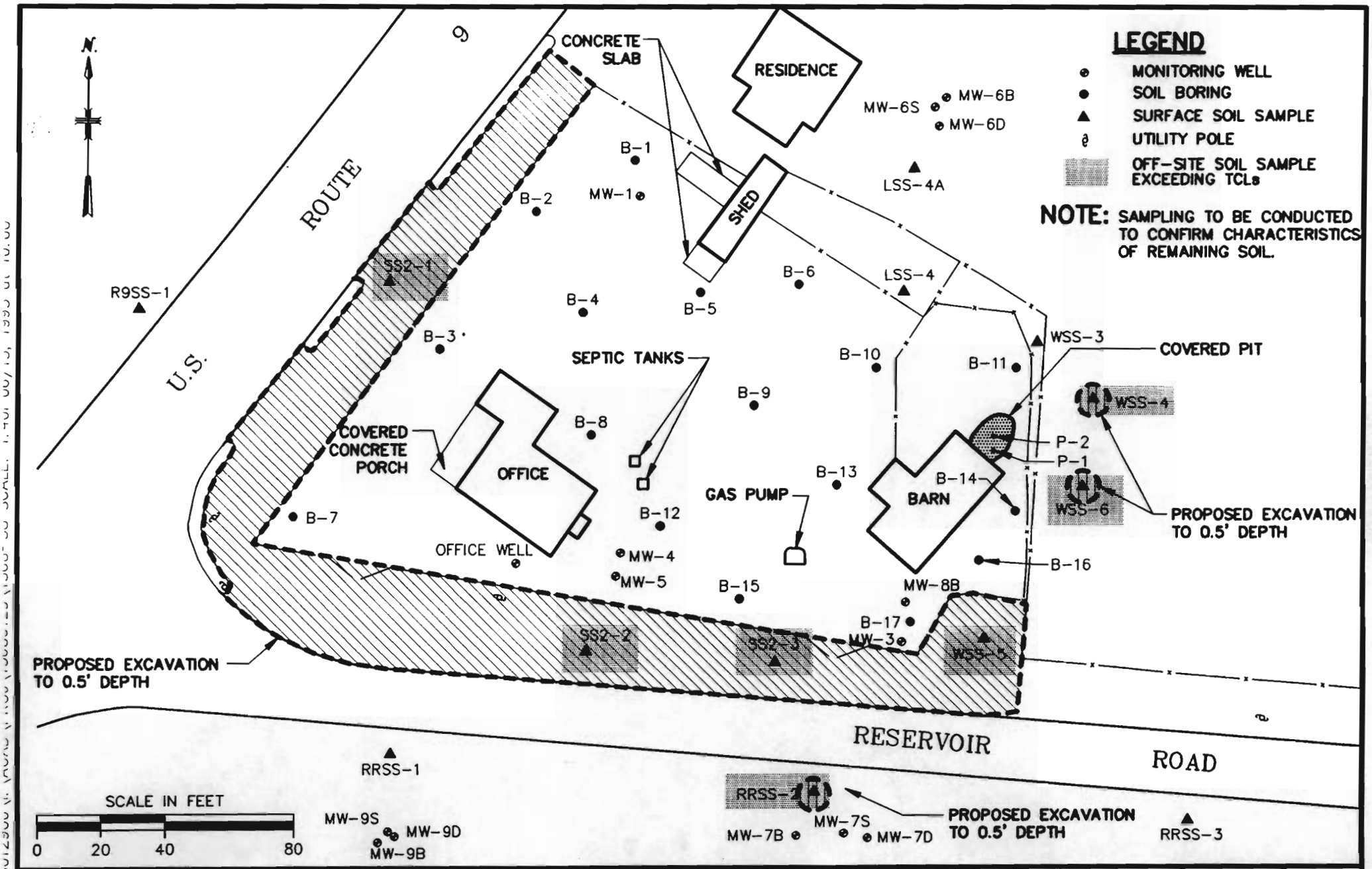
described below. The estimated volume of soil excavated from the three off-property areas shown in Figure 3-3 is 201 cy.

As shown in Figure 3-1, concentrations of pesticides/herbicides decrease with depth in the former disposal pit. Excavation and off-site disposal of the upper portion of the former disposal pit and on-property surface soils with the highest concentrations of pesticides/herbicides could be implemented. Excavation of two feet of soil from the top of the former pit would require off-site disposal of approximately 22 cy of soil. "Hot spot" on-property surface soil excavation would require off-site disposal of approximately 6 cy of soil. In conjunction with the excavation of the upper portion of the former disposal pit, off-property soils could be excavated and placed on-property prior to capping with topsoil. The estimated volume of soil excavated from the off-property area shown in Figure 3-4 is 2 cy.

3.2.5.2 Off-property Soils

Excavation and removal of surface soils in limited areas could be used to interrupt the potential exposure pathway to off-property surface soils which exceed TCLs. Because the soils in these areas are not on the former Abalene Pest Control property or are outside the fence on the former Abalene Pest Control property, exposure to these soils can not be controlled by Orkin. Figure 3-3 presents the off-property surface soil sampling locations for which the TCLs were exceeded. One location is to the west of the site SS2-1, one location is to the south of Reservoir Road (RRSS-2), three sampling locations are to the south of the fenced site (SS2-2, SS2-3 and WSS-5), and two sampling locations are to the east of the fenced site (WSS-4 and WSS-6). Also presented in Figure 3-3 are the proposed limits of surface soil excavation previously discussed.

The potential excavation in the vicinity of sampling location RRSS-2 is a ten foot diameter to a depth of 0.5 feet which will be supported by confirmatory sampling. Because sample RRSS-2 is from a residential lawn with an unknown history of pesticide/herbicide applications, it is not known if the chemicals detected in sample RRSS-2 are associated with the former Abalene Pest Control site. Based on its sampling, the NYSDOH concluded that pesticide concentrations in its samples were "within the range of background levels in developed areas," see Appendix A. Due to the presence of Reservoir Road between this sampling location and the former Abalene Pest Control site, fugitive dust is the only potential chemical pathway to associate this sample with the former Abalene Pest Control site. As such, the vertical extent of chemicals in this location is likely to be limited if they



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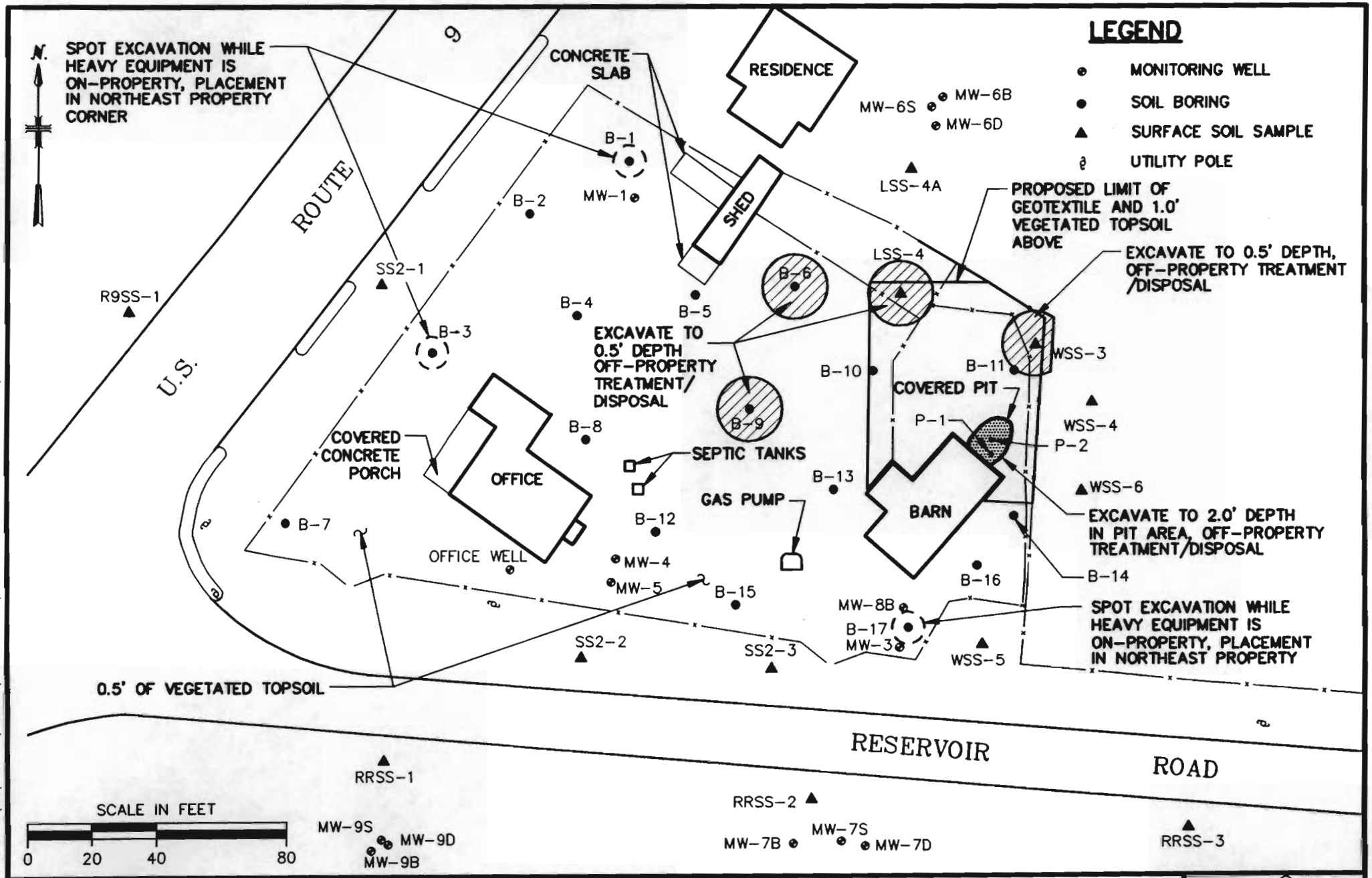
PROPOSED LIMITS OF OFF-PROPERTY SURFACE SOIL EXCAVATION ALTERNATIVES 1,2,3,4, & 5

FIGURE 3-3



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PROPOSED LIMITS OF ON-PROPERTY EXCAVATION FOR ALTERNATIVE 4B

FIGURE 3-4

are associated with the former Abalene Pest Control site. The estimated volume of soil from excavation of this area is approximately 1.5 cy based on a 0.5 foot excavation depth.

The potential excavation limits of surface soils outside of the southeastern and eastern fence line is also shown in Figure 3-3. The horizontal limits of this proposed excavation are based on the analytical results for off-property surface soil samples SS2-2, SS2-3, WSS-5, WSS-6, WSS-4, LSS-4A and on-property surface soil samples B-17, WSS-3, and LSS-4 and the immunoassay results presented in Appendix B. Based on the results of the immunoassay sampling, only spot excavations would be conducted along the eastern property boundary. The potential excavation of surface soils outside the fenced site along the western and southwestern fence line is also shown in Figure 3-3. The horizontal limits of this potential excavation incorporates the soils between the fence line and U.S. Route 9 and Reservoir Road which exceed TCLs (SS2-1 and SS2-2). For volumetric calculations, the assumed depth of excavation is 0.5 foot. The estimated volume of soil from excavation of the areas shown in Figure 3-3 is approximately 201 cy.

The potential 0.5 foot excavation of adjacent off-property areas is based on a knowledge of the vertical distribution of pesticides/herbicides on the property and the likely migration pathways from the property to adjacent off-property areas. As documented in the Site Investigation Report, the concentration of pesticides/herbicides decreases rapidly with depth below the ground surface. The fence along the eastern property boundary would have restricted physically placing pesticides/herbicides to the east of the fence as confirmed by the immunoassay analyses. The presence of pesticides/herbicides in this area may result from surface run-off and air emissions during operations. As a result, the depth of pesticides/herbicides in these off-property areas is likely to be less than in on-property areas.

If excavation of these off-property surface soils is part of the selected Remedial Alternative, confirmatory sampling for pesticides will be conducted during either preliminary design activities or following excavation for the purpose of documenting the results of the excavation. Confirmatory sampling may be conducted by immunoassay screening or laboratory analysis.

This remedial alternative assumes that the excavated areas will be backfilled with clean soil and vegetated. Under this alternative, the excavated surface soils will be placed within the fenced boundaries of the former Abalene Pest Control site and graded prior to the installation of the selected cap.

The effectiveness of the excavation and removal alternative for accomplishing the RAO would be excellent in both the short and long term. The alternative includes both excavation of off-property and on-property soils. In the short term, standard dust suppression measures could be used to control construction impacts. The long-term effectiveness of placing off-property soils on the site and capping and removing soils from the former disposal pit from the site would be excellent in terms of meeting the RAO for the site. Soil in the former disposal pit area would be physically removed from the possibility of human contact on the site. The exposure pathway from surface contact would be interrupted as is recommended by the Health Risk Assessment.

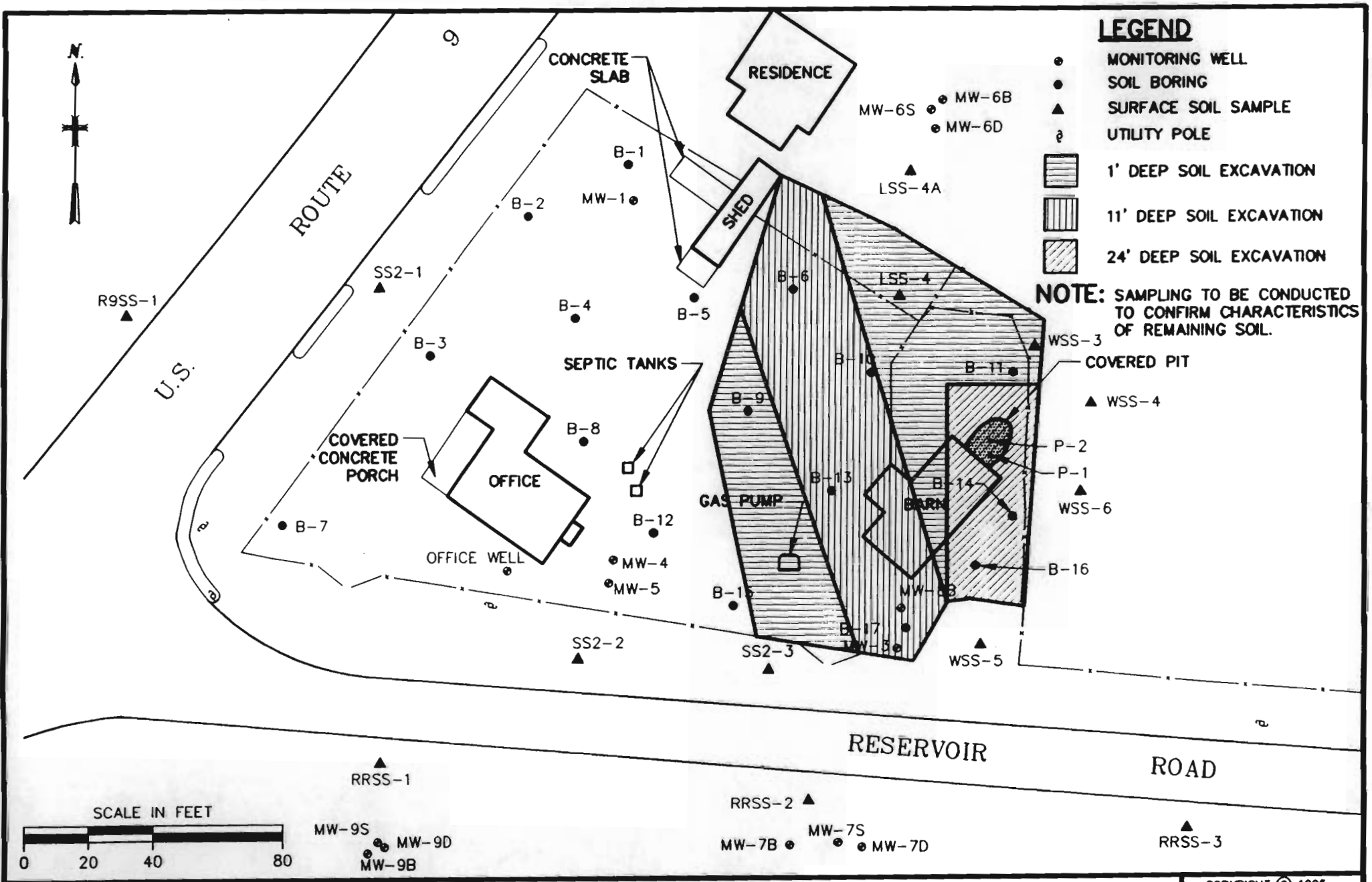
The toxicity of the soils would be reduced by this alternative since the off-property treatment/disposal method includes incineration. The volume of the waste is not reduced. The mobility of the waste is reduced by incineration at a permitted facility, which ensures that no further contamination of other media by this soil will occur on the site.

3.2.5.3 On-property Soils

Excavation of on-property soil could focus on target areas where pesticide concentrations are highest. Removal and off-property disposal of these "hot spots" combined with capping would reduce potential exposure. Figure 3-4 presents the on-property areas which would be treated and disposed of off-property. Alternatively, excavation and removal of the surface and subsurface soils in certain areas on the property could be used to interrupt the potential exposure pathway and comply with TAGM requirements. Figures 2-1 through 2-5 present the on-property areas where soil sampling locations exceeded TAGM guidelines. The shading on Figure 3-5 delineates the depths to which various areas need to be excavated in order to remove all soil over TAGM guidelines. The estimated volume of soil involved in the shaded area is 3,300 cubic yards.

If excavation of on-property soils is part of the selected Remedial Alternative, confirmatory sampling for pesticides will be conducted during either preliminary design activities or following excavation for the purpose of documenting the results of the excavation. Confirmatory sampling will be conducted by immunoassay screening or laboratory analysis.

This remedial alternative assumes that the excavated areas will be backfilled with clean soil and vegetated. The excavated soils will be treated and disposed of at a permitted facility.



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PROPOSED LIMITS OF ON-PROPERTY SOIL EXCAVATION FOR ALTERNATIVE 5

FIGURE 3-5

The effectiveness of the excavation and removal alternative for accomplishing the RAO will be excellent in both the short and long term. In the short term, standard dust suppression measures can be used to control construction impacts. The long term effectiveness of removing and disposing of the soils off of the property will be excellent in terms of meeting the RAO for the site. The exposure pathway from surface contact will be interrupted as recommended by the Health Risk Assessment.

The toxicity of the soils is reduced by this alternative since the off-property disposal method includes incineration. The volume of waste is not reduced. The mobility of the waste is reduced by incineration at a permitted facility, which ensures that no further contamination of other media by this soil will occur on the site.

3.2.6 Stabilization of Soil in Pit Area

In-situ or ex-situ fixation, solidification and stabilization of the contaminated soil in the pit could be used to reduce the potential exposure to affected soil. In-situ stabilization would be accomplished using multi-axis overlapping hollow stem augers to inject solidification and stabilization agents into the soil. These agents are then blended into the soil. The augers are mounted on a crawler-type base machine. A batch mixing plant and raw materials storage tank would be used at the site. This technology solidifies a volume of soil which would extend down to the treatment depth of 15 feet below the existing grade in the pit area. Approximately 125 cy of soil would be stabilized in the pit. The volume of the solidified soil would increase by up to 30% due to the addition of stabilization agents. Excess soil would be spread out over the site. Topsoil would be placed in an eight-inch thick layer above the stabilized soil and across the entire site. This topsoil would be regraded to provide for positive drainage and a smooth transition into the existing grade around the perimeter of the site. Seeding of the site would be done after final grading. Soil would not be removed from the site.

Ex-situ fixation, solidification and stabilization may be conducted by means of excavating the soils from the proposed area of concern by using a back-hoe. The excavated soils will then be placed onto a conveyor belt or directly fed into an homogenizer to mix the soils. From the homogenizer the soils are transferred to a pug mill where they are blended with a portland cement-based mixture and liquid reagents (water, or other proprietary agent). The blended soils will then be returned to the excavation to solidify in-place. The sides of the excavation will be sheet piled to prevent their collapse during the excavation.

The total depth of the excavation will be approximately 15 feet below the ground surface in the pit area. The total volume of soil to be treated will be approximately 125 cy. The volume of the solidified soil would increase approximately 10% due to the addition of solidification agents. Trucked in topsoil would be placed in a one-foot thick layer above the stabilized soil and across the entire site. This topsoil would be regraded and seeded in the same manner as described above for in-situ stabilization.

The effectiveness of stabilization is good for accomplishing the RAO in short-term and long-term. The stabilized and covered soil will be much less exposed to human contact.

The toxicity of the chemicals is not reduced by this method. The volume of the soil is increased, but the mobility of the chemicals is greatly reduced by this process.

3.2.7 Institutional Controls

3.2.7.1 Fencing

Depending on the selected remedy, fencing may not be necessary and the existing fencing could be removed. If limited action is selected, the existing fencing may remain. However, placement of the topsoil cover could be accomplished with the existing fence in place.

3.2.7.2 Deed Restrictions

Deed restrictions are legal limitations placed on the future use of the land which are identified in the deed to the affected property. These restrictions generally do not have a short term effect because the restrictions are generally already known to those people who are involved with the project. Deed restrictions have the primary objective of informing parties in the future who are interested in purchasing or otherwise using the property, of the history of the property and the potential hazards of excavating it. These restrictions will most likely be beneficial in the more distant future when the appearance of the site will not indicate its past use.

3.2.8 Buildings

There are three buildings on the site which have been exposed to chemicals by operations at the facility. Several options are available for disposal of this material. Under all options, the buildings will be demolished and reduced to pieces of an average size appropriate to the final disposition of the debris. Demolition will include removal of all above ground structures from the property.

3.2.8.1 Cleaning

Under the off-property disposal option, the buildings may be cleaned to a technology standard as provided in NYCRR Part 376.4(g) which are state regulations governing land disposal of contaminated building debris. These regulations would allow disposal of the cleaned debris as non-hazardous waste.

3.2.8.2 Disposal: Off-property

Off-property disposal will involve removal and disposal of the demolition debris at an appropriate disposal facility. If the debris has been cleaned, it can be disposed of at a permitted solid waste facility.

The effectiveness of this option in the long term is sufficient to meet the RAO of the project. Off-property disposal will break the exposure route for human contact with the contaminated materials. Normal short-term construction impacts can be controlled using accepted techniques.

The mobility of the chemicals will be reduced by transporting the material off-property to a secure landfill and will be reduced by the on-property disposal method by eliminating exposure of the structures to weather, and vandalism. The toxicity of the chemicals is not reduced; but the volume of the waste is reduced by virtue of the demolition process, and by the cleaning process, if it is conducted.

3.2.9 Underground Tanks

An underground storage tank (UST) is located adjacent to an unpaved driveway southwest of the concrete block building at the site. Based upon information obtained from the NYSDEC's Petroleum Bulk Storage Registration for the tank, the tank was used to store gasoline for refueling commercial vehicles. According to the registration form, the 4,000 gallon UST is constructed of uncoated steel, has no secondary containment, corrosion

protection, or leak detection system, and is empty. The piping which is appurtenant to the tank consists of a direct fill port, a vent pipe, and a supply line to a suction pump/dispenser which is located immediately above the tank. The piping system is constructed of galvanized steel and does not have a mechanism for leak detection or overfill prevention. No evidence of tank system leaks or product spills has been identified. Use of the UST was apparently discontinued in early 1988.

The NYCRR Part 613.9 Regulations require that tanks which are permanently out of service be closed. Closure requirements include:

- Removing liquids, sludges, and vapors from the tank.
- Cleaning the tank's interior.
- Disconnecting appurtenant piping.
- Removing and disposing of the tank, or closing it in place by filling it with an inert material.

Since the tank system has not been tested since at least 1987, has no other mechanism for leak detection, and has not been upgraded with corrosion or overfill prevention, it is currently not in compliance with the Part 613 Regulations. There is no apparent future use for the tank. Therefore, it should be removed from the site in accordance with the Part 613 Regulations.

There are also two septic tanks located on the site. These tanks will be handled in a similar manner to the petroleum tanks with the exception that abandonment of the tanks in place is compatible with the site RAOs and will be conducted rather than excavation and off-property disposal.

Proper removal and disposal of the petroleum tank, its appurtenances, and associated petroleum-contaminated soil will provide both short- and long-term effectiveness by permanently removing them from the site. Any potential risk posed to the public health or the environment by the tank or its stored product will be eliminated.

Proper abandonment of the septic tanks will permanently reduce the volume of waste on the site, and hence will have long-term effectiveness. There will be no potential threat of contamination from the cleaned and abandoned tanks.

3.2.10 On-property Wells

The on-property wells will be decommissioned by pressure grouting the wells in place. The grout mixture will contain five to six gallons of water per 94-pound bag of Type II cement. The wells will be tremie-grouted from the bottom to produce a grout column without air or water pockets. A pressure grout apparatus will then be assembled by attaching the grout line to the top of the well via a glued-on connector. Additional grout will be pumped at a pressure of approximately 100 psi. Grouting will stop when less than one cubic foot of grout is accepted by the well in a 15-minute period. The well riser will then be cut approximately three feet below the ground surface. Native soil will be used to backfill the hole to grade.

The pit in the basement of the office building will be investigated to determine if a well is present. If a well is determined to be present, it will be decommissioned as described above.

3.3 REMEDIAL ALTERNATIVES

3.3.1 Introduction

In this section the above remedial technologies are assembled into five alternatives for remediation of the former Abalene Pest Control site. The first alternative is a limited action alternative consisting of steps that will be implemented at the site regardless of the final remedial alternative chosen.

It is apparent from the remedial technology evaluation that capping of the contaminated soil in place will be the primary means for achieving the RAO on the site. Capping will be the primary element of three of the alternatives evaluated. These alternatives will include some options for different action in the area of the former disposal pit. The fifth alternative emphasizes the excavation and off-site disposal of pesticide/ herbicide containing soils.

3.3.2 Alternative 1: Limited Action

The limited action alternative will serve as the baseline representing the minimum steps to be taken for the remediation of the site. It will be used to compare the other alternatives. The limited action alternative will include the following:

- Institutional controls:
  - Deed restrictions
  - Existing fencing to remain.
- Well abandonment.
- Building demolition and off-property disposal.
- Limited excavation of off-property soil and placement on the site.
- Vegetative cover.
- Gas tank excavation and removal.
- Septic tank abandonment.

3.3.3 Alternative 2: Site Capping

The site capping alternative will include all of those items included with Alternative 1 (plus fence removal) plus installation of a cap on the site. The cap will be a minimum of eight inches thick and of one of the following designs:

A. eight inch soil cap
B. six inch asphaltic cap
C. NYCRR Part 360 cap
D. limited geomembrane

Costs will be determined for each of these subalternatives and the advantages or disadvantages of each will be presented under the detailed analysis of alternatives.

3.3.4 Alternative 3: Soil Solidification and Site Capping

This alternative will consist of all of the components of Alternatives 1 (plus fence removal) and 2A, plus the solidification of a limited amount of the contaminated soil in the former disposal pit. The soils in the pit area are generally more contaminated than the remainder of the site by an order-of-magnitude or more. The area that would be treated is shown in Figure 3-2.

3.3.5 Alternative 4: Focused Soil Removal and Site Capping

This alternative is subdivided into Alternatives 4A and 4B. Alternative 4A will consist of all of the components of Alternatives 1 (plus fence removal) and 2A, plus the

excavation and removal of soil from the area of the former disposal pit. As discussed in the Final Site Investigation Report, the soils in the pit area are generally more contaminated than the remainder of the site by an order-of-magnitude or more. The disposal pit area that would be excavated is shown in Figure 3-2.

Alternative 4B will consist of all of the components of Alternative 1 (plus fence removal) plus the excavation and off-site disposal of target soil areas. Alternative 4B will also include the consolidation of off-property soils in the northeast corner of the property beneath a geotextile. In addition to the consolidation of off-property soils in northeast corner of the property, spot excavations will also be conducted around soil borings B-1, B-3 and B-17. The soils from these areas will be placed under the geotextile cover in the northeast corner. The off-property areas to be excavated are shown in Figure 3-3. A geotextile will delineate the boundary between pesticide-containing soils and a one-foot thick topsoil cap. A one-half foot thick topsoil cap will be placed over the remainder of the property. Alternative 4B is summarized in Figure 3-4.

3.3.6 Alternative 5: Excavation and Removal of Soil Exceeding SCGs

This alternative will consist of all of the components of Alternative 1 (plus fence removal) plus the excavation and off-site disposal of all soil exceeding the SCGs from the site. The off-property and on-property areas that would be excavated are shown in Figures 3-3 and 3-5, respectively.

4.0 DETAILED ANALYSIS OF ALTERNATIVES

4.1 INTRODUCTION

This section presents a detailed analysis of the alternatives outlined in Section 3.0.

4.2 EVALUATION CRITERIA

Seven criteria were used to screen alternatives passing through the preliminary screening process. These criteria, which are presented in TAGM 4030, are as follows:

1. Overall protection of human health and the environment.
2. Compliance with New York State Standards, Criteria and Guidelines (SCGs).
3. Short-term effectiveness.
4. Long-term effectiveness and permanence.
5. Reduction of toxicity, mobility or volume of waste.
6. Implementability.
7. Costs including Capital, Annual Operations and Maintenance, and Present worth.

A detailed analysis of the alternatives passing the preliminary screening process will be performed using the above criteria, which are described below.

4.2.1 Overall Protection of Human Health and the Environment

These criteria are used to evaluate the adequacy of the remedial alternatives with respect to the protection of human health and the environment. The determination of the overall protection of human health and the environment for alternatives is primarily based on the short-term effectiveness, long-term effectiveness and permanence, and compliance with the SCGs.

4.2.2 Compliance with New York State SCGs

SCGs are those requirements adapted from other statutes and other regulations which partly define remedial actions as cited in 6 NYCRR Part 375. Remedial alternatives were evaluated to determine whether they achieve SCGs under State and Federal environmental laws, public health laws, and state facility siting laws.

4.2.3 Short-term Effectiveness

An evaluation of the short-term impacts associated with the construction and implementation of each alternative was performed. The effect of each alternative on human health and the environment during the construction and implementation phases was evaluated considering the following:

- Protection of community health during construction and implementation of the proposed remedial alternative.
- Protection of workers health during construction and implementation of the proposed remedial alternative.
- Environmental impacts which may result from the construction and implementation of the proposed remedial alternative and the reliability of remedial actions to reduce or prevent these impacts.
- The time required to construct and implement each alternative.

4.2.4 Long-term Effectiveness and Permanence

An evaluation of the long-term impacts associated with the construction and implementation of each alternative was performed. The long-term effectiveness and permanence of each remedial alternative was evaluated with respect to the quantity of residual chemicals remaining at the site after remediation goals have been met. This analysis focuses on the adequacy and reliability of controls necessary to manage the untreated waste and treatment residuals. The volume, toxicity, mobility, degree of which they remain hazardous, and tendency to bioaccumulate were evaluated for the residual chemicals associated with each alternative. Specific considerations included:

- Residual exposure risk.
- Adequacy of controls.
- Reliability of controls.

4.2.5 Reduction of Toxicity, Mobility or Volume of Waste

The degree to which each remedial alternative uses recycling or treatment technologies to permanently decrease toxicity, mobility or volume of the contaminants was evaluated. The effectiveness of each remedial alternative in addressing the predominant health and environmental risks posed by the site was also evaluated. Factors that were evaluated included:

- The treatment process used for the alternative and contaminants that would be treated for.
- Amount of contaminated media that will be remediated.
- Degree to which the toxicity, mobility, or volume of contaminated media will be reduced expressed as a percentage of reduction or order of magnitude.
- The extent to which the remedial action will be permanent.
- The quantity and composition of treatment residuals remaining after remediation accounting for persistence, toxicity, mobility and the tendency for bioaccumulation.
- The ability of the alternative to satisfy the statutory preference for treatment as a primary element.

4.2.6 Implementability

The technical and administrative feasibility of implementing each remedial alternative was evaluated according to the following criteria:

- **Technical Feasibility**: The difficulties and uncertainties related to the construction and implementation of a remedial alternative. This includes the reliability and means of monitoring the effectiveness of the remedial alternative.
- **Administrative Feasibility**: The amount of coordination with governing agencies needed to obtain necessary approvals or permits.
- **Availability of Services and Materials**: This includes the sufficiency of off-site treatment, storage and disposal capacity for contaminated media or treatment process residues and the accessibility of necessary equipment and specialists to implement innovative technologies.

4.2.7 Costs Including Capital, Annual Operations and Maintenance, and Present Worth

This criteria can be divided into capital costs, annual operations and maintenance (O&M) costs and net present worth costs. Capital costs consist of direct (construction) and indirect (non-construction and overhead) costs. A breakdown of the components included under each type of cost is presented below.

4.2.7.1 Direct Capital Costs

- **Construction and Equipment Costs**: Construction equipment, materials and labor required to install or implement a remedial action.
- **Site Development Costs**: Preparation of existing site.
- **Building and Service Costs**: Process and non process related buildings, utility connections and purchased services.
- **Disposal Costs**: Includes transportation and disposal of materials

4.2.7.2 Indirect Capital Costs

- **Engineering Expenses**: Treatability testing, design, drafting, construction supervision and administration.
- **Legal Fees, License and Permit Costs**: Technical and administrative costs to obtain necessary licenses or permits for installation or operation of remedial alternatives.
- **Initial Start-up Costs for Remedial Alternatives**: Labor and expense for start-up period immediately following construction.
- **Contingency Allowance**: Costs associated with unpredictable phenomenon.

4.2.7.3 Annual O&M Costs

These costs are for post-construction/implementation maintenance of remedial alternatives including:

- **Labor**: Includes wages, salaries, overhead and training for operations staff labor.
- **Maintenance Materials and Labor Costs**: Parts and labor associated with routine maintenance of equipment and facilities.

- **Purchased Services**: Sample collection, laboratory testing and professional fees as required for confirmatory testing and reporting.
- **Administrative Costs**: Additional costs associated with the administration of operations and maintenance not previously accounted for.
- **Replacement Costs**: Replacement of equipment or structures that degrade over time.
- **Site Reviews**: Cost of routine site reviews if remedial alternative leaves residual contamination on the site.

4.3 ALTERNATIVES ANALYSIS

Each of the five alternatives is considered in detail in this section. All of the alternatives assume that the existing buildings will be demolished and disposed of off-property.

4.3.1 Alternative 1: Limited Action

4.3.1.1 Description

The limited action alternative will serve as the baseline representing the minimum steps to be taken for remediation of the site. This alternative consists of a number of GRAs which are readily implementable, some of which would have been completed upon abandonment of the site regardless of its status as an inactive hazardous waste site. These are actions which limit public access to the site, improve the appearance of the site, and limit the potential for structures such as the gas tank and water supply well from being reused. Following are those GRAs which constitute Alternative 1:

- Institutional controls: Deed restrictions and fencing.
- Well abandonment.
- Building demolition and off-property disposal.
- Excavation of limited off-site soil.
- Gas tank excavation and removal.
- Septic tank abandonment.
- Vegetative cover (on- and off-property).

4.3.1.2 Overall Protection of Human Health and the Environment

Alternative 1 provides protection of human health and the environment by controlling access to the site and establishing a vegetative cover.

4.3.1.3 Compliance with SCGs and TCLs

Alternative 1 is in compliance with TCLs for off-site soils which will be excavated and regraded on the site. Soils on the site will not be in compliance with the TCLs due to the limited thickness of the vegetative cover on the site. This alternative is not fully in compliance with SCGs because soils exceeding TAGM values left on the site are not isolated by a cap.

4.3.1.4 Short-term Effectiveness

Community Protection

During the construction period of this Alternative, standard construction procedures to limit airborne transport of soil will be employed to protect the surrounding residences from exposure to the site contaminants. A perimeter monitoring program will be developed to monitor for chemicals which could be released by the construction of this alternative.

Worker Protection

Implementation of this alternative will be undertaken using standard procedures for worker protection including the establishment of a Health and Safety Plan which addresses the specific issues pertaining to construction of the alternative and the appropriate protective measures which should be taken. All of the elements of this alternative employ common construction procedures for which established health and safety procedures have been developed.

Environmental Impacts

Construction of this alternative will have a negligible impact on the environment. Control measures to mitigate construction impacts on off-site residences will also mitigate impacts on the local environment. The environmental risk assessment indicated that the site and the surrounding area are unremarkable in terms of habitat, flora, and fauna, and that no special measures are needed to prevent adverse impacts.

Time Required to Implement

This alternative will require approximately two months to implement following the start of construction.

4.3.1.5 Long-term Effectiveness and Permanence

The long-term effectiveness of this alternative is dependent upon the effectiveness of site fencing and the vegetative cover to prevent human exposure by contact with the contaminated soils. The residual risk due to the site contaminants will be reduced by ongoing inspection and maintenance of the vegetative layer and site fencing.

4.3.1.6 Reduction of Toxicity, Mobility, or Volume of Waste

Alternative 1 will reduce the mobility and volume of the waste in the gas tank and the septic tanks by removing it from the site for treatment or disposal. The potential mobility of the site contaminants in the soils will be reduced because improved drainage over the site resulting from the regrading will reduce erosion and infiltration. The toxicity and volume of the contaminants in the soil will not be reduced by this alternative.

4.3.1.7 Implementability

Alternative 1 is readily implementable using locally available resources. The construction methods to be employed are common earthmoving and remediation techniques requiring no highly specialized equipment. Monitoring of the site following implementation will involve only standard well sampling techniques, standard post-closure inspection procedures and maintenance which can be accomplished using local resources.

4.3.1.8 Cost

The Capital, O&M and Present worth costs for Alternative 1 are presented in Table 4-1.

- **Capital Costs**: The probable capital cost to construct and implement Alternative 1 is $221,000.

- **O&M Costs**: The probable annual operations, monitoring and maintenance cost for Alternative 1 is $9,500.

- **Present Worth Cost**: Over a five year monitoring period, the probable net present worth for this alternative is $262,000. This was calculated using a 5% annual discount rate over the five year period.

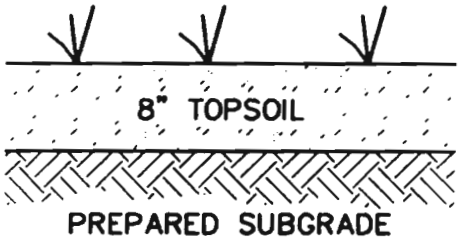
4.3.2 Alternative 2: Site Capping

4.3.2.1 Description

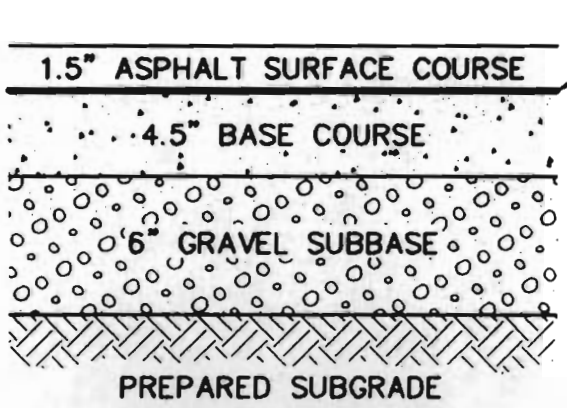
The site capping alternative will involve all of the elements of Alternative 1 (with fence removal), plus capping of the contaminated soils in place with one of four proposed cap systems to prevent human exposure to the contaminated soil through physical contact. This alternative includes all of the GRAs which were included under the limited action alternative, with the substitution of various cap alternatives for the vegetative cover in Alternative 1 and the existing fence would be removed. Each of the caps would remove the exposure to surface soils and are treated in a parallel manner in this section. Stormwater management for increased discharge to adjacent properties will be evaluated during the detailed design phase. Note that prior to the installation of a cap, the designated off-property soils will be excavated and moved onto the property. These areas would then be backfilled and vegetative cover would be established on them. The site will then be graded to provide a smooth subbase for the cap. The cross-section of these caps is shown in Figure 4-1. The limit of the caps for Alternatives 2A, 2B, and 2C are shown in Figure 4-2.

The first cap (Alternative 2A) consists of an eight-inch thick, vegetated topsoil layer which will be graded to promote positive drainage to the perimeter of the site.

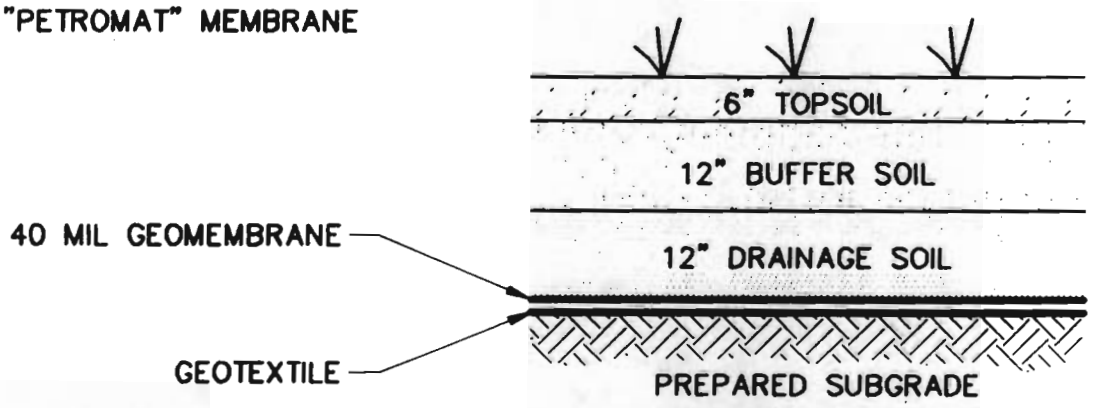
The second cap considered (Alternative 2B) would be an asphaltic cap consisting of a six inch gravel subbase, a 4.5 inch asphaltic concrete base course, and a 1.5 inch asphaltic concrete finish course. Drainage would again be to the perimeter of the site. This cap could be converted for use as a basketball court, tennis court or other recreational use following its completion.



ALTERNATIVE 2A,3,4
8" TOPSOIL CAP



ALTERNATIVE 2B
ASPHALT PAVEMENT CAP



ALTERNATIVE 2C
6NYCRR PART 360 CAP

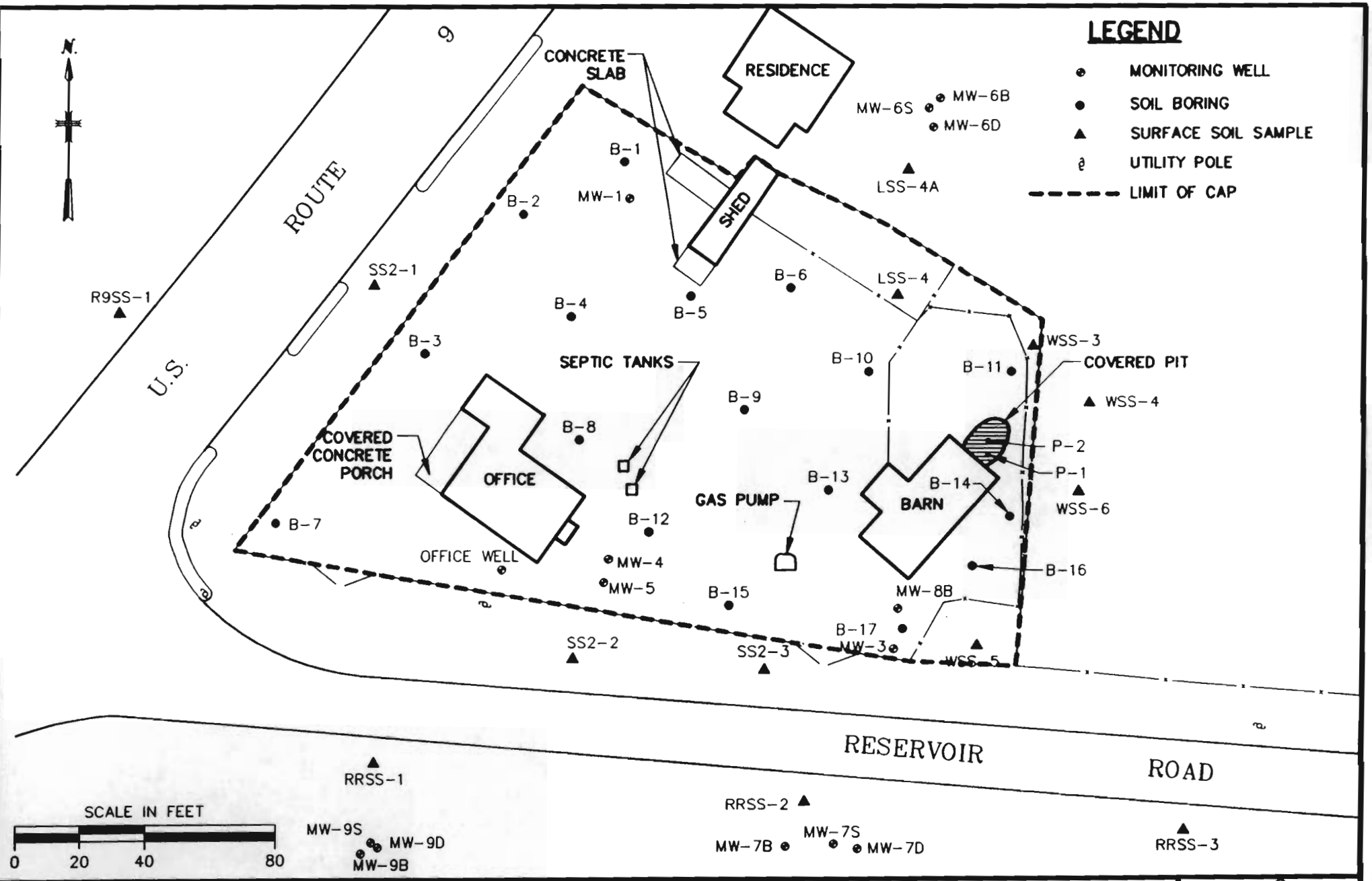
NOT TO SCALE

MALCOLM PIRNIE

ABALENE PEST CONTROL
MOREAU, NEW YORK

CAPPING OPTIONS

FIGURE 4-1



MALCOLM PIRNIE

ABALENE PEST CONTROL
MOREAU, NEW YORK

PROPOSED LIMITS OF ALTERNATIVE 2A,2B,2C,3 & 4A CAPS

FIGURE 4-2

TABLE 4-1
OPINION OF PROBABLE COST
ALTERNATIVE 1

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
DIRECT CAPITAL COSTS:				
Overall Site				
Excavate contaminated soil from off-property	201	cy	$5.00	$1,005
Backfill excavated off-property areas with clean topsoil	201	cy	$15.00	$3,015
Off-property confirmitory sampling	21	ea.	$250.00	$5,250
Place and grade excavated fill on property	244	cy	$6.00	$1,464
Furnish and install 4" topsoil cover layer	473	cy	$30.00	$14,200
Establish vegetative cover	53.3	1000 sf	$38.00	$2,025
Buildings				
Containerize residual product and vacuum slabs	10	40 gal drm.	$975.00	$9,750
Disposal of drummed residual product and waste	10	40 gal drm.	$800.00	$8,000
Decontaminate buildings		lump sum		$16,500
Disposal of drummed decon. generated waste	17	40 gal drm.	$800.00	$13,600
Analytical testing		lump sum		$5,000
Demolish buildings and dispose of off-property as non-hazardous waste		lump sum		$31,250
Furnish and place additional backfill in Office Building Basement	207	cy	$15.00	$3,105
Septic Tanks				
Analytical testing of tank contents		lump sum		$2,500
Remove and dispose of tank contents	300	gal	$20.17	$6,051
Excavate soil to expose tank openings, grout full, backfill		lump sum		$2,500
Underground Storage Tank				
Excavate and remove tank from below-ground		lump sum		$10,000
Dispose of tank and associated wastes		lump sum		$775
Analytical testing of tank contents and soil		lump sum		$3,350

TABLE 4-1
OPINION OF PROBABLE COST
ALTERNATIVE 1

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
Monitoring and office wells				
Decommision wells		lump sum		$6,000
Institutional Controls				
Effect deed restrictions on property		lump sum		$2,000
TOTAL DIRECT COSTS				$147,340
INDIRECT CAPITAL COSTS:				
Engineering and Permitting @ 25 % of Total Direct Costs				$36,835
Contingency @ 25% of Total Direct Costs				$36,835
TOTAL INDIRECT COSTS				$73,670
TOTAL CAPITAL COSTS				$221,011
O&M COSTS:				
Groundwater monitoring - 9 wells on an annual basis				
Sampling and analysis by EPA method 8080	1	event	$7,500	$7,500
Turf maintenance		lump sum		$2,000
TOTAL ANNUAL O&M COSTS				$9,500
PRESENT WORTH COSTS:				
Present worth of annual O&M costs, 5% discount rate over 5 years				$40,986
Total capital costs				$221,011
TOTAL PRESENT WORTH				$261,996
				Say $262,000

The third cap considered (Alternative 2C) is a composite cap system meeting the requirements of 6 NYCRR part 360. This cap consists of the following (in descending order):

Vegetative cover (grass)
Six inch topsoil layer
12 inch buffer soil
12 inch drainage soil
40 mil geomembrane
Geotextile
Existing soil subbase

This cap would provide a smooth transition into the existing grade around the perimeter of the site. The upper layer of the cap will be designed to extend over those areas off-property which were excavated. Gravity drainage to the perimeter of the property will be promoted by grading.

The fourth cap considered (Alternative 2D) would include the components of the Alternative 2C cap. This cap would cover an area over the former pit as opposed to the entire property. An eight-inch layer of topsoil would be placed over the entire property, providing positive drainage and a transition into the existing grade. Drainage would be to the perimeter of the property.

4.3.2.2 Overall Protection of Human Health and the Environment

Alternative 2 provides overall protection of human health and the environment in accordance with the RAOs for the former Abalene Pest Control site.

4.3.2.3 Compliance with SCGs and TCLs

Alternative 2 does not include the removal of on-property soils which exceed NYSDEC TAGM values, although off-property soils which exceeded NYSDEC TAGM values would be consolidated on the property. However, as discussed in Section 2, empirical, historical groundwater monitoring data indicate that groundwater concentrations have decreased with time. Also, the Health Risk Assessment for the former Abalene Pest Control site developed risk-based TCLs for the site. Alternative 2 achieves these TCLs by interrupting the potential exposure pathway. This is the RAO for the site. Also, while not an RAO for the site, the caps proposed in Alternative 2 will reduce infiltration in areas where the TAGMs are exceeded.

4.3.2.4 Short-term Effectiveness

Community Protection

During the construction period of this Alternative, standard construction procedures to limit airborne transport of soil will be employed to protect the surrounding residences from exposure to the site contaminants. A perimeter monitoring program will be developed to ensure that unacceptable levels of contaminants are not being released by the construction of this alternative.

Worker Protection

Implementation of this alternative will be undertaken using standard procedures for worker protection including the establishment of a Health and Safety Plan which addresses the specific issues pertaining to construction of the alternative and the appropriate protective measures which should be taken. All of the elements of this alternative employ common construction procedures for which established health and safety procedures have been developed.

Environmental Impacts

Construction of this alternative will have a negligible impact on the environment. Control measures to mitigate construction impacts on off-site residences will also mitigate impacts on the local environment. The environmental risk assessment indicated that the site and the surrounding area are unremarkable in terms of habitat, flora, and fauna, and that no special measures are needed to prevent adverse impacts.

Time Required to Implement

This alternative will require approximately three months to implement following the start of construction.

4.3.2.5 Long-term Effectiveness and Permanence

The long-term effectiveness and permanence of this alternative for meeting the RAOs can be maintained with minimal post closure monitoring and maintenance. The residual risk with a properly installed cap will be negligible.

4.3.2.6 Reduction of Toxicity, Mobility, or Volume of Waste

Alternative 2 will reduce the mobility and volume of the waste in the gas tank and the septic tanks by removing it from the site for treatment or disposal. The mobility of the site contaminants in the soil under the caps will be reduced because improved drainage over the site resulting from the regrading and the increased thickness of the cap will reduce percolation in the area of the eight-inch topsoil cap. The 360 cap of Alternative 2C and the asphaltic concrete cap will both practically eliminate infiltration on the site and hence eliminate transport of contaminants by infiltration through to the groundwater. The partial 360 cap of Alternative 2D will reduce infiltration on the site in the disposal pit area and hence virtually eliminate transport of contaminants by infiltration through to the groundwater in this area. The toxicity and volume of the contaminants in the soil will not be reduced by this alternative.

4.3.2.7 Implementability

Alternative 2 is readily implementable using locally available resources. The construction methods to be employed are common earthmoving and remediation techniques requiring no highly specialized equipment. Monitoring of the site following implementation will involve only standard well sampling techniques, and turf and maintenance which can be accomplished using local resources.

4.3.2.8 Cost

The Capital, O&M and Present Worth costs for Alternatives 2A, 2B, 2C and 2D are presented in Tables 4-2A, 4-2B, 4-2C, and 4-2D respectively.

- **Capital Costs**: The probable capital cost to construct and implement Alternative 2A is $260,000.The probable capital cost to construct and implement Alternative 2B is $350,000. The probable capital cost to construct and implement Alternative 2C is $312,000. The probable capital cost to construct and implement Alternative 2D is $249,000.

- **O&M Costs**: The probable annual operations, monitoring and maintenance cost for Alternative 2A is $9,500. The probable annual operations, monitoring and maintenance cost for Alternative 2B is $8,500. The probable annual operations, monitoring and maintenance cost for Alternative 2C is $9,500. The probable annual operations, monitoring and maintenance cost to construct and implement Alternative 2D is $9,500.

TABLE 4-2A
OPINION OF PROBABLE COST
ALTERNATIVE 2A

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
DIRECT CAPITAL COSTS:				
Overall Site				
Excavate contaminated soil from off-property	201	cy	$5.00	$1,005
Backfill excavated areas with clean topsoil	201	cy	$15.00	$3,015
Off-property confirmation sampling	21	ea.	$250.00	$5,250
Excavate soil from edge of cover area.	355	cy	$5.00	$1,775
Place and grade excavated fill on property	634	cy	$6.00	$3,804
Furnish and install 8" topsoil cover layer	947	cy	$30.00	$28,400
Establish vegetative cover	53.3	1000 sf	$38.00	$2,025
Buildings				
Containerize residual product and vacuum slabs	10	40 gal drm.	$975.00	$9,750
Disposal of drummed residual product and waste	10	40 gal drm.	$800.00	$8,000
Decontaminate buildings		lump sum		$16,500
Disposal of drummed decon. generated waste	17	40 gal drm.	$800.00	$13,600
Analytical testing		lump sum		$5,000
Demolish buildings and dispose of off-property as non-hazardous waste		lump sum		$31,250
Furnish and place additional backfill in Office Building Basement	207	cy	$15.00	$3,105
Septic Tanks				
Testing of tank contents		lump sum		$2,500
Remove and dispose of tank contents	300	gal	$20.17	$6,051
Excavate soil to expose tank openings, grout full, backfill		lump sum		$2,500
Underground Storage Tank				
Excavate and remove tank from below-ground		lump sum		$10,000
Dispose of tank and associated wastes		lump sum		$775
Analytical testing of tank contents and soil		lump sum		$3,350

TABLE 4-2A
OPINION OF PROBABLE COST
ALTERNATIVE 2A

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
Monitoring and office wells				
Decommission wells		lump sum		$6,000
Institutional Controls				
Disassemble and remove fence from site		lump sum		$7,500
Effect deed restrictions on property		lump sum		$2,000
TOTAL DIRECT COSTS				$173,155
INDIRECT CAPITAL COSTS:				
Engineering and Permitting @ 25 % of Total Direct Costs				$43,289
Contingency @ 25 % of Total Direct Costs				$43,289
TOTAL INDIRECT COSTS				$86,578
TOTAL CAPITAL COSTS				$259,733
O&M COSTS				
Groundwater monitoring - 9 wells on an annual basis				
Sampling and analysis by EPA method 8080	1	event	$7,500	$7,500
Turf maintenance		lump sum		$2,000
TOTAL ANNUAL O&M COSTS				$9,500
PRESENT WORTH COSTS				
Present worth of annual O&M costs, 5% discount rate over 5 years				$40,986
Total Capital Cost				$259,733
TOTAL PRESENT WORTH				$300,719
			Say	$301,000

TABLE 4-2B
OPINION OF PROBABLE COST
ALTERNATIVE 2B

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
DIRECT CAPITAL COSTS:				
Overall Site				
Excavate contaminated soil from off-property	201	cy	$5.00	$1,005
Backfill excavated areas with clean topsoil	201	cy	$15.00	$3,015
Off-property confirmation sampling	21	ea.	$250.00	$5,250
Excavate soil from edge of cover area.	355	cy	$5.00	$1,775
Place and grade excavated fill on property	634	cy	$6.00	$3,804
Furnish and install 6" gravel bedding	709	cy	$32.00	$22,688
Furnish and install 6" full depth asphalt concrete cover	38,333	sf	$1.75	$67,083
Establish vegetative cover	15	1000 sf	$38.00	$571
Buildings				
Containerize residual product and vacuum slabs	10	40 gal drm	$975.00	$9,750
Disposal of drummed residual product and waste	10	40 gal drm	$800.00	$8,000
Decontaminate buildings		lump sum		$16,500
Disposal of drummed decon. generated waste	17	40 gal drm	$800.00	$13,600
Analytical testing		lump sum		$5,000
Demolish buildings and dispose of off-property as non-hazardous waste		lump sum		$31,250
Furnish and place additional backfill in Office Building Basement	207	cy	$15.00	$3,105
Septic Tanks				
Testing of tank contents		lump sum		$2,500
Remove and dispose of tank contents	300	gal	$20.17	$6,051
Excavate soil to expose tank openings, grout full, backfill		lump sum		$2,500

TABLE 4-2B
OPINION OF PROBABLE COST
ALTERNATIVE 2B

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
Underground Storage Tank				
Excavate and remove tank from below-ground		lump sum		$10,000
Dispose of tank and associated wastes		lump sum		$775
Analytical testing of tank contents and soil		lump sum		$3,350
Monitoring and office wells				
Decommission wells		lump sum		$6,000
Institutional Controls				
Disassemble and remove fence from site		lump sum		$7,500
Effect deed restrictions on property		lump sum		$2,000
TOTAL DIRECT COSTS				$233,072
INDIRECT CAPITAL COSTS:				
Engineering and Permitting @ 25 % of Total Direct Costs				$58,268
Contingency @ 25 % of Total Direct Costs				$58,268
TOTAL INDIRECT COSTS				$116,536
TOTAL CAPITAL COSTS				$349,608
O&M COSTS				
Groundwater monitoring - 9 wells on an annual basis				
Sampling and analysis by EPA method 8080	1	event	$7,500	$7,500
Asphalt Crack Repair	1	event	$1,000	$1,000
TOTAL ANNUAL O&M COSTS				$8,500
PRESENT WORTH COSTS				
Present worth of annual O&M costs, 5% discount rate over 5 years				$36,672
Total Capital Cost				$349,608
TOTAL PRESENT WORTH				$386,279
			Say	$386,000

TABLE 4-2C
OPINION OF PROBABLE COST
ALTERNATIVE 2C

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
DIRECT CAPITAL COSTS:				
Overall Site				
Excavate contaminated soil from off-property	201	cy	$5.00	$1,005
Backfill excavated areas with clean topsoil	201	cy	$15.00	$3,015
Off-property confirmation sampling	21	ea.	$250.00	$5,250
Excavate soil from edge of cover area.	890	cy	$5.00	$4,450
Place and grade excavated fill on property	1,222	cy	$6.00	$7,332
Furnish and install geotextile fabric	38,333	sf	$0.20	$7,667
Furnish and install geomembrane liner	38,333	sf	$0.50	$19,167
Furnish and install 24" barrier protection layer	2,800	cy	$7.00	$19,600
Furnish and install 6" topsoil layer	700	cy	$15.00	$10,500
Establish vegetative cover	53.3	1000 sf	$38.00	$2,025
Buildings				
Containerize residual product and vacuum slabs	10	40 gal drm.	$975.00	$9,750
Disposal of drummed residual product and waste	10	40 gal drm.	$800.00	$8,000
Decontaminate buildings		lump sum		$16,500
Disposal of drummed decon. generated waste	17	40 gal drm.	$800.00	$13,600
Analytical testing		lump sum		$5,000
Demolish buildings and dispose of off-property as non-hazardous waste		lump sum		$31,250
Furnish and place additional backfill in Office Building Basement	207	cy	$15.00	$3,105
Septic Tanks				
Testing of tank contents		lump sum		$2,500
Remove and dispose of tank contents	300	gal	$20.17	$6,051
Excavate soil to expose tank openings, grout full, backfill		lump sum		$2,500

TABLE 4-2C
OPINION OF PROBABLE COST
ALTERNATIVE 2C

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
Underground Storage Tank				
Excavate and remove tank from below-ground		lump sum		$10,000
Dispose of tank and associated wastes		lump sum		$775
Analytical testing of tank contents and soil		lump sum		$3,350
Monitoring and office wells				
Decommission wells		lump sum		$6,000
Institutional Controls				
Disassemble and remove fence from site		lump sum		$7,500
Effect deed restrictions on property		lump sum		$2,000
TOTAL DIRECT COSTS				$207,892
INDIRECT CAPITAL COSTS:				
Engineering and Permitting @ 25 % of Total Direct Costs				$51,973
Contingency @ 25 % of Total Direct Costs				$51,973
TOTAL INDIRECT COSTS				$103,946
TOTAL CAPITAL COSTS				$311,837
O&M COSTS				
Groundwater monitoring - 9 wells on an annual basis				
Sampling and analysis by EPA method 8080	1	event	$7,500	$7,500
Turf maintenance		lump sum		$2,000
TOTAL ANNUAL O&M COSTS				$9,500
PRESENT WORTH COSTS				
Present worth of annual O&M costs, 5% discount rate over 5 years				$40,986
Total Capital Cost				$311,837
TOTAL PRESENT WORTH				$352,823
			Say	$353,000

TABLE 4-2D
OPINION OF PROBABLE COST
ALTERNATIVE 2D

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
DIRECT CAPITAL COSTS:				
Overall Site				
Excavate contaminated soil from off-property	201	cy	$5.00	$1,005
Backfill excavated areas with clean topsoil	201	cy	$15.00	$3,015
Off-property confirmation sampling	21	ea.	$250.00	$5,250
Excavate soil from edge of cover area.	888	cy	$5.00	$4,438
Place and grade excavated fill on property	1,222	cy	$6.00	$7,332
Furnish and install geomembrane liner over pit area	625	sf	$0.50	$313
Furnish and install 24" barrier protection layer over pit area	46	cy	$7.00	$322
Furnish and install 8" topsoil layer over entire site	950	cy	$15.00	$14,250
Establish vegetative cover	53.3	1000 sf	$38.00	$2,025
Buildings				
Containerize residual product and vacuum slabs	10	40 gal drm.	$975.00	$9,750
Disposal of drummed residual product and waste	10	40 gal drm.	$800.00	$8,000
Decontaminate buildings		lump sum		$16,500
Disposal of drummed decon. generated waste	17	40 gal drm.	$800.00	$13,600
Analytical testing		lump sum		$5,000
Demolish buildings and dispose of off-property as non-hazardous waste		lump sum		$31,250
Furnish and place additional backfill in Office Building Basement	207	cy	$15.00	$3,105
Septic Tanks				
Testing of tank contents		lump sum		$2,500
Remove and dispose of tank contents	300	gal	$20.17	$6,051
Excavate soil to expose tank openings, grout full, backfill		lump sum		$2,500

TABLE 4-2D
OPINION OF PROBABLE COST
ALTERNATIVE 2D

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
Underground Storage Tank				
Excavate and remove tank from below-ground		lump sum		$10,000
Dispose of tank and associated wastes		lump sum		$775
Analytical testing of tank contents and soil		lump sum		$3,350
Monitoring and office wells				
Decommission wells		lump sum		$6,000
Institutional Controls				
Disassemble and remove fence from site		lump sum		$7,500
Effect deed restrictions on property		lump sum		$2,000
TOTAL DIRECT COSTS				$165,830
INDIRECT CAPITAL COSTS:				
Engineering and Permitting @ 25 % of Total Direct Costs				$41,458
Contingency @ 25 % of Total Direct Costs				$41,458
TOTAL INDIRECT COSTS				$82,915
TOTAL CAPITAL COSTS				$248,746
O&M COSTS				
Groundwater monitoring - 9 wells on an annual basis				
Sampling and analysis by EPA method 8080	1	event	$7,500	$7,500
Turf maintenance		lump sum		$2,000
TOTAL ANNUAL O&M COSTS				$9,500
PRESENT WORTH COSTS				
Present worth of annual O&M costs, 5% discount rate over 5 years				$40,986
Total Capital Cost				$248,746
TOTAL PRESENT WORTH				$289,731
			Say	$290,000

- **Present Worth Cost**: Over a five year monitoring period, the probable net present worth for Alternative 2A is $301,000. The probable net present worth for Alternative 2B is $386,000. The probable net present worth for Alternative 2C and 2D are $353,000 and $290,000, respectively. These values were calculated using a 5% annual discount rate over the five year period.

4.3.3 Alternative 3: Limited Soil Stabilization

4.3.3.1 Description

This alternative involves all of the elements of Alternative 1 (plus fence removal), plus the stabilization/solidification of a limited amount of soil in the chemical disposal area. Following stabilization, the entire site will be capped with a eight-inch topsoil cap as in Alternative 2A. Two types of stabilization methods are examined, in-situ (Alternative 3A) and ex-situ (Alternative 3B).

Soil stabilization involves converting soil into a solid mass by the addition of cementitious material to the soil combined with mixing. This process can occur in-situ using multi-axis overlapping hollow stem augers to inject solidification and stabilization agents into the soil. These agents are then blended into the soil. The augers are mounted on a crawler-type base machine. A batch mixing plant and raw materials storage tank would be used at the site. This technology solidifies a volume of soil which would extend down to the treatment depth of 15 feet below the existing grade in the pit area. Approximately 125 cy of soil would be stabilized. The volume of the solidified soil would increase by up to 30% due to the addition of stabilization agents. Excess soil would be spread out over the sight.

Stabilization can also occur ex-situ. Soil is excavated and combined with the cementitious material in a pug mill located on the site. The treated soil is then immediately returned to the excavation. The volume of soil will be increased due to the stabilization agent and the excess soil will be spread over the site.

Following stabilization, a cap as outlined in Alternative 2A (eight-inch topsoil cap) will be installed to prevent human contact with the stabilized soils.

4.3.3.2 Overall Protection of Human Health and the Environment

Alternative 3 provides overall protection of human health and the environment in accordance with the RAOs for the former Abalene Pest Control site.

4.3.3.3 Compliance with SCGs and TCLs

Alternative 3 does not include the removal of soils which exceed NYSDEC TAGM values. However, as discussed in Section 2, empirical, historical groundwater monitoring data indicate that groundwater concentrations have decreased with time. Also, the Health Risk Assessment for the former Abalene Pest Control site developed risk-based TCLs for the site. Alternative 3 achieves these TCLs by interrupting the potential exposure pathway. This is the RAO for the site. Also, while not an RAO for the site, the cap proposed in Alternative 3 will reduce infiltration in areas where the TAGMs are exceeded.

4.3.3.4 Short-term Effectiveness

Community Protection

During the construction period of this Alternative, standard construction procedures to limit airborne transport of soil will be employed to protect the surrounding residences from exposure to the site contaminants. Ex-situ stabilization will present a higher risk of airborne transport of soil, due to the excavation activity required. A perimeter monitoring program will be developed to ensure that unacceptable levels of contaminants are not being released by the construction of this alternative.

Worker Protection

Implementation of this alternative will be undertaken using standard procedures for worker protection including the establishment of a Health and Safety Plan which addresses the specific issues pertaining to construction of the alternative and the appropriate protective measures which should be taken. All of the elements of this alternative employ common construction procedures for which established health and safety procedures have been developed.

Environmental Impacts

Construction of this alternative will have a negligible impact on the environment. Control measures to mitigate construction impacts on off-site residences will also mitigate impacts on the local environment. The environmental risk assessment indicated that the site and the surrounding area are unremarkable in terms of habitat, flora, and fauna, and that no special measures are needed to prevent adverse impacts.

Time Required to Implement

This alternative will require approximately four months to implement following the start of construction.

4.3.3.5 Long-term Effectiveness and Permanence

The long-term effectiveness and permanence of this alternative for meeting the RAOs can be maintained with minimal post closure monitoring and maintenance. The residual risk with a properly installed cap will be negligible.

4.3.3.6 Reduction of Toxicity, Mobility, or Volume of Waste

Alternative 3 will reduce the mobility and volume of the waste in the gas tank and the septic tanks by removing it from the site for treatment or disposal. The toxicity of the treated soil will not be affected. The volume will increase by approximately 30% due to the addition of the solidification materials. However, the mobility of the contaminants in the soil treated in-situ will be greatly reduced due to their fixation in a cementious matrix. The mobility of the site contaminants in the soil spread ex-situ will be reduced because improved drainage over the site, resulting from regrading, will reduce infiltration. The toxicity and volume of the contaminants in the soil will not be reduced by this alternative.

4.3.3.7 Implementability

Several vendors are available and experienced at using this technology for soil remediation . The construction methods to be employed are common earthmoving and remediation techniques requiring no highly specialized equipment. Monitoring of the site following implementation will involve only standard well sampling techniques, standard landfill post-closure inspection procedures and maintenance which can be accomplished using local resources.

4.3.3.8 Costs

The Capital, O&M and Present worth costs for Alternatives 3A and 3B are presented in Table 4-3.

- **Capital Costs**: The probable capital cost to construct and implement Alternative 3A is $372,000. The probable capital cost to construct and implement Alternative 3B is $305,000.

TABLE 4-3
OPINION OF PROBABLE COST
ALTERNATIVE 3

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
DIRECT CAPITAL COSTS:				
Overall Site				
Excavate contaminated soil from off-property	201	cy	$5.00	$1,005
Backfill excavated areas with clean topsoil	201	cy	$15.00	$3,015
Off-property confirmation sampling	21	ea.	$250.00	$5,250
Excavate soil from edge of cover area.	355	cy	$5.00	$1,775
Place and grade excavated fill on property	634	cy	$6.00	$3,804
Furnish and install 8" topsoil cover layer	950	cy	$30.00	$28,500
Establish vegetative cover	53.3	1000 sf	$38.00	$2,027
Alternative 3A, In-situ stabilization of pit soil		lump sum		$75,000
				OR
Alternative 3B, Ex-situ stabilization of pit soil		lump sum		$30,000
Buildings				
Containerize residual product and vacuum slabs	10	40 gal drm.	$975.00	$9,750
Disposal of drummed residual product and waste	10	40 gal drm.	$800.00	$8,000
Decontaminate buildings		lump sum		$16,500
Disposal of drummed decon. generated waste	17	40 gal drm.	$800.00	$13,600
Analytical testing		lump sum		$5,000
Demolish buildings and dispose of off-property as non-hazardous waste		lump sum		$31,250
Furnish and place additional backfill in Office Building Basement	207	cy	$15.00	$3,105
Septic Tanks				
Testing of tank contents		lump sum		$2,500
Remove and dispose of tank contents	300	gal	$20.17	$6,051
Excavate soil to expose tank openings, grout full, backfill		lump sum		$2,500

TABLE 4-3
OPINION OF PROBABLE COST
ALTERNATIVE 3

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
Underground Storage Tank				
Excavate and remove tank from below-ground		lump sum		$10,000
Dispose of tank and associated wastes		lump sum		$775
Analytical testing of tank contents and soil		lump sum		$3,350
Monitoring and office wells				
Decommission wells		lump sum		$6,000
Institutional Controls				
Disassemble and remove fence from site		lump sum		$7,500
Effect deed restrictions on property		lump sum		$2,000
TOTAL DIRECT COSTS, Alternative 3A - In-situ stabilization				$248,257
TOTAL DIRECT COSTS, Alternative 3B - Ex-situ stabilization				$203,257
INDIRECT CAPITAL COSTS:				
Alternative 3A				
Engineering and Permitting @ 25 % of Total Direct Costs				$62,064
Contingency @ 25 % of Total Direct Costs				$62,064
Alternative 3B				
Engineering and Permitting @ 25 % of Total Direct Costs				$50,814
Contingency @ 25 % of Total Direct Costs				$50,814
TOTAL INDIRECT COSTS, Alternative 3A - In-situ stabilization				$124,129
TOTAL INDIRECT COSTS, Alternative 3B - Ex-situ stabilization				$101,629
TOTAL CAPITAL COSTS, Alternative 3A - In-situ stabilization				$372,386
TOTAL CAPITAL COSTS, Alternative 3B - Ex-situ stabilization				$304,886
O&M COSTS:				
Groundwater monitoring - 9 wells on an annual basis Sampling and analysis by EPA method 8080	1	event	$7,500	$7,500
Turf maintenance		lump sum		$2,000
TOTAL ANNUAL O&M COSTS				$9,500

TABLE 4-3
OPINION OF PROBABLE COST
ALTERNATIVE 3

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
PRESENT WORTH COSTS:				
Present worth of annual O&M costs, 5% discount rate over 5 years				$40,986
Total capital costs, Alternative 3A				$372,386
Total capital costs, Alternative 3B				$304,886
TOTAL PRESENT WORTH Alternative 3A - In-situ stabilization				$413,372
			Say	$413,000
TOTAL PRESENT WORTH Alternative 3B - Ex-situ stabilization				$345,872
			Say	$346,000

- **O&M Costs**: The probable annual operations, monitoring and maintenance cost for both Alternatives 3A and 3B is $9,500.

- **Present Worth Cost**: Over a five year monitoring period, the probable net present worth for Alternative 3A is $413,000. Similarly, the present worth of Alternative 3B is $346,000. These values were calculated using a 5% annual discount rate over the five year period.

4.3.4 Alternative 4: Limited Contaminant Removal and Site Capping

4.3.4.1 Description

Alternative 4A involves all of the elements of Alternative 1 (with fence removal) plus the excavation and off-site disposal of a limited amount of soil from the disposal pit area. The volume of soil to be excavated for Alternative 4A is approximately 125 cy from the area of the former disposal pit. This is the soil on the property with the highest contaminant levels. Following the excavation, the area will be backfilled and the entire site capped with eight inches of topsoil, as in Alternative 2A.

The volume of soil to be excavated for Alternative 4B is 236 cy. This volume includes soil from the following areas shown on Figure 3-4:

- A two-foot deep excavation from below the existing "cap" in the former disposal pit and off-site disposal.

- Excavation in a twenty-foot diameter, to a depth of six inches, centered around LSS-4, B-6 and B9 and off-site disposal.

- Excavation in approximately a twenty-foot diameter to a depth of six inches centered around WSS-3 and off-site disposal. The area of excavation would be truncated to the east of WSS-3 based on the results of the immunoassay sampling.

- Off-property excavation to a depth of six inches in the target area of WSS-4 outside the eastern property line. This soil will be used to partially backfill the former disposal pit.

- Spot excavation in the areas of B-3, B-17 and B-1, and placement in the northeast corner of the property.

Also, as shown on Figure 3-3, an L-shaped area outside of the northwest and south fencelines will be excavated, placed on the property, and graded. Spot excavations at WSS-4, WSS-6 and RRSS-2 will be performed similarly.

Alternative 4B also incorporates Alternative 1 and includes the following:

- Screening and replacement of the existing gravel cover beneath the topsoil cap.
- A geotextile "marker" in the northeast corner of the property covered by a one-foot topsoil layer.
- Six inches of topsoil over the remainder of the site.

4.3.4.2 Overall Protection of Human Health and the Environment

Alternatives 4A and 4B provide overall protection of human health and the environment in accordance with the RAOs for the former Abalene Pest Control site.

4.3.4.3 Compliance with SCGs and TCLs

Alternatives 4A and 4B do not include the removal of all soils which exceed NYSDEC TAGM values. However, as discussed in Section 2, empirical, historical groundwater monitoring data indicate that groundwater concentrations have decreased with time. Also, the Health Risk Assessment for the former Abalene Pest Control site developed risk-based TCLs for the site. Alternatives 4A and 4B achieve these TCLs by interrupting the potential exposure pathway. This is the RAO for the site. Also, while not an RAO for the site, the cap proposed in Alternatives 4A and 4B will reduce infiltration in areas where the TAGMs are exceeded.

4.3.4.4 Short-term Effectiveness

Community Protection

During the construction period of this Alternative, standard construction procedures to limit airborne transport of soil will be used to protect the surrounding residences from exposure to the site contaminants. Due to the increased excavation in areas of high concentration, the risk of airborne contamination will be higher than alternatives without excavation. A perimeter monitoring program will be developed to ensure that unacceptable levels of contaminants are not being released by the construction activities of this alternative.

Worker Protection

Implementation of this alternative will be undertaken using standard procedures for worker protection including the establishment of a Health and Safety Plan which addresses the specific issues pertaining to construction of the alternative and the appropriate protective measures which should be taken. All of the elements of this alternative use common construction procedures for which established health and safety procedures have been developed.

Environmental Impacts

Construction of this alternative will have a negligible impact on the environment. Control measures to mitigate construction impacts on off-site residences will also mitigate impacts on the local environment. The environmental risk assessment indicated that the site and the surrounding area are unremarkable in terms of habitat, flora, and fauna, and that no special measures were needed to prevent adverse impacts.

Time Required to Implement

This alternative will require approximately three months to implement following the start of construction.

4.3.4.5 Long-term Effectiveness and Permanence

The long-term effectiveness and permanence of this alternative for meeting the RAOs can be maintained with post closure monitoring and maintenance. The residual risk with the properly installed cap of Alternative 4A or 4B will be negligible.

4.3.4.6 Reduction of Toxicity, Mobility, or Volume of Waste

Alternatives 4A and 4B will reduce the mobility and volume of the waste in soil by excavation and off-site disposal and in the gas tank and the septic tanks by removing it from the site for treatment or disposal. The mobility of any remaining site contaminants in the soil will be reduced because of improved drainage over the site resulting from regrading.

4.3.4.7 Implementability

Alternatives 4A and 4B are readily implementable using locally available resources. The construction methods to be employed are common earthmoving and remediation

TABLE 4-4A
OPINION OF PROBABLE COST
ALTERNATIVE 4A

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
DIRECT CAPITAL COSTS:				
Overall Site				
Excavate contaminated soil from off-property areas	201	cy	$5.00	$1,005
Backfill excavated areas with clean topsoil	201	cy	$15.00	$3,015
Off-property confirmation sampling	21	ea.	$250.00	$5,250
Excavate soil from edge of cover area.	355	cy	$5.00	$1,775
Place and grade excavated fill on property	634	cy	$6.00	$3,804
Furnish and install 8" topsoil cover layer	950	cy	$30.00	$28,500
Establish vegetative cover	53.3	1000 sf	$38.00	$2,027
Excavate soil in pit area	125	cy	$5.00	$625
Off-property disposal of pit soil as hazardous waste (incineration)	194	ton	$1,400.00	$273,000
Buildings				
Containerize residual product and vacuum slabs	10	40 gal drm.	$975.00	$9,750
Disposal of drummed residual product and waste	10	40 gal drm.	$800.00	$8,000
Decontaminate buildings		lump sum		$16,500
Disposal of drummed decon. generated waste	17	40 gal drm.	$800.00	$13,600
Analytical testing		lump sum		$5,000
Demolish buildings and dispose of off-property as non-hazardous waste		lump sum		$31,250
Furnish and place additional backfill in Office Building Basement	207	cy	$15.00	$3,105
Septic Tanks				
Testing of tank contents		lump sum		$2,500
Remove and dispose of tank contents	300	gal	$20.17	$6,051
Excavate soil to expose tank openings, grout full, backfill		lump sum		$2,500

TABLE 4-4A
OPINION OF PROBABLE COST
ALTERNATIVE 4A

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
Underground Storage Tank				
Excavate and remove tank from below-ground		lump sum		$10,000
Dispose of tank and associated wastes		lump sum		$775
Analytical testing of tank contents and soil		lump sum		$3,350
Monitoring and office wells				
Decommision wells		lump sum		$6,000
Institutional Controls				
Remove fence for construction and subsequently restore		lump sum		$15,000
Effect deed restrictions on property		lump sum		$2,000
TOTAL DIRECT COSTS				$454,382
INDIRECT CAPITAL COSTS:				
Engineering and Permitting @ 25% of Total Direct Costs				$113,596
Contingency @ 25% of Total Direct Costs				$113,596
TOTAL INDIRECT COSTS				$227,191
TOTAL CAPITAL COSTS				$681,573
O&M COSTS:				
Groundwater monitoring - 9 wells on an annual basis Sampling and analysis by EPA method 8080	1	event	$7,500	$7,500
Turf maintenance		lump sum		$2,000
Routine facility inspection - quarterly	4	event	$200	$800
Miscellaneous repairs		lump sum		$1,000
TOTAL ANNUAL O&M COSTS				$11,300
PRESENT WORTH COSTS:				
Present worth of annual O&M costs, 5% discount rate over 5 years				$48,752
Total capital costs				$681,573
TOTAL PRESENT WORTH				$730,325
			Say	$730,000

TABLE 4-4B
OPINION OF PROBABLE COST
ALTERNATIVE 4B

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
DIRECT CAPITAL COSTS:				
Overall Site				
Excavate contaminated soil from off-property areas	203	cy	$5.00	$1,015
Backfill off-prop. excavated areas with clean topsoil	203	cy	$15.00	$3,045
Off-property confirmation sampling	8	ea.	$250.00	$2,000
Place and grade specific off-property excavated fill.	201	cy	$6.00	$1,206
Furnish and install 12" topsoil cover layer	130	cy	$30.00	$3,900
Furnish and install separation fabric	3,500	sf	$0.20	$700
Furnish and install 6" topsoil cover layer	565	cy	$30.00	$16,950
Establish vegetative cover	37	1000 sf	$38.00	$1,406
Excavate soil in pit area	11	cy	$15.00	$165
Backfill pit with clean fill	9	cy	$15.00	$135
On-property confirmation sampling	20	ea.	$250.00	$5,000
Excavate soil in 4 target areas	22	cy	$15.00	$334
Off-property disposal of pit and target area soil as hazardous waste (incineration)	50	ton	$1,400.00	$69,921
Buildings				
Containerize residual product and vacuum slabs	10	40 gal drm.	$975.00	$9,750
Disposal of drummed residual product and waste	10	40 gal drm.	$800.00	$8,000
Decontaminate buildings		lump sum		$16,500
Disposal of drummed decon. generated waste	17	40 gal drm.	$800.00	$13,600
Analytical testing		lump sum		$5,000
Demolish buildings and dispose of off-property as non-hazardous waste		lump sum		$31,250
Furnish and place additional backfill in Office Building Basement	207	cy	$15.00	$3,105

TABLE 4-4B
OPINION OF PROBABLE COST
ALTERNATIVE 4B

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
Septic Tanks				
Testing of tank contents		lump sum		$2,500
Remove and dispose of tank contents	300	gal	$20.17	$6,051
Excavate soil to expose tank openings, grout full, backfill		lump sum		$2,500
Underground Storage Tank				
Excavate and remove tank from below-ground		lump sum		$10,000
Dispose of tank and associated wastes		lump sum		$775
Analytical testing of tank contents and soil		lump sum		$3,350
Monitoring and office wells				
Decommision wells		lump sum		$6,000
Institutional Controls				
Disassemble and remove fence from site		lump sum		$7,500
Effect deed restrictions on property		lump sum		$2,000
TOTAL DIRECT COSTS				$233,658
INDIRECT CAPITAL COSTS:				
Engineering and Permitting @ 25% of Total Direct Costs				$58,415
Contingency @ 25% of Total Direct Costs				$58,415
TOTAL INDIRECT COSTS				$116,829
TOTAL CAPITAL COSTS				$350,487

TABLE 4-4B
OPINION OF PROBABLE COST
ALTERNATIVE 4B

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
O&M COSTS:				
Groundwater monitoring - 9 wells on an annual basis Sampling and analysis by EPA method 8080	1	event	$7,500	$7,500
Turf maintenance		lump sum		$2,000
TOTAL ANNUAL O&M COSTS				$9,500
PRESENT WORTH COSTS:				
Present worth of annual O&M costs, 5% discount rate over 5 years				$40,986
Total capital costs				$350,487
TOTAL PRESENT WORTH				$391,473
			Say	$391,000

techniques requiring no highly specialized equipment. Monitoring of the site following implementation will involve only standard well sampling techniques, and turf maintenance which can be accomplished using local resources.

4.3.4.8 Cost

The Capital, O&M and Present worth costs for Alternative 4A and Alternative 4B are presented in Table 4-4A and Table 4-4B, respectively.

- **Capital Costs**: The probable capital cost to construct and implement Alternative 4A is $682,000. The probable capital cost to construct and implement Alternative 4B is $350,000.

- **O&M Costs**: The probable annual operations, monitoring and maintenance cost for Alternative 4A is $11,300. The probable annual operations, monitoring and maintenance cost for Alternative 4B is $9,500.

- **Present Worth Cost**: Over a five year monitoring period, the probable net present worth for Alternative 4A is $730,000. The probable net present worth for Alternative 4B is $391,000, calculated using a 5% annual discount rate over the five year period.

4.3.5 Alternative 5: Excavation and Removal of Soil Exceeding SCGs

4.3.5.1 Description

This alternative involves all of the elements of Alternative 1 (with fence removal) plus the excavation and off-site disposal of all soil exceeding SCGs. The volume of soil to be excavated for this alternative is approximately 3,900 cy. Following excavation, the area will be backfilled and a vegetative cover established. The excavated soil will be disposed of in a permitted treatment and/or disposal facility.

4.3.5.2 Overall Protection of Human Health and the Environment

Alternative 5 provides overall protection of human health and the environment in accordance with the RAOs for the former Abalene Pest Control site.

4.3.5.3 Compliance with SCGs and TCLs

Alternative 5 will comply with all SGCs and TCLs by removing all soils which exceed NYSDEC TAGM values and TCLs.

4.3.5.4 Short-term Effectiveness

Community Protection

During the construction period of this Alternative, standard construction procedures to limit airborne transport of soil will be employed to protect the surrounding residences from exposure to the site contaminants. Due to the increased excavation in areas of high concentration, the risk of airborne contamination will be higher than alternatives without excavation. A perimeter monitoring program will be developed to ensure that unacceptable levels of contaminants are not being released by the construction of this alternative.

Worker Protection

Implementation of this alternative will be undertaken using standard procedures for worker protection including the establishment of a Health and Safety Plan which addresses the specific issues pertaining to construction of the alternative and the appropriate protective measures which should be taken. All of the elements of this alternative employ common construction procedures for which established health and safety procedures have been developed.

Environmental Impacts

Construction of this alternative will have a negligible impact on the environment. Control measures to mitigate construction impacts on off-site residences will also mitigate impacts on the local environment. The environmental risk assessment indicated that the site and the surrounding area are unremarkable in terms of habitat, flora, and fauna, and that no special measures were needed to prevent adverse impacts.

Time Required to Implement

This alternative will require approximately three months to implement following the start of construction.

4.3.5.5 Long-term Effectiveness and Permanence

The long-term effectiveness and permanence of this alternative is complete since all of the contaminants will be removed from the site.

TABLE 4-5
OPINION OF PROBABLE COST
ALTERNATIVE 5

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
DIRECT CAPITAL COSTS				
Overall Site				
Excavate contaminated soil from off-property	201	cy	$5.00	$1,005
Dispose of excavated soil at a hazardous waste facility	201	cy	$300.00	$60,300
Backfill excavated off-property areas with clean topsoil	429	cy	$15.00	$6,435
Off-property confirmation sampling	14	ea.	$250.00	$3,500
Excavate soil from edge of cover area	355	cy	$5.00	$1,775
Dispose of excavated soil at a hazardous waste facility	355	cy	$300.00	$106,500
Backfill excavated areas near edge of cover with clean soil	355	cy	$15.00	$5,325
Edge of cover confirmation sampling	7	ea.	$250.00	$1,750
Excavate contaminated soil from on-property	3,300	cy	$5.00	$16,500
On-property soil excavation shoring/sheeting		lump sum		$46,000
Dispose of excavated soil as haz-waste (incineration)	4,950	ton	$1,400.00	$6,930,000
Backfill on-property excavated areas with clean soil	3,300	cy	$15.00	$49,500
On-property confirmation sampling	15	ea.	$250.00	$3,750
Furnish and install 4" topsoil cover layer	473	cy	$30.00	$14,190
Establish vegetative cover	53.3	1000 sf	$38.00	$2,025
Buildings				
Containerize residual product and vacuum slabs	10	40 gal drm.	$975.00	$9,750
Disposal of drummed residual product and waste	10	40 gal drm.	$800.00	$8,000
Decontaminate buildings		lump sum		$16,500
Disposal of drummed decon. generated waste	17	40 gal drm.	$800.00	$13,600
Analytical testing		lump sum		$5,000

TABLE 4-5
OPINION OF PROBABLE COST
ALTERNATIVE 5

Demolish buildings and dispose of off-property as non-hazardous waste		lump sum		$31,250
Furnish and place additional backfill in Office Building Basement	207	cy	$15.00	$3,105
Septic Tanks				
Analytical testing of tank contents		lump sum		$2,500
Remove and dispose of tank contents	300	gal	$20.17	$6,051
Excavate soil to expose tank openings, grout full, backfill		lump sum		$2,500
Underground Storage Tank				
Excavate and remove tank from below ground		lump sum		$10,000
Dispose of tank and associated wastes		lump sum		$775
Analytical testing of tank contents and soil		lump sum		$3,350
Monitoring and Office Wells				
Decommission wells		lump sum		$6,000
Institutional Controls				
Effect deed restrictions on property		lump sum		$2,000
Disassemble and remove fence from site		lump sum		$7,500
TOTAL DIRECT COSTS				$7,376,436
INDIRECT CAPITAL COSTS:				
Engineering and Permitting @ 25 % of Total Direct Costs				$1,844,109
Contingency @ 25 % of Total Direct Costs				$1,844,109
TOTAL INDIRECT COSTS				$3,688,218
TOTAL CAPITAL COSTS				$11,064,655
O&M COSTS:				
Groundwater monitoring - 9 wells on an annual basis				
Sampling and analysis by EPA method 8080	1	event	$7,500	$7,500
Turf maintenance		lump sum		$2,000
TOTAL ANNUAL O&M COSTS				$9,500

TABLE 4-5 OPINION OF PROBABLE COST ALTERNATIVE 5	
PRESENT WORTH COSTS:	
Present worth cost of annual O&M costs, 5% discount rate over 5 years	$40,986
Total capital costs	$11,064,655
TOTAL PRESENT WORTH	$11,105,640
Say	$11,106,000

supplies has been interrupted by the installation and maintenance of activated carbon filters and the supply of bottled water to the surrounding residences. This program will continue in consultation with the NYSDOH. On a case-by-case basis, if the NYSDOH determines that a route of potential exposure is not present, then this program may be terminated. The RAOs for the site indicate that the potential exposure pathway for contact with soil should be interrupted to protect human health. The five alternatives presented provide varying degrees of remedial action for accomplishing this objective on the site. The limited action alternative addresses a number of ancillary concerns on the site such as the buildings and the underground storage tanks in addition to providing for a limited vegetative cover over the site. This alternative, alone, does not fully meet the RAOs. All of the remaining alternatives include the components of the limited action alternative.

Alternative 2, the capping alternative, provides additional remediation sufficient to meet the RAOs by preventing contact with the soil. Four capping options are examined: topsoil, asphaltic, part 360, and partial-site part 360. Alternatives 3 and 4 provide not only a soil cap to prevent exposure by contact, but additional treatment of the more contaminated soils in the former disposal pit area (Alternatives 4A and 4B) and targeted surface soils (Alternative 4B). Alternative 3 involves stabilization of these soils and Alternative 4 provides for removal and off-site disposal of some soils. Alternative 5 provides for removal and off-site treatment and disposal of all soils which exceed SCGs.

4.4.2 Adequacy of the Alternatives to Meet the RAOs

With the exception of the Limited Action alternative, all of the remaining alternatives will be adequate to meet the RAOs, which are to prevent potential human contact with contaminated soils.

Some of the alternatives provide for additional protection beyond the level of the RAOs. Alternatives 3 and 4 provide for direct treatment, either by solidification or excavation and off-site disposal, of the highest levels of pesticides/herbicides in the former disposal pit area. Alternative 5 provides for off-site disposal of all soils which exceed NYSDEC TAGM values. While all of the capping alternatives provide for decreased infiltration by virtue of improved drainage and evapotranspiration from the vegetation, Alternatives 2B and 2C provide for practically eliminating infiltration through the installation of an impervious barrier as part of the cover system. For Alternative 2B this is the asphaltic surface and for Alternative 2C it is the geomembrane cap. With proper

maintenance, the integrity of either of these caps will be preserved to a level that will essentially eliminate infiltration on the site. Alternative 2D provides a virtually impervious barrier in the area of the former disposal pit. It should be noted, however, that groundwater is not a media addressed by the RAOs since adequate steps have already been taken to prevent human contact with or ingestion of the site contaminants via groundwater.

4.4.3 Implementability

With the possible exception of in-situ stabilization, all of the elements of all of the alternatives are readily implementable using locally available resources. All of the technologies are well tested, and the health and safety concerns of each method are readily addressed. In-situ stabilization requires some large specialized equipment which is not locally available and has a substantial mobilization cost. In fact, the mobilization cost for this project will be considerably greater than the actual treatment cost because of the small quantity of material that will be treated on this site. Ex-situ stabilization requires less specialized equipment and is much easier to implement.

4.4.4 Cost

Table 4-6 shows the calculated present worth cost of each of the alternatives.

TABLE 4-6

SUMMARY OF PRESENT WORTH
COSTS FOR ALTERNATIVES

Alternative	Total Present Worth
1	$262,000
2A	$301,000
2B	$386,000
2C	$353,000
2D	$290,000
3A	$413,000

TABLE 4-6 (Continued)

SUMMARY OF PRESENT WORTH
COSTS FOR ALTERNATIVES

Alternative	Total Present Worth
3B	$346,000
4A	$730,000
4B	$391,000
5	$11,106,000

Of those alternatives which meet the RAOs, Alternative 2D, the consolidation and capping of soils in the area of the former pit is the least expensive, followed by Alternative 2A, the soil cap. The most expensive is the off-property disposal of all soils which exceed SCGs (Alternative 5), followed by the off-property disposal of pit area soils (Alternative 4A). The post-closure operation and maintenance costs are very similar for all but Alternative 5 which is lower due to the complete removal of soils exceeding NYSDEC TAGM values. The differences in cost reflect primarily the differences in the capital cost of constructing the remedial alternative.

5.0 RECOMMENDED REMEDIAL ALTERNATIVE

The remedial alternative selected for the former Abalene Pest Control site should meet the RAO for the site of interrupting the potential exposure pathway to soils which exceed the TCLs developed in the Health Risk Assessment. This Feasibility Study Report has evaluated a range of remedial alternatives including Limited Action and Alternatives which can achieve this RAO. Based on the evaluation of the remedial alternatives, Alternative 4B can achieve this RAO in the most cost-effective manner. Based on the approved Health Risk Assessment, Alternative 5 which has an estimated cost which is orders of magnitudes more costly than the other alternatives is not necessary to protect human health. Alternative 5 provides for the excavation and off-site disposal of soils exceeding the SCGs. These SCGs are based on a partitioning model included in the NYSDEC TAGM 4046. Empirical data for the site, including analytical results for soil and groundwater samples, indicate that the vertical leaching of chemicals is limited and that potential environmental risks are adequately addressed by Alternatives 2 through 4. Alternative 4A, which includes complete excavation of the former disposal pit area, is more than twice as costly as Alternative 4B and would not provide a significantly higher level of protection. Although more costly than Alternatives 2A and 2D, Alternative 4B provides a higher level of protection because it includes off-site disposal of the on-property soils which contain the highest concentrations of pesticides/herbicides.

When implemented, Alternative 4B will meet all the RAOs by the excavation of off-site soils in exceedance of the TCLs and placement on-property. In addition to the excavation of these soils, Alternative 4B includes the excavation and off-property disposal of the upper two feet of soil from below the existing cap on the former disposal pit, and the placement of "hot" spot soils in the vicinity of soil boring B-1, B-3 and B-17 beneath the geotextile layer in the northeast corner of the property.

The combination of all these actions will meet the RAOs and will be protective of human health and the environment. Based on the analysis contained in this Feasibility Study Report, Alternative 4B is the recommended remedial alternative.

All of the elements included in Alternative 4B are shown below:

- Institutional controls: Deed restrictions.
- Removal of fencing.
- Abandonment of on-property wells.
- Grouting in-place of the septic tanks.
- Excavation and removal of the underground gas tank.
- Decontamination, demolition, and off-site disposal of the above-grade building structures.
- Excavation and off-site disposal of the upper two feet of soil from the former disposal pit.
- Excavation and off-site disposal of surface soils from four on-property "hot spot" areas.
- Excavation of off-property surface soils along the northeastern property boundary and placement of these soils in the area of the former disposal pit.
- Excavation and on-site placement of off-site soils from outside the northwest and south property boundaries. Additional radial "spot" excavations from the areas of WSS-4, WSS-6 and RRSS-2 would be performed similarly.
- Placement of a geotextile over the northeastern portion of the site and capping this area with one foot of topsoil.
- Placement of one-half foot of topsoil over the remainder of the property.
- Vegetate the topsoil cap.

As discussed in Section 4, implementation of these GRAs, in combination with ongoing inspection and maintenance, provides for the overall protection of human health and the environment by limiting exposure to soils on and off the property which contain the highest levels of pesticides/herbicides and which may contain pesticides/herbicides in excess of the TCLs.

6.0 REFERENCES

C.T. Male, 1987, Survey Map.

HSWMR, 1994, Risk Assessment for Soils and Groundwater, Abalene Pest Control, Moreau, New York.

Malcolm Pirnie, Inc., 1993, Interim Report and Supplement Sampling and Analysis Plan, Abalene Pest Control, Moreau, New York.

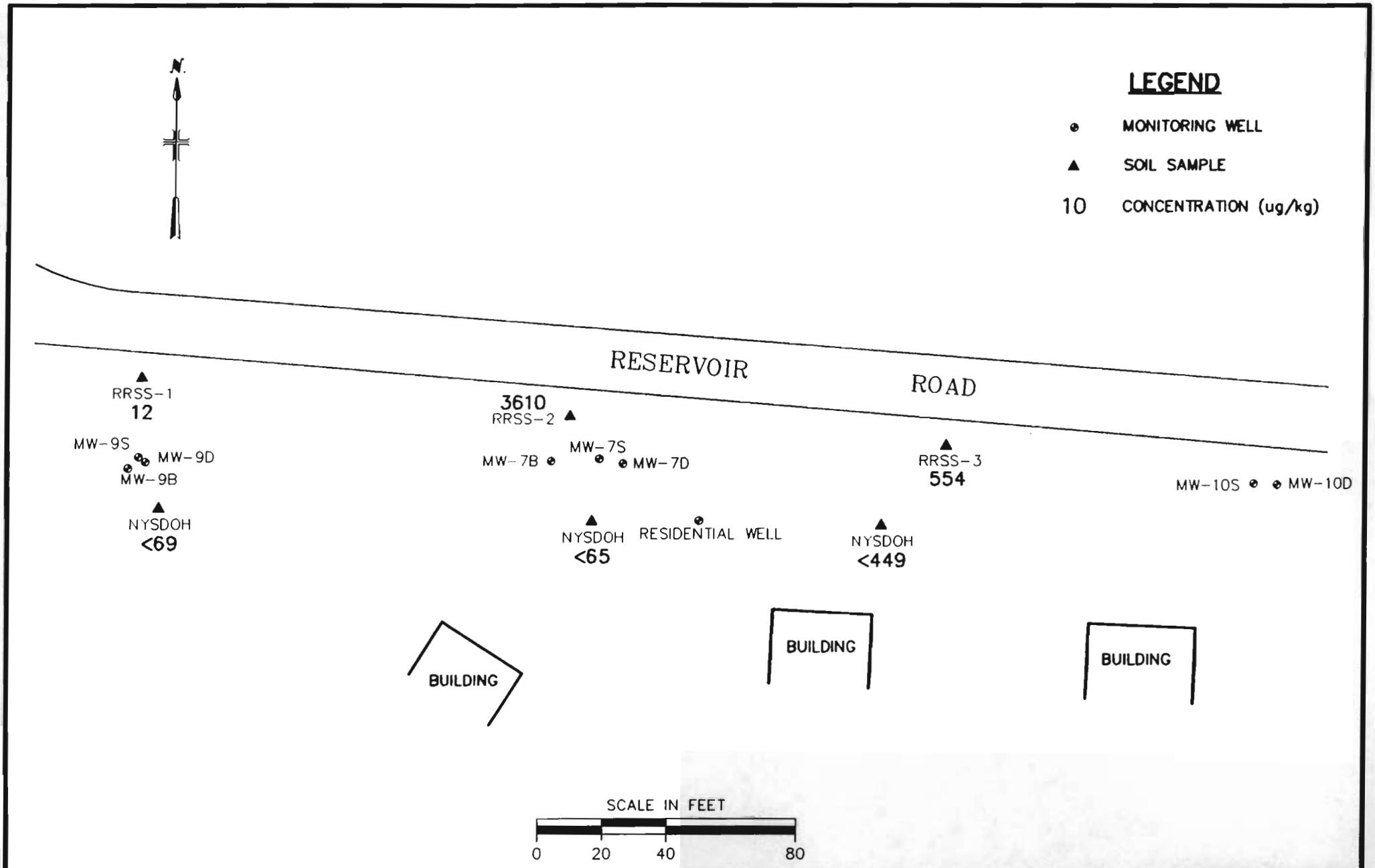
Malcolm Pirnie, Inc., 1993, Revised Supplemental Sampling and Analysis Plan, Abalene Pest Control, Moreau, New York.

Malcolm Pirnie, Inc., 1993, Final Site Investigations Report, Abalene Pest Control, Moreau, New York.

USEPA, 1993, SITE Program Technology Profiles, Office of Research and Development, Risk Reduction Laboratories, Cincinnati, Ohio. EPA/540/R-93/526.

APPENDIX A

NYSDOH Residential Soil Sampling Results



MALCOLM PIRNIE

ABALENE PEST CONTROL
MOREAU, NEW YORK

OFF-PROPERTY SURFACE SOIL SAMPLES, SOUTH OF RESERVOIR RD.

MARCH 1995

STATE OF NEW YORK
DEPARTMENT OF HEALTH

Office of Public Health

11 University Place Albany, New York 12203-3399

Barbara A. DeBuono, M.D., M.P.H.
Commissioner

Karen Schimke
Executive Deputy Commissioner

March 6, 1995

Mr. & Mrs. Everett Williams
P.O. Box 1493
South Glens Falls, NY 12803

RE: Abalene Orkin Pest Control
Moreau, Saratoga County
Site #546035

Dear Mr. & Mrs. Williams:

The results of the analysis of the soil samples that I collected from your property on September 21, 1995 are enclosed. The laboratory detected low concentrations of pesticides, which present minimal risk and do not necessitate any precautions on your part. Also enclosed is a sheet that should help you interpret the laboratory report form.

I collected the samples in response to concerns expressed about the possibility that pesticide contamination extended onto your property from the Abalene - Orkin site which is across Reservoir Road. The sample was analyzed for organochlorine pesticides, which are found at Abalene - Orkin, and can be a concern for human exposure because of their persistence in the environment. The laboratory detected five pesticides in the sample from your yard: DDE at 8 mcg/kg PL, DDD at 8 mcg/kg PL, DDT at 8 mcg/kg PL, Dieldrin at 3 mcg/kg PL, and Chlordane at 38 mcg/kg. Mcg/kg is an abbreviation for micrograms per kilogram, which is equal to parts per billion. The notation PL indicates that the laboratory detected the compounds but at a level that was too low to record a specific value. The PL notation means, "present but less than the stated concentrations."

The concentrations we found are within the range of background levels in developed areas. Because of the widespread use of these compounds it is common to find small amounts of them in soils. The soils found on your property present no more threat to human health than any typical residential soil.

Please call me at (800) 458-1158 ext. 306 if you have any questions.

Sincerely,

Robert Montione
Public Health Specialist II (Environment)
Bureau of Environmental Exposure
Investigation

STATE OF NEW YORK
DEPARTMENT OF HEALTH

Office of Public Health 11 University Place Albany, New York 12203-3399

Barbara A. DeBuono, M.D., M.P.H.
Commissioner

Karen Schimke
Executive Deputy Commissioner

March 6, 1995

Mr. & Mrs. Chester Sanders
246 Resevoir Rd.
Ft. Edward, NY 12828

RE: Abalene Orkin Pest Control
Moreau, Saratoga County
Site #546035

Dear Mr. & Mrs. Sanders:

The results of the analysis of the soil samples that I collected from your property on September 21, 1995 are enclosed. The laboratory detected low concentrations of pesticides, which present minimal risk and do not necessitate any precautions on your part. Also enclosed is a sheet that should help you interpret the laboratory report form.

I collected the samples in response to concerns expressed about the possibility that pesticide contamination extended onto your property from the Abalene - Orkin site which is across Reservoir Road. The sample was analyzed for organochlorine pesticides, which are found at Abalene - Orkin, and can be a concern for human exposure because of their persistence in the environment. The laboratory detected five pesticides in the sample from your yard: DDE at 8 mcg/kg PL, Heptachlor Epoxide at 8.0 mg/Kg PL, DDT at 20 mcg/kg, Dieldrin at 3 mcg/kg PL, and Chlordane at 410 mcg/kg. Mcg/kg is an abbreviation for micrograms per kilogram, which is equal to parts per billion. The notation PL indicates that the laboratory detected the compounds but at a level that was too low to record a specific value. The PL notation means, "present but less than the stated concentrations."

The concentrations we found are within the range of background levels in developed areas. Because of the widespread use of these compounds it is common to find small amounts of them in soils. The soils found on your property present no more threat to human health than any typical residential soil.

Please call me at (800) 458-1158 ext. 306 if you have any questions.

Sincerely,

Robert Montione
Public Health Specialist II (Environment)
Bureau of Environmental Exposure
Investigation

STATE OF NEW YORK
DEPARTMENT OF HEALTH

Office of Public Health 11 University Place Albany, New York 12203-3399

Barbara A. DeBuono, M.D., M.P.H.
Commissioner

Karen Schimke
Executive Deputy Commissioner

March 6, 1995

Mr. W.J. Rourke
10264 Saratoga Road
Fort Edward, NY 12828

RE: Abalene Orkin Pest Control
Moreau, Saratoga County
Site #546035

Dear Mr. Rourke:

The results of the analysis of the soil samples that I collected from your property on September 21, 1995 are enclosed. The laboratory detected low concentrations of pesticides, which present minimal risk and do not necessitate any precautions on your part. Also enclosed is a sheet that should help you interpret the laboratory report form.

I collected the samples in response to concerns expressed about the possibility that pesticide contamination extended onto your property from the Abalene - Orkin site which is across Reservoir Road. The sample was analyzed for organochlorine pesticides, which are found at Abalene - Orkin, and can be a concern for human exposure because of their persistence in the environment. The laboratory detected five pesticides in the sample from your yard: DDE at 8 mcg/kg PL, DDD at 8 mcg/kg PL, DDT at 15 mcg/kg, Dieldrin at 3 mcg/kg PL, and Chlordane at 35 mcg/kg. Mcg/kg is an abbreviation for micrograms per kilogram, which is equal to parts per billion. The notation PL indicates that the laboratory detected the compounds but at a level that was too low to record a specific value. The PL notation means, "present but less than the stated concentrations."

The concentrations we found are within the range of background levels in developed areas. Because of the widespread use of these compounds it is common to find small amounts of them in soils. The soils found on your property present no more threat to human health than any typical residential soil.

Please call me at (800) 458-1158 ext. 306 if you have any questions.

Sincerely,

Robert Montione
Public Health Specialist II (Environment)
Bureau of Environmental Exposure
Investigation

APPENDIX B

Immunoassay Surface Soil Sampling Results

Twenty-two surface soil samples were collected on April 21, 1995 for the immunoassay analysis of DDT and Chlordane. The surface soil samples, whose locations were surveyed and are shown on the following Figure, were collected from 0 to 6 inches below ground surface. Where gravels were present on the ground surface, the gravels were removed with a shovel to expose the native soils below. Each sample was collected with a decontaminated stainless steel scoop and homogenized in a decontaminated stainless steel bowl. Samples were placed in jars and transported and stored according to chain-of-custody procedures. The samples were stored at 4°C until analysis.

The samples were analyzed on April 26, 1995 for DDT and Chlordane using SW-846 methods 4042 and 4041, respectively. Millipore EnviroGard™ Soil Test Kits were used for the immunoassay analyses. Duplicate samples were analyzed for the purposes of determining the reproducibility of the analytical data and aiding in determining the quality of the data being produced. Soil extracts were diluted 1:10 for the analysis of Chlordane to measure within the range of the Chlordane standards (0 to 600 ppb). The concentrations have been adjusted accordingly (multiplied by 10) to reflect this dilution.

The following Tables and Figure present the concentration ranges detected in the soil samples.

ABALENE PEST CONTROL
CONCENTRATION OF DDT IN SURFACE SOILS
IMMUNOASSAY ANALYSIS, April, 1995

SAMPLE #	BATCH #	RUN 1 OPTICAL DENSITY	RUN 2 OPTICAL DENSITY	DDT CONCENTRATION RANGE (mg/kg)
B-6 NORTH	2	0.67	0.69	>10
B-6 SOUTH	2 (2)	0.8 (0.59)	0.79 (0.59)	>10 (>10)
B-6 EAST	2	0.5	0.49	>10
B-6 WEST	2	1.07	1.04	1-10
B-9 NORTH	1	0.17	0.17	>10
B-9 SOUTH	2	0.53	0.5	>10
B-9 EAST	1 (1)	1.16 (0.91)	1.13 (0.89)	0 - 1 (1 - 10)
B-9 WEST	1	0.26	0.26	>10
LSS4-NORTH	2	0.51	0.52	>10
LSS4-SOUTH	2	1.21	1.16	0.2 - 1
LSS4-EAST	2	0.78	0.83	>10 / 1-10
LSS4-WEST	1 (1)	0.43 (0.65)	0.44 (0.65)	>10 (1 - 10)
WEST 1	1	1.47	1.41	0 - 0.2
WEST 2	1	1.45	1.39	0 - 0.2
WEST 3	2 (2)	1.48 (1.31)	1.47 (1.28)	0.2 - 1 (0.2 - 1)
WEST 4	1	1.4	1.37	0 - 0.2
WEST 5	2	1.66	1.61	0 - 0.2
WEST 6	1 (1)	1.37 (1.22)	1.32 (1.18)	0 - 0.2 (0 - 0.2)
WEST 7	1	1	0.97	1 / 1-10
WEST 8	1	1.02	0.99	0.2 - 1
WEST 9	2 (2)	1.02 (1.05)	0.99 (1.03)	1 - 10 (1 - 10)
WEST 10	1	1.57	1.51	0 - 0.2
0 ppm STANDARD	1	1.63	1.57	0
0.2 ppm STANDARD	1	1.17	1.12	0.2
1.0 ppm STANDARD	1	1	0.98	1
10.0 ppm STANDARD	1	0.62	0.56	10
0 ppm STANDARD	2	1.82	1.78	0
0.2 ppm STANDARD	2	1.5	1.48	0.2
1.0 ppm STANDARD	2	1.14	1.1	1
10.0 ppm STANDARD	2	0.85	0.82	10

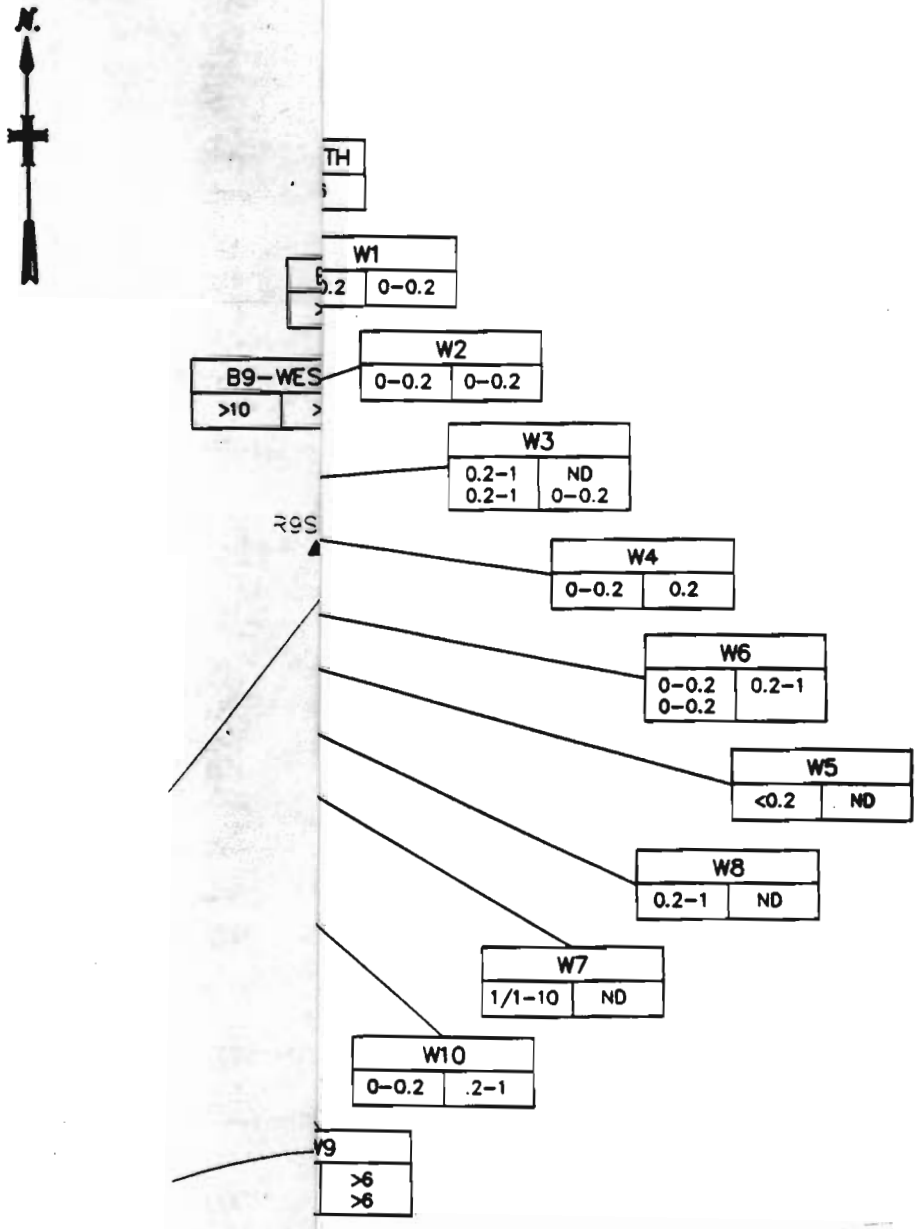
( ) Indicates values for a duplicate sample.

f:\p\1368012\ddt

ABALENE PEST CONTROL
CONCENTRATION OF CHLORDANE IN SURFACE SOILS
IMMUNOASSAY ANALYSIS, April, 1995

SAMPLE #	BATCH #	RUN 1 OPTICAL DENSITY	RUN 2 OPTICAL DENSITY	CHLORDANE CONCENTRATION RANGE (mg/kg)*
B-6 NORTH	1	0.34	0.34	1 - 6
B-6 SOUTH	1 (2)	0.03 (0.03)	0.03 (0.03)	>6 (>6)
B-6 EAST	2	0.42	0.41	1 - 6
B-6 WEST	1	0.38	0.38	1 - 6
B-9 NORTH	1	0.02	0.03	>6
B-9 SOUTH	2	0.22	0.24	>6
B-9 EAST	2 (2)	0.32 (0.43)	0.31 (0.43)	>6 (1 - 6)
B-9 WEST	2	0.05	0.07	>6
LSS4-NORTH	2	0.08	0.08	>6
LSS4-SOUTH	1	0.81	0.78	0.2 - 1
LSS4-EAST	2	0.6	0.6	1 - 6
LSS4-WEST	1 (1)	0.02 (0.02)	0.02 (0.04)	>6 (>6)
WEST 1	2	1.47	1.46	0 - 0.2
WEST 2	2	1.48	1.46	0 - 0.2
WEST 3	1 (2)	1.45 (1.53)	1.47 (1.54)	ND (0 - 0.2)
WEST 4	1	1.16	1.14	0.2 / 0 - 0.2
WEST 5	2	1.66	1.64	ND
WEST 6	1	1.05	1.01	0.2 - 1
WEST 7	2	1.65	1.68	ND
WEST 8	1	1.38	1.34	ND
WEST 9	1 (1)	0.22 (0.26)	0.21 (0.30)	>6 (>6)
WEST 10	1	1.11	1.09	0.2 - 1
0 ppb STANDARD	1	1.37	1.33	0
20 ppb STANDARD	1	1.16	1.11	0.02
100 ppb STANDARD	1	0.62	0.61	0.1
600 ppb STANDARD	1	0.32	0.32	0.6
0 ppb STANDARD	2	1.61	1.59	0
20 ppb STANDARD	2	1.27	1.21	0.02
100 ppb STANDARD	2	0.86	0.83	0.1
600 ppb STANDARD	2	0.41	0.4	0.6

( ) Indicates values for a duplicate sample.
* Samples were diluted 1:10 to measure within the range of the standards.
The concentrations listed have been adjusted (multiplied by 10) to reflect this dilution.



LEGEND

- MONITORING WELL
- SOIL BORING
- SURFACE SOIL SAMPLE
- IMMUNOASSAY SURFACE SOIL SAMPLE
- UTILITY POLE

3705 : 1368012900\I: \ACAD\PROJ\1368129\1368 /0 SCALE: 1:40i 04/27, 1995 at 15:55

MALCOLM PIRNIE

APPENDIX C

Summary of Compounds Detected in Residential Well Samples

ABALENE PEST CONTROL
SITE NO. 546035 MOREAU, NY
SUMMARY OF COMPOUNDS DETECTED IN RESIDENTIAL WELL SAMPLES

Name	Homes With GAC Filters	Date	Analyzed By			Endo-Sulfan Sulfate µg/l	BHC Beta µg/l	BHC gamma µg/l	BHC delta µg/l	Chlor-dane µg/l	DDD µg/l	DDE µg/l	DDT µg/l	2,4-D µg/l	Hepta-chlor µg/l	Aldrin µg/l	Hepta-chlor Epoxide µg/l	Silvex 2,4,5-TP µg/l	Meth-oxychlor µg/l	2,4,5-T µg/l	Dursban µg/l
La Pier	X	4/3/87	DOH				0.03	0.23													
		5/20/87	DOH					0.37													
			Swanson				0.2	0.3													
		7/30/87	DOH					0.55													
		8/11/87	Swanson				0.05	0.6		0.1	0.07	0.04			0.02						
		4/28/88	Swanson					0.7								0.2					
		6/6/88	Swanson					0.62							0.14	0.32					
		6/9/88	DOH				0.15	0.42								0.26					
		7/14/88	Swanson					0.76								0.48					
		12/8/88	Swanson					0.2													
		10/27/89	DOH					0.12													
		12/6/89	Swanson					0.1													
		4/26/90	Swanson					0.17													
		5/30/91	Swanson	Nothing detected in sample		<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.20	<0.15	<0.05	<0.05	<0.05	<0.15	<0.05		
		6/18/92	Swanson	Nothing detected in sample		<0.01	<0.01	<0.01	<0.01	<0.07	<0.01	<0.01	<0.01	<0.10	<0.01	<0.01	<0.01	<0.06	<0.05		
		11/4/93	Pace	Nothing detected in sample		<0.68	<0.06	<0.04	<0.09	<0.14	<0.11	<0.04	<0.12	<12	<0.03	<0.04	<0.86	<1.7	<1.8	<2.0	
		11/4/93	DOH	Nothing detected in sample		<0.05	<0.04	<0.04	<0.04	<0.1	<0.05	<0.05	<0.05	<1.0	<0.05	<0.02	<0.05	<0.2	<0.5		
		5/19/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		8/31/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		3/7/95	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				

* = Present below reportable value

ABALENE PEST CONTROL
SITE NO. 546035 MOREAU, NY
SUMMARY OF COMPOUNDS DETECTED IN RESIDENTIAL WELL SAMPLES

Name	Homes With GAC Filters	Date	Analyzed By			Endo-Sulfan Sulfate µg/l	BHC Beta µg/l	BHC gamma µg/l	BHC delta µg/l	Chlor-dane µg/l	DDD µg/l	DDE µg/l	DDT µg/l	2,4-D µg/l	Hepta-chlor µg/l	Aldrin µg/l	Hepta-chlor Epoxide µg/l	Silvex 2,4,5-TP µg/l	Meth-oxychlor µg/l	2,4,5-T µg/l	Dursban µg/l
Rourke	X	4/3/87	DOH			0.05				0.55											
(Old Well)		5/20/87	DOH						0.04 *	0.16											
			Swanson							0.3											
		6/22/87	Swanson	Nothing detected in sample																	
		7/30/87	DOH							0.2											
		8/11/87	Swanson							0.56	0.03	0.03			0.27						
		9/25/87	DOH				0.04 *		0.04 *					0.5			0.05 *				
		4/28/88	Swanson	Nothing detected in sample																	
		6/6/88	Swanson							0.48						0.01	0.04				
		6/9/88	DOH							0.42							0.05 *				
		7/14/88	Swanson	Nothing detected in sample																	
		12/8/88	Swanson	Nothing detected in sample																	
		3/22/89	Swanson	Nothing detected in sample																	
		10/27/89	DOH						0.04								0.05				
		12/6/89	Swanson	Nothing detected in sample																	
		4/26/90	Swanson	Nothing detected in sample																	
		5/30/91	Swanson			<0.05	<0.05	<0.05	<0.05	0.3	<0.10	<0.10	<0.20	<0.15	<0.05	<0.05	0.05	<0.15	<0.05		
		5/30/91	DOH	Nothing detected in sample																	
		6/18/92	Swanson	Nothing detected in sample		<0.01	<0.01	<0.01	<0.01	<0.07	<0.01	<0.01	<0.01	<0.10	<0.01	<0.01	<0.01	<0.06	<0.05		
		11/4/93	Pace			<0.67	<0.06	<0.04	<0.09	<0.14	<0.11	<0.04	<0.12	2.6J	<0.03	<0.04	<0.84	<1.7	<1.8	<2.0	
		11/4/93	DOH			<0.05	<0.04	<0.04	<0.04	0.67	<0.05	<0.05	<0.05	<1.0	<0.05	<0.02	<0.05	<0.2	<0.5		
(New Well)	X	1/26/94	Pace	Nothing detected in sample		<0.075	<0.007	<0.004	<0.01	<0.015	<0.012	<0.004	<0.014		<0.003	<0.004	<0.09		<0.2		
		1/26/94	DOH	Nothing detected in sample																	
		5/19/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		8/31/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		12/1/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		3/7/95	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				

* = Present below reportable value

ABALENE PEST CONTROL
SITE NO. 546035 MOREAU, NY
SUMMARY OF COMPOUNDS DETECTED IN RESIDENTIAL WELL SAMPLES

Name	Homes With GAC Filters	Date	Analyzed By		Endo-Sulfan Sulfate µg/l	BHC Beta µg/l	BHC gamma µg/l	BHC delta µg/l	Chlor-dane µg/l	DDD µg/l	DDE µg/l	DDT µg/l	2,4-D µg/l	Hepta-chlor µg/l	Aldrin µg/l	Hepta-chlor Epoxide µg/l	Silvex 2,4,5-TP µg/l	Meth-oxychlor µg/l	2,4,5-T µg/l	Dursban µg/l
Rossley	X	4/3/87	DOH						0.13											
(Deep Well)		5/20/87	DOH	Nothing detected in sample																
			Swanson	Nothing detected in sample																
		6/22/87	Swanson						0.09											
		7/30/87	DOH	Nothing detected in sample																
		8/11/87	Swanson						0.34	0.67	0.67	0.44		0.34						
		9/25/87	DOH	Nothing detected in sample																
		4/28/88	Swanson						1.6											
		6/6/88	Swanson						0.1											
		6/9/88	DOH	Nothing detected in sample											0.04 *					
		7/14/88	Swanson						0.1											
		12/8/88	Swanson	Nothing detected in sample																
		3/22/89	Swanson	Nothing detected in sample																
		10/27/89	DOH	Nothing detected in sample																
		12/6/89	Swanson	Nothing detected in sample																
		4/26/90	Swanson	Nothing detected in sample																
		5/30/91	Swanson		<0.05	<0.05	<0.05	<0.05	0.13	<0.10	<0.10	<0.20	<0.15	<0.05	<0.05	<0.05	<0.15	<0.05		
		6/18/92	Swanson		<0.01	<0.01	<0.01	<0.01	<0.07	<0.01	<0.01	<0.01	<0.10	<0.01	<0.01	0.05	<0.06	<0.05		
		11/4/93	Pace	Nothing detected in sample	<0.68	<0.06	<0.04	<0.09	<0.14	<0.11	<0.04	<0.12	<12	<0.03	<0.04	<0.85	<1.7	<1.8	<2.0	
		11/4/93	DOH	Nothing detected in sample	<0.05	<0.04	<0.04	<0.04	<0.1	<0.05	<0.05	<0.05	<1.0	<0.05	<0.02	<0.05	<0.2	<0.5		
		5/19/94	Buck	Nothing detected in sample	<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		8/31/94	Buck	Nothing detected in sample	<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		12/1/94	Buck	Nothing detected in sample	<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		3/7/95	Buck	Nothing detected in sample	<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
(Shallow Well)		4/3/87	DOH	Nothing detected in sample																
(Well Not Used		5/20/87	DOH	Nothing detected in sample																
For Drinking)			Swanson	Nothing detected in sample																
		6/22/87	Swanson						0.07											
		9/25/87	DOH	Nothing detected in sample																
		4/28/88	Swanson	Well Abandoned																

* = Present below reportable value

ABALENE PEST CONTROL
SITE NO. 546035 MOREAU, NY
SUMMARY OF COMPOUNDS DETECTED IN RESIDENTIAL WELL SAMPLES

Name	Homes With GAC Filters	Date	Analyzed By			Endo-Sulfan Sulfate µg/l	BHC Beta µg/l	BHC gamma µg/l	BHC delta µg/l	Chlor-dane µg/l	DDD µg/l	DDE µg/l	DDT µg/l	2,4-D µg/l	Hepta-chlor µg/l	Aldrin µg/l	Hepta-chlor Epoxide µg/l	Silvex 2,4,5-TP µg/l	Meth-oxychlor µg/l	2,4,5-T µg/l	Dursban µg/l
Lord	X	4/3/87	DOH				0.04	0.04													
		5/20/87	DOH	Nothing detected in sample																	
			Swanson	Nothing detected in sample																	
		6/22/87	Swanson	Nothing detected in sample																	
		7/30/87	DOH						0.04												
		9/25/87	DOH															0.1 *			
		6/9/88	DOH													0.03					
		10/27/89	DOH	Nothing detected in sample																	
		12/6/89	Swanson	Nothing detected in sample																	
		4/26/90	Swanson	Nothing detected in sample																	
		5/30/91	Swanson	Nothing detected in sample		<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.20	<0.15	<0.05	<0.05	<0.05	<0.15	<0.05		
		5/30/91	DOH	Nothing detected in sample																	
		6/18/92	Swanson			<0.01	<0.01	<0.01	<0.01	<0.07	<0.01	<0.01	<0.01	<0.10	<0.01	<0.01	0.03	<0.06	<0.05		
		11/4/93	Pace	Nothing detected in sample		<0.69	<0.06	<0.04	<0.09	<0.15	<0.11	<0.04	<0.13	<12	<0.03	<0.04	<0.86	<1.7	<1.8	<2.0	
		11/4/93	DOH	Nothing detected in sample		<0.05	<0.04	<0.04	<0.04	<0.1	<0.05	<0.05	<0.05	<1.0	<0.05	<0.02	<0.05	<0.2	<0.5		
		5/19/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		8/31/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		3/7/95	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				

* = Present below reportable value

ABALENE PEST CONTROL
SITE NO. 546035 MOREAU, NY
SUMMARY OF COMPOUNDS DETECTED IN RESIDENTIAL WELL SAMPLES

Name	Homes With GAC Filters	Date	Analyzed By			Endo-Sulfan Sulfate µg/l	BHC Beta µg/l	BHC gamma µg/l	BHC delta µg/l	Chlor-dane µg/l	DDD µg/l	DDE µg/l	DDT µg/l	2,4-D µg/l	Hepta-chlor µg/l	Aldrin µg/l	Hepta-chlor Epoxide µg/l	Silvex 2,4,5-TP µg/l	Meth-oxychlor µg/l	2,4,5-T µg/l	Dursban µg/l
Miller	X	4/3/87	DOH																		
(Harrinton)		5/20/87	DOH	Nothing detected in sample																0.2	
			Swanson	Nothing detected in sample																	
		6/22/87	Swanson					0.07													
		7/30/87	DOH	Nothing detected in sample																	
		8/11/87	Swanson							0.15	0.05				0.012					0.5	
		9/25/87	DOH																	0.15	
		4/28/88	Swanson	Nothing detected in sample																	
		6/6/88	Swanson	Nothing detected in sample																	
		6/9/88	DOH	Nothing detected in sample																	
		7/14/88	Swanson	Nothing detected in sample																	
		12/8/88	Swanson	Nothing detected in sample																	
		3/22/89	Swanson	Nothing detected in sample																	
		10/27/89	DOH																	0.17	0.05
		12/6/89	Swanson	Nothing detected in sample																	
		4/26/90	Swanson	Nothing detected in sample																	
		5/30/91	Swanson	Nothing detected in sample		<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.20	<0.15	<0.05	<0.05	<0.05	<0.15	<0.05		
		6/18/92	Swanson	Nothing detected in sample		<0.01	<0.01	<0.01	<0.01	<0.07	<0.01	<0.01	<0.01	<0.10	<0.01	<0.01	<0.01	<0.06	<0.05		
		5/19/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		8/31/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		3/7/95	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				

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ABALENE PEST CONTROL
SITE NO. 546035 MOREAU, NY
SUMMARY OF COMPOUNDS DETECTED IN RESIDENTIAL WELL SAMPLES

Name	Homes With GAC Filters	Date	Analyzed By			Endo-Sulfan Sulfate µg/l	BHC Beta µg/l	BHC gamma µg/l	BHC delta µg/l	Chlor-dane µg/l	DDD µg/l	DDE µg/l	DDT µg/l	2,4-D µg/l	Hepta-chlor µg/l	Aldrin µg/l	Hepta-chlor Epoxide µg/l	Silvex 2,4,5-TP µg/l	Meth-oxychlor µg/l	2,4,5-T µg/l	Dursban µg/l
Ellsworth		4/3/87	DOH			0.03	0.008														
(NC Signs)		5/20/87	DOH	Nothing detected in sample																	
			Swanson	Nothing detected in sample																	
		6/22/87	Swanson	Nothing detected in sample																	
		7/30/87	DOH	Nothing detected in sample																	
		9/25/87	DOH	Nothing detected in sample																	
		6/9/88	DOH	Nothing detected in sample																	
		10/27/89	DOH	Nothing detected in sample																	
		12/6/89	Swanson	Nothing detected in sample																	
		4/26/90	Swanson	Nothing detected in sample																	
		11/4/93	Pace	Nothing detected in sample		<0.67	<0.06	<0.04	<0.09	<0.14	<0.11	<0.04	<0.12		<0.03	<0.04	<0.84	<1.7	<1.8	<2.0	
		11/4/93	DOH	Nothing detected in sample		<0.05	<0.04	<0.04	<0.04	<0.1	<0.05	<0.05	<0.05	<1.0	<0.05	<0.02	<0.05	<0.2	<0.5		
		5/19/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		8/31/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
(Empire Gas)		12/1/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		3/7/95	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				

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ABALENE PEST CONTROL
SITE NO. 546035 MOREAU, NY
SUMMARY OF COMPOUNDS DETECTED IN RESIDENTIAL WELL SAMPLES

Name	Homes With GAC Filters	Date	Analyzed By			Endo-Sulfan Sulfate µg/l	BHC Beta µg/l	BHC gamma µg/l	BHC delta µg/l	Chlor-dane µg/l	DDD µg/l	DDE µg/l	DDT µg/l	2,4-D µg/l	Hepta-chlor µg/l	Aldrin µg/l	Hepta-chlor Epoxide µg/l	Silvex 2,4,5-TP µg/l	Meth-oxychlor µg/l	2,4,5-T µg/l	Dursban µg/l
West	X	4/3/87	DOH	Nothing detected in sample																	
			Swanson	Nothing detected in sample																	
		6/22/87	Swanson							0.03											
		9/25/87	DOH	Nothing detected in sample																	
		6/9/88	DOH	Nothing detected in sample																	
		10/27/89	DOH	Nothing detected in sample																	
		12/6/89	Swanson	Nothing detected in sample																	
		4/26/90	Swanson	Nothing detected in sample																	
		5/30/91	Swanson	Nothing detected in sample		<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.20	<0.15	<0.05	<0.05	<0.05	<0.15	<0.05		
		6/18/92	Swanson	Nothing detected in sample		<0.01	<0.01	<0.01	<0.01	<0.07	<0.01	<0.01	<0.01	<0.10	<0.01	<0.01	<0.01	<0.06	<0.05		
		11/4/93	Pace	Nothing detected in sample		<0.7	<0.06	<0.04	<0.1	<0.15	<0.12	<0.04	<0.13		<0.03	<0.04	<0.88		<1.9		
		11/4/93	DOH	Nothing detected in sample		<0.05	<0.04	<0.04	<0.04	<0.1	<0.05	<0.05	<0.05	<1.0	<0.05	<0.02	<0.05	<0.2	<0.5		
		5/19/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		8/31/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		3/7/95	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				

* = Present below reportable value

ABALENE PEST CONTROL
SITE NO. 546035 MOREAU, NY
SUMMARY OF COMPOUNDS DETECTED IN RESIDENTIAL WELL SAMPLES

Name	Homes With GAC Filters	Date	Analyzed By			Endo-Sulfan Sulfate µg/l	BHC Beta µg/l	BHC gamma µg/l	BHC delta µg/l	Chlor-dane µg/l	DDD µg/l	DDE µg/l	DDT µg/l	2,4-D µg/l	Hepta-chlor µg/l	Aldrin µg/l	Hepta-chlor Epoxide µg/l	Silvex 2,4,5-TP µg/l	Meth-oxychlor µg/l	2,4,5-T µg/l	Dursban µg/l
Greenwood		4/3/87	DOH	Nothing detected in sample																	
(Magic)			Swanson											0.4							
		6/22/87	Swanson	Nothing detected in sample																	
		7/30/87	DOH	Nothing detected in sample																	
		8/11/87	Swanson				0.02			0.04											
		9/25/87	DOH	Nothing detected in sample																	
		4/28/88	Swanson	Nothing detected in sample																	
		6/6/88	Swanson	Nothing detected in sample																	
		6/9/88	DOH	Nothing detected in sample																	
		7/14/88	Swanson	Nothing detected in sample																	
		5/19/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		8/31/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		3/7/95	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				

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ABALENE PEST CONTROL
SITE NO. 546035 MOREAU, NY
SUMMARY OF COMPOUNDS DETECTED IN RESIDENTIAL WELL SAMPLES

Name	Homes With GAC Filters	Date	Analyzed By			Endo-Sulfan Sulfate µg/l	BHC Beta µg/l	BHC gamma µg/l	BHC delta µg/l	Chlor-dane µg/l	DDD µg/l	DDE µg/l	DDT µg/l	2,4-D µg/l	Hepta-chlor µg/l	Aldrin µg/l	Hepta-chlor Epoxide µg/l	Silvex 2,4,5-TP µg/l	Meth-oxychlor µg/l	2,4,5-T µg/l	Dursban µg/l
Williams	X	4/3/87	DOH	Nothing detected in sample																	
		6/22/87	Swanson							0.04											
		7/30/87	DOH	Nothing detected in sample																	
		4/28/88	Swanson							0.2											
		6/6/88	Swanson							0.2					0.02						
		6/9/88	DOH							0.1											
		7/14/88	Swanson	Nothing detected in sample																	
		12/8/88	Swanson	Nothing detected in sample																	
		3/22/89	Swanson	Nothing detected in sample																	
		10/27/89	DOH	Nothing detected in sample																	
		12/6/89	Swanson	Nothing detected in sample																	
		5/30/91	Swanson	Nothing detected in sample		<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.20	<0.15	<0.05	<0.05	<0.05	<0.15	<0.05		
		6/18/92	Swanson	Nothing detected in sample		<0.01	<0.01	<0.01	<0.01	<0.07	<0.01	<0.01	<0.01	<0.10	<0.01	<0.01	<0.01	<0.06	<0.05		
		11/4/93	Pace	Nothing detected in sample		<0.75	<0.07	<0.05	<0.1	<0.16	<0.12	<0.05	<0.14	<12	<0.03	<0.05	<0.94	<1.7	<2.0		
		11/4/93	DOH	Nothing detected in sample		<0.05	<0.04	<0.04	<0.04	<0.1	<0.05	<0.05	<0.05	<1.0	<0.05	<0.02	<0.05	<0.2	<0.5		
		5/19/94	Buck			<0.066	<0.006	<0.004	<0.009	0.104	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		7/12/94	Buck			<0.066	<0.006	<0.004	<0.009	0.042	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		8/31/94	Buck			<0.066	<0.006	<0.004	<0.009	0.040	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		12/1/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		3/7/95	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				

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ABALENE PEST CONTROL
SITE NO. 546035 MOREAU, NY
SUMMARY OF COMPOUNDS DETECTED IN RESIDENTIAL WELL SAMPLES

Name	Homes With GAC Filters	Date	Analyzed By			Endo-Sulfan Sulfate µg/l	BHC Beta µg/l	BHC gamma µg/l	BHC delta µg/l	Chlor-dane µg/l	DDD µg/l	DDE µg/l	DDT µg/l	2,4-D µg/l	Hepta-chlor µg/l	Aldrin µg/l	Hepta-chlor Epoxide µg/l	Silvex 2,4,5-TP µg/l	Meth-oxychlor µg/l	2,4,5-T µg/l	Dursban µg/l
Sweet Apt.	X	5/30/91	Swanson	Nothing detected in sample		<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.20	<0.15	<0.05	<0.05	<0.05	<0.15	<0.05		
		6/18/92	Swanson	Nothing detected in sample		<0.01	<0.01	<0.01	<0.01	<0.07	<0.01	<0.01	<0.01	<0.10	<0.01	<0.01	<0.01	<0.06	<0.05		
		11/4/93	Pace	Nothing detected in sample		<0.067	<0.06	<0.04	<0.09	<0.14	<0.11	<0.04	<0.12		<0.03	<0.04	<0.84		<1.8		
		5/19/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		8/31/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		3/7/95	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				

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ABALENE PEST CONTROL
SITE NO. 546035 MOREAU, NY
SUMMARY OF COMPOUNDS DETECTED IN RESIDENTIAL WELL SAMPLES

Name	Homes With GAC Filters	Date	Analyzed By			Endo-Sulfan Sulfate µg/l	BHC Beta µg/l	BHC gamma µg/l	BHC delta µg/l	Chlor-dane µg/l	DDD µg/l	DDE µg/l	DDT µg/l	2,4-D µg/l	Hepta-chlor µg/l	Aldrin µg/l	Hepta-chlor Epoxide µg/l	Silvex 2,4,5-TP µg/l	Meth-oxychlor µg/l	2,4,5-T µg/l	Dursban µg/l
Dessaint		5/30/91	Swanson	Nothing detected in sample		<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.20	<0.15	<0.05	<0.05	<0.05	<0.15	<0.05		
		6/18/92	Swanson	Nothing detected in sample		<0.01	<0.01	<0.01	<0.01	<0.07	<0.01	<0.01	<0.01	<0.10	<0.01	<0.01	<0.01	<0.06	<0.05		
		11/4/93	Pace	Nothing detected in sample		<0.74	<0.07	<0.05	<0.1	<0.16	<0.12	<0.05	<0.13		<0.03	<0.05	<0.93		<2.0		
		5/19/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		8/31/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		3/7/95	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				

* = Present below reportable value

ABALENE PEST CONTROL
SITE NO. 546035 MOREAU, NY
SUMMARY OF COMPOUNDS DETECTED IN RESIDENTIAL WELL SAMPLES

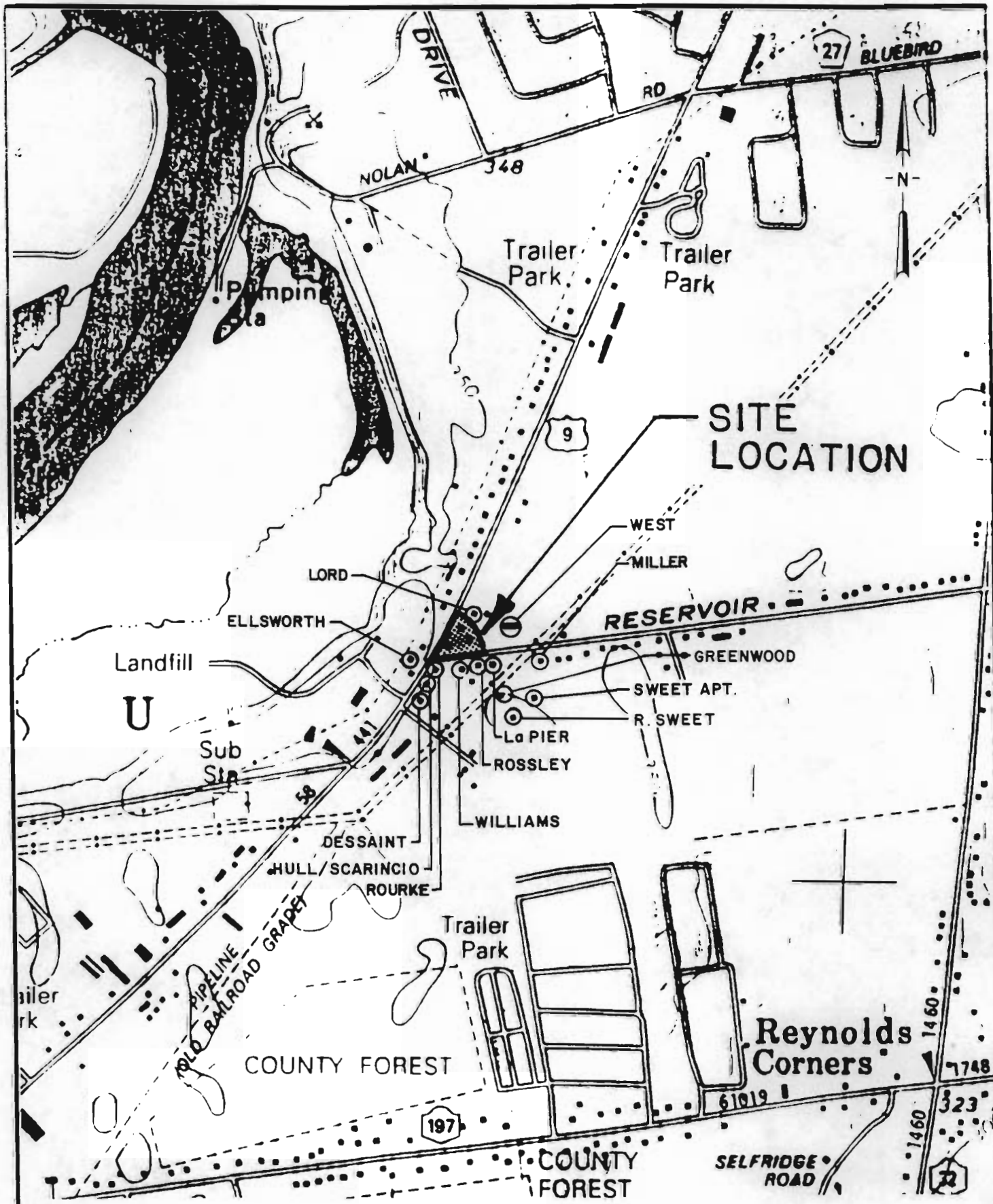
Name	Homes With GAC Filters	Date	Analyzed By			Endo-Sulfan Sulfate µg/l	BHC Beta µg/l	BHC gamma µg/l	BHC delta µg/l	Chlor-dane µg/l	DDD µg/l	DDE µg/l	DDT µg/l	2,4-D µg/l	Hepta-chlor µg/l	Aldrin µg/l	Hepta-chlor Epoxide µg/l	Silvex 2,4,5-TP µg/l	Meth-oxychlor µg/l	2,4,5-T µg/l	Dursban µg/l
R. Sweet		5/30/91	Swanson	Nothing detected in sample		<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.20	<0.15	<0.05	<0.05	<0.05	<0.15	<0.05		
		6/18/92	Swanson	Nothing detected in sample		<0.01	<0.01	<0.01	<0.01	<0.07	<0.01	<0.01	<0.01	<0.10	<0.01	<0.01	<0.01	<0.06	<0.05		
		11/4/93	Pace	Nothing detected in sample		<0.69	<0.06	<0.04	<0.09	<0.15	<0.11	<0.04	<0.13		<0.03	<0.04	<0.86		<1.8		
		5/19/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		8/31/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		3/7/95	Buck			<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	0.018		<0.003	<0.004	<0.083				
		4/21/95	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				

* = Present below reportable value

ABALENE PEST CONTROL
SITE NO. 546035 MOREAU, NY
SUMMARY OF COMPOUNDS DETECTED IN RESIDENTIAL WELL SAMPLES

Name	Homes With GAC Filters	Date	Analyzed By			Endo-Sulfan Sulfate µg/l	BHC Beta µg/l	BHC gamma µg/l	BHC delta µg/l	Chlor-dane µg/l	DDD µg/l	DDE µg/l	DDT µg/l	2,4-D µg/l	Hepta-chlor µg/l	Aldrin µg/l	Hepta-chlor Epoxide µg/l	Silvex 2,4,5-TP µg/l	Meth-oxychlor µg/l	2,4,5-T µg/l	Dursban µg/l
Hull/Scarincio		5/30/91	Swanson	Nothing detected in sample		<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.20	<0.15	<0.05	<0.05	<0.05	<0.15	<0.05		
(Brown)		6/18/92	Swanson	Nothing detected in sample		<0.01	<0.01	<0.01	<0.01	<0.07	<0.01	<0.01	<0.01	<0.10	<0.01	<0.01	<0.01	<0.06	<0.05		
		11/4/93	Pace	Nothing detected in sample		<0.72	<0.06	<0.04	<0.1	<0.15	<0.12	<0.04	<0.13		<0.03	<0.04	<0.9		<1.9		
		5/19/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
(Rockefeller)		8/31/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		12/1/94	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				
		3/7/95	Buck	Nothing detected in sample		<0.066	<0.006	<0.004	<0.009	<0.014	<0.011	<0.004	<0.012		<0.003	<0.004	<0.083				

* = Present below reportable value



NOT TO SCALE

SOURCE: U.S.G.S. 7.5 MIN. GLENS FALLS QUAD. 1991 & GANSEVOORT QUAD. 1991.

FIGURE 1

MALCOLM PIRNIE

ABALENE PEST CONTROL (SITE NO. 546036)

MOREAU, NEW YORK

RESIDENTIAL WELL SAMPLING POINTS

FEBRUARY 1994

APPENDIX D

Alternative 5 Excavation Calculation Summary
and Fencing Removal Cost Calculations

MALCOLM PIRNIE

MALCOLM PIRNIE, INC.
BY RJP DATE 3/16/95 SHEET NO. 1 OF 1
CHKD. BY LRH DATE 5/2/95 JOB NO. 1368017
SUBJECT VOL - CALCS.

VOLUMES OF SOIL TO BE EXCAVATED AS SHOWN IN FIGURE 3-4 5 LRH

for 1' deep excavation:

∴ volumes exclude building footprint

$A = 2114\ sf + 2666\ sf$
$= 4780\ sf$

$V = 4780\ sf \times 1\ ft \times \frac{cy}{27\ cf}$

$\boxed{V = 177\ cy}$ ✓

for 11' deep excavation:

$A = 4016\ sf$

$V = 4016\ sf \times 11\ ft \times \frac{cy}{27\ cf}$

$\boxed{V = 1636\ cy}$ ✓

for 24' deep excavation

$A = 1547\ sf$

$V = 1547\ sf \times 24\ ft \times \frac{cy}{27\ cf}$

$\boxed{V = 1375\ cy}$ ✓

$\boxed{V_{TOTAL} = 3188\ cy \text{ say } 3200\ cy}$ ✓

RECYCLED PAPER

Fencing Cost.

MALCOLM PIRNIE, INC.

Randall J. Parsons

TELEPHONE CALL CONFIRMATION

Local 783-0395 Long Distance _____ Date 2/16/95

To/From AFSCO fence. Time 3:10

_____ Project ORKIN

MPI Name Spoke to Bruce. Proj. No. 1368012

Subject:

Removal of existing fence
- 685 lf of existing fence
- 8' high chainlink w/ barbwire
- excavate exist. footings
- remove all from site - no salvage value

$ 8,500 (say $7500) w/o barbwire

New 8' Chainlink fence. furnished & installed
$17.50 to $18.00/lf
say $9.00/lf for materials only
gates extra say $500.00

@ $18/lf fence cost = $12,330
+ 2 gates +$1000
13,330

say $15,000