Mead Property Site

Ulster County, New York
Site Number 3-56-019

New York State Superfund
Record of Decision

March 1992

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

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Mead Property Site, Riverside Road, Town of Lloyd, Ulster County, New York - Site ID #356019

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Mead Property Site, developed in accordance with the New York State Environmental Conservation Law (ECL), and is consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) 42 USL Section 9601, et. seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). Appendix A of this record lists the documents that comprise the Administrative Record for the Mead Property Site. The documents in the Administrative Record are the basis for the selected remedial action.

ASSESSMENT OF THE SITE

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

DESCRIPTION OF THE SELECTED REMEDY

The major components of the selected remedy are as follows:

* Excavation followed by thermal destruction of the contaminated soil/waste that presently exists on-site in several septage pits. Thermal destruction will take place on-site using a commercial transportable incinerator of the rotary kiln or circulating bed combustion technology. The unit will be transported to, and assembled on-site to operate until all of the soil/waste has been excavated and destroyed. The thermal destruction process will be designed to operate with all required air pollution controls. Other alternatives which meet the technical and regulatory requirements for remediation of the Mead soil/waste and comply with TAGM #4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites, may be considered before the start of the remedial design.

* Extraction of contaminated groundwater from the bedrock aquifer and treatment through a granular activated carbon filter. This alternative will also serve to control migration of contaminants off site. Groundwater pump and treat is expected to operate for six years with the goal of removing a significant portion of the contaminant mass. Treated groundwater will be discharged to surface water on site.

* Installation, maintenance and monitoring of granular activated carbon filtration systems at all affected homeowners. These systems are currently in use at the four affected residences. Discussions with the Town of Lloyd concerning extension of the Highland Water District to these homeowners are underway. This option is being further evaluated as an alternative water supply and would replace point-of-use systems if determined to be cost effective.

* Institutional controls would be implemented to restrict site access and groundwater usage through deed restrictions, regulatory restrictions and/or well-use advisories. Such controls would be required until the groundwater has been restored to drinking water quality standards.

* Long-term monitoring (30-years) would be carried out to gauge the effectiveness of the selected alternative and monitor groundwater quality at all nearby residences.

* As an interim remedial measure (IRM), a temporary cover will be placed over the septage pits to minimize infiltration and provide a barrier until final remediation of the site takes place. This cover design will also include surface water controls to channel water away from contaminated areas.

DECLARATION

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

3-25-92
Date

Edward O. Sullivan
Deputy Commissioner
Office of Environmental Remediation

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

I. SITE LOCATION AND DESCRIPTION

The Mead site, which comprises approximately 4 acres and is trapezoidal in shape, is located on North Riverside Road in the Town of Lloyd, Ulster County, New York (Figure A-1). The site is a heavily vegetated inactive septage waste disposal site located on a north-south trending ridge. The site is located approximately 1.25 miles west of the Hudson River and 5 miles east of New Paltz, New York on the north side of North Riverside Road approximately 0.2 miles west of Route 9W. Residences are located within about 500 feet of the site to the north, east, and southeast, all of which rely on groundwater as their source of drinking water. An intermittent stream runs along the western side of the site and drains into a small pond located about 500 feet southwest of the site. The Mead Site is not fenced and is bordered by a privately owned active septage disposal facility to the south-southwest (Figure A-2).

A lagoon disposal system was operated at the site by Mr. Roy Mead for approximately 30 years (1946-1976). Mr. Mead, now deceased, disposed of unknown volumes of septic and industrial wastes into on-site septage pits. All of the pits were excavated in the native soil and were not believed to be lined in any way. The site has been inactive since 1976.

II. SITE HISTORY

In 1986, monitoring wells were installed at a neighboring septage facility and high levels of 1,1,1-trichloroethane (TCA), trichlorethene (TCE) and other volatile organic contaminants (VOCs) were detected. As a result, this site was registered as a Class 2 inactive hazardous waste disposal site. A Class 2 site is a site which poses a significant threat to public health or the environment, requiring remedial action. In 1987, sampling activities by the Ulster County Health Department (UCHD) found three homes with detectable levels of VOCs in the wells. These homeowners have had carbon filtration systems installed to treat their water supply.

A background investigation conducted by E&E found records to indicate that Mr. Mead, for a period of at least three years, picked up a variety of wastes from a local International Business Machines (IBM) industrial facility. A search of NYSDEC Region 3 files on the Mead site revealed proposals and contracts between Mr. Mead and IBM for waste pickup and pumping services. There are five separate contracts dated from 1971 to 1973. Although very little is known about the actual volume and ratio of contaminants disposed of at this property, the scope of work included pumping chemical settling tanks and containerizing the resulting sludge into drums, disposing of surface water contaminated with diesel fuel, and disposing of septic waste. The wastes allegedly disposed of on the property were common industrial and household solvents, including trichloroethane, toluene, chlorobenzene, xylene, and ethyl benzene, although there are no specific chemicals listed in any of the proposals and contracts with the local industrial facility. No other records are known to exist to indicate additional sources of either the septic or industrial wastes.

III. CURRENT SITE STATUS

In March 1989 a contract between NYSDEC and Ecology & Environment (E&E), a Buffalo, New York based engineering firm, was approved to conduct a Remedial Investigation/Feasibility Study (RI/FS) on the Mead Site. Guidelines for the investigation were established based upon the draft October 1988 United States Environmental Protection Agency (EPA) document, Guidance for conducting Remedial Investigations and Feasibility Studies Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The primary objectives of this study are:

Remedial Investigation (field data):

- Assess the nature, extent and the source of contamination.
- Evaluate the groundwater flow conditions and groundwater quality in the overburden and bedrock.

Feasibility Study (cleanup alternatives):

- Assess the risk to public health and to the environment.
- Develop and select a cost-effective, environmentally sound, remedial action to correct the problems.

Fieldwork was conducted in three phases. A focused RI was conducted in April and May, 1989. The Phase I investigation was conducted from August, 1989 to March, 1990 and a Phase II Investigation from March 1991 to June 1991. Extensive sampling was carried out on all media, including groundwater, surface water, sediment, soil, soil gas, waste and air, both on-site and at adjacent properties. Additional studies included an aerial photographic study to help define the exact locations of the septage pits and aquifer tests to evaluate the potential for groundwater restoration. The results of the RI/FS identify several contamination problems:

- A domestic well survey was conducted and revealed one additional homeowner with VOC contamination in their drinking water for which NYSDEC installed a carbon filtration unit.
- Extensive on-site VOC contamination was found in the groundwater and septage waste pits. Total VOC contamination (primarily TCA) was found at levels up to 9 parts per million (ppm) in the groundwater and up to 8900 ppm in waste materials. In addition, polychlorinated biphenols (PCBs) were found in waste at levels up to 144 ppm.
- Contaminated waste and soil was identified in over 20 waste pits. The waste consists of a black, organic, very dense sludge and was disposed of in long, narrow pits up to 200' in length and approximately 6 to 10 feet in width. Several irregular shaped pits also exist. Waste depth varies from 0 to 8 feet. The estimated waste and contaminated soil volume is 11,000 yd^3 and is distributed over a 3-acre area.
- Contaminant levels in drinking water at the four affected homeowner wells have remained relatively constant since sampling began in 1987. Levels of VOCs (primarily TCA, TCE, 1,1 DCA and 1,1 DCE) range up to 540 ppb.

Table 1 (below) is a list of contamination levels for the primary contaminants or indicator chemicals (those contaminants which pose the greatest public health and environmental concern for a particular site) in groundwater and soil/waste samples at Mead along with the associated cleanup levels or ARARs (Applicable or Relevant and Appropriate Requirements).

Table 1

Contaminant	Groundwater Concentrations(ppb)		Cleanup Standards (ppb)	Soil/Waste Concentrations(ppb)		Cleanup Goals (ppb)
	Maximum	Mean	(a)	Maximum	Mean	(b)
1,1-Dichloroethane	1,500	450	5	280,000	13,000	200
1,2-Dichloroethane	150	32	5	27	ND	100
1,2-Dichloroethene	5	ND	5	1,600	70	100
1,1,1-Trichloroethane	10,000	2,800	5	1,800,000	80,000	760
Trichloroethene	700	200	5	6,700,000	290,000	700
1,2-Dichlorobenzene	33	2	4.7	280,000	24,000	850
Toluene	2.6	ND	5	260,000	16,000	5,500
Xylenes	ND	ND	5	100,000	13,000	1,200
4-Methylphenol	ND	ND	1	260,000	25,000	1,000
Polychlorinated biphenyls	ND	ND	.1	144,000	10,000	1,000

(a) - based on 10 NYCRR Part 5 and 6 NYCRR Part 703.5 groundwater quality standards
(b) - based on NYSDEC recommended soil cleanup goals
ND - non-detectable

Public Health and Environmental Assessment

A risk assessment was conducted to determine whether the contaminants found at the Mead Property Site could pose a significant threat to human health or the environment. Carrying out a risk assessment requires identification of the following:

* Contaminants of potential concern at the site
* Potential pathways of exposure and potentially exposed populations

The primary contaminants of concern, along with their concentrations, are presented in Table 1. A detailed description of all contaminants present at this site can be found in the RI/FS. Potential pathways of exposure and associated cancer risks, have been identified as follows:

1. Inhalation of vapors emanating from the ground by site visitors and nearby workers and residents

   The estimated cancer risk associated with VOCs emanating from waste materials is significantly lower than $1x10^{-6}$ (1 in one million chance of developing cancer as a result of exposure), the lowest level considered to pose a significant risk by regulatory agencies for all potential receptors evaluated. Therefore, site contaminant vapors emanating from waste materials do not appear to pose a significant threat of any adverse health effects.

2. Domestic use of groundwater

Under this pathway of exposure, exposure routes would include ingestion, inhalation and dermal contact of VOCs. The estimated cancer risk associated with exposure to VOCs from untreated water via these pathways exceed $1x10^{-6}$ and the highest risk is $6x10^{-4}$, a level generally considered unacceptable by regulatory agencies.

3. Direct contact with surficial waste materials

This exposure route would include dermal contact and ingestion of contaminated soil/waste. While a quantitative risk analysis was not performed on this route of exposure, substantial concentrations of contaminants present in these materials suggest that significant risk would result from direct exposure. As a result, cleanup goals for contaminants of concern have been presented in Table 1.

4. Impact to fish and wildlife

A Habitat-Based Assessment (HBA) was conducted to determine if the various environmental receptors are adversely impacted by on-site contamination. The results of this investigation suggest that the levels of organic and inorganic contaminants in surface water and sediment, attributable to the Mead site, are not likely to cause significant impairment of the biota in downgradient wetlands and streams.

IV. ENFORCEMENT STATUS

Following identification of hazardous wastes at the Mead Property Site in 1986, this site was included on the NYS registry of Class 2 inactive hazardous waste disposal sites in 1987. As a result, in September, 1987, NYSDEC sent a 60-day notice to the attorney of the current owner and potentially responsible party (PRP), Mr. Roy Mead, to conduct an RI/FS of this site. The owner declined in 1988 to conduct an RI/FS and the project was referred to the Division of Hazardous Waste Remediation (DHWR) for a State-funded RI/FS in April, 1988.

Background investigations conducted as part of this study indicated that Mr. Mead had contracts with International Business Machines (IBM) to pick up a variety of industrial wastes from IBMs Kingston facility and dispose of this waste on site. In December, 1990 NYSDEC sent a 60 day notice letter to IBM for conducting a remedial program at the site. While IBM has not formally conveyed their involvement in the Mead Property Site, they have acknowledged through personal communications that it does appear that IBM wastes were taken to the Mead site. Negotiations are currently underway with IBM.

V. GOALS FOR REMEDIATION

The alternatives under consideration for remediation of the Mead Property Site, including the NYSDEC preferred alternatives, are in accordance with the New York State Environmental Conservation Law (ECL) and are consistent with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), 42 USL Section 9601, et.seq., and as amended by the Superfund Amendment and Reauthorization Act of 1986 (SARA). The goal of the Feasibility Study is to select alternatives which meet the following seven screening criteria:

Overall Protection of Human Health and the Environment

This criterion will provide a final check to assess whether each alternative provides adequate protection of human health and the environment. The overall assessment of protection draws on the assessments conducted under other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness and compliance with applicable standards.

Evaluation of the overall protectiveness of an alternative will focus on whether a specific alternative achieves adequate protection and will describe how site risks posed through each pathway being addressed by the FS are eliminated, reduced, or controlled through treatment, engineering, or institutional controls. This evaluation will allow for consideration of whether an alternative poses any unacceptable short-term or cross media impacts.

Compliance with ARARs

This evaluation criterion will be used to determine whether each alternative will meet all of its identified federal and state requirements. The detailed analysis will summarize which requirements are applicable, relevant, and appropriate to an alternative and describe how the alternative meets these requirements.

Long-Term Effectiveness and Permanence

The evaluation of alternatives under this criterion will address the results of the remedial action in terms of the risk remaining at the facility after response objectives have been met. The primary focus of this evaluation will be the extent and effectiveness of the controls that may be required to manage the risk posed by treatment residuals and/or untreated wastes. Such an evaluation is particularly important to all alternatives.

Reduction of Toxicity, Mobility, or Volume through Treatment

This evaluation criterion will address the regulatory preference for selecting remedial actions that employ treatment technologies permanently and significantly reducing the toxicity, mobility, or volume of the contaminants. This preference is satisfied when treatment is used to reduce the principal risks at a site through destruction of contaminants, for a reduction of total mass or contaminants, to attain irreversible reduction in mobility, or to achieve reduction of the total volume of contaminated media.

Short-Term Effectiveness

This evaluation criterion will address the effects of the alternatives during the construction and implementation phase until remedial response objectives are met. Under this criterion, alternatives will be evaluated with respect to their effects on human health and the environment during implementation of the remedial action.

Implementability

The implementability criterion will address the technical and administrative feasibility of implementing an alternative and availability of various services and materials required during its implementation.

Cost

Detailed cost analysis of the selected remedial alternatives will include the following steps:

* Estimation of capital, operations and maintenance (O&M), and institutional costs; and
* Present worth analysis.

Costs developed during the FS are expected to provide an accuracy of +50% to -30%

Following the individual analyses, the alternatives for the waste material and soil, groundwater and also for the alternate residential water supply, are compared and contrasted, and a preferred remedy is recommended.

VI. SUMMARY OF THE EVALUATION OF ALTERNATIVES

A. Initial Screening of Alternatives

The nine remedial alternatives considered for the Mead site prior to initial screening using the two above-described criteria are presented below. This list excludes technologies which were considered inappropriate and infeasible at the onset of the screening process. The reasons for eliminating these technologies are covered in detail in the Feasibility Study.

The nine alternatives retained for consideration are numbered to correspond with the RI/FS report and are as follows:

Soil/Waste Alternatives

1. No Action;
2. Capping;
3. On-Site Incineration;
4. Off-Site Incineration;
5. Off-Site Land Disposal;
6. Low Temperature Thermal Desorption

Groundwater Alternatives

1. No Action;
2. Institutional Controls;
3. Groundwater Pump and Treat

In addition to the three groundwater alternatives which are being considered prior to initial screening, three additional alternatives address an alternative residential water supply for the affected homeowner wells:

Residential Water Supply Alternatives

1. Point-of-Use Treatment;
2. Establishing a Community Water Supply;
3. Extension of the Community Water Supply

These alternatives will be evaluated independently from soil/waste and groundwater remedial alternatives.

Of the six soil/waste, three groundwater and three water supply alternatives under consideration, all passed the initial screening criteria, and were retained for further detailed evaluation.

Those wishing to learn more about the initial screening process and the specific reasons for retaining the above alternatives are encouraged to review the RI/FS.

B. Description of Soil/Waste Alternatives Retained From Initial Screening

Alternative 1 - No Action

NYSDEC has evaluated the "no action" alternative. Under this alternative, NYSDEC would take no further action at the site to remediate contaminants in the soil/waste.

Alternative 2 - Capping

This method would significantly reduce infiltration of precipitation and runoff, thereby limiting the potential for additional groundwater and surface water contamination. In addition, the cap would limit direct exposure to contaminated soil/waste and water at or near the ground surface. The cap would be designed to meet the requirements for a hazardous waste landfill as outlined in 6 NYCRR, Part 373. The technology needed for capping the site is reliable and well established. Long-term monitoring and maintenance and institutional controls would be required. Future land use restrictions would apply.

Alternative 3 - On-Site Incineration

This method would utilize an on-site mobile incineration system to incinerate organic contaminants in the soil. Emissions from thermal destruction would be treated through the use of air pollution control equipment to attain required air emission standards. The excavated waste would be placed at a temporary staging area which would be constructed using an impermeable liner and cover. Incineration of all organic wastes at the site would require approximately six months to one year to complete at an anticipated processing rate of 3 to 7 tons per hour. The incinerated waste material and soils (ash) would require disposal in a RCRA-permitted disposal facility if the material is determined to be a listed hazardous waste. Other disposal options may be available under the following conditions.

* If the treated waste is delisted, such that it is no longer hazardous, it would be disposed of off site at a 6 NYCRR Part 360 soil waste facility. If disposed of on site, the requirements of 6 NYCRR Part 360 must still be met.

* If the treated waste cannot be delisted, on-site disposal would require construction of a 6 NYCRR Part 373 hazardous waste facility.

Incineration is a reliable, effective and well established method for treating organic wastes.

Alternative 4 - Off-Site Incineration

Under this alternative, the contaminated soil/waste material would be excavated and transported off-site for incineration at the most cost-effective facility permitted to incinerate this waste. The same technical requirements would apply as in Alternative 3, however, on-site disposal of ash would not apply. As with on-site incineration, this alternative is reliable, effective and well established.

Alternative 5 - Off-Site Land Disposal

This alternative would call for disposal of all contaminated soil/waste at a hazardous waste facility permitted to accept such waste. Implementation of this alternative depends on the classification of this waste. Due to the high VOC concentration present at Mead, NYSDEC suspects this waste will be classified as a Resource Conservation and Recovery Act (RCRA) listed waste, subject to RCRA land disposal restrictions (LDRs). Under LDR, this waste would require treatment before disposal. In addition, Mead waste has been determined to be a RCRA characteristic waste, having failed the Toxicity Characteristic Leaching Procedure (TCLP) for VOCs. This procedure characterizes the ability of contaminants to leach from their host material into water which comes in contact with it. While treatment standards have not yet been promulgated for wastes exhibiting the hazardous characteristic of toxicity for VOCs, they are expected to be before the Mead site has been remediated. This would require wastes with VOC levels greater than promulgated treatment standards to be treated prior to disposal. Although it is unlikely that land disposal without treatment will be an option, this alternative is being retained for detailed analysis on the possibility that some of the waste could be disposed of off-site.

Alternative 6 - Low Temperature Thermal Desorption

Low-temperature thermal desorption systems are designed to separate organic contaminants from solids or sludges with relatively low organic concentrations, typically less than 10%. Although the percent organic material in the waste material exceeds 10%, low-temperature thermal desorption could be an applicable organic treatment technology for remediation of the waste, depending upon treatability testing results that would be required to assess the effectiveness of this technology. The technology is reliable, effective and commercially available. Air emissions must comply with applicable state and federal air quality regulations. The organic contaminants extracted from this process would require transportation and treatment off-site at a facility permitted to accept this waste material.

C. Description of Groundwater Alternatives Retained From Initial Screening

Alternative 1 - No Action

NYSDEC has evaluated the "no action" alternative. Under this alternative, NYSDEC would take no further action at the site to remediate contaminants in the groundwater. A long-term groundwater monitoring program would be implemented to evaluate the effectiveness of this alternative.

Alternative 2 - Institutional Controls

This alternative would be no more effective in reducing groundwater contamination than the no-action alternative. However, this alternative would minimize the potential for exposure to contaminated groundwater through controls such as deed restrictions, regulatory restrictions and/or well-use advisories. This alternative would be difficult to implement if no reduction of contaminant mass entering the groundwater is achieved through waste material and soil remedial actions.

Alternative 3 - Groundwater Pump and Treat

This alternative would include drilling a series of groundwater extraction wells (wells used to extract contaminated groundwater) for the purpose of groundwater treatment and contaminant migration control. This alternative would only be applicable to the bedrock aquifer. The overburden aquifer, because of its extremely low permeability, would not yield enough water to make this alternative feasible. Groundwater pumping is proven and effective in controlling migration of groundwater. The contaminated groundwater would require treatment using one or more of the following treatment methods:

Air stripping transfers volatile organic contaminants from the water phase into the air phase. Treatment of the air phase (e.g., carbon adsorption) would be required to remove the organic contaminants. This technology is well-established for removal of VOCs found in the groundwater. Iron concentrations in the groundwater will require pretreatment to prevent plugging or fouling of the air stripping apparatus. This is a conventional treatment technique that is commercially available.

Carbon adsorption is well demonstrated as an effective and reliable means of removing low-solubility organics from water over a broad concentration range. This conventional treatment method is easily implemented. Treatability testing is recommended prior to implementation to estimate carbon usage. The spent carbon would require treatment before disposal or reuse.

UV/ozonation is a relatively new technology for treatment (through oxidization) of organic contaminants in groundwater. However, organic compounds with single bonds such as 1,1,1-TCA and 1,1-DCA (two compounds commonly found in the groundwater at the Mead site) are relatively difficult to oxidize. Iron pretreatment would be required. A bench scale treatability study would be required prior to implementation. UV/ozonation treatment systems are readily available through commercial vendors.

D. Description of Alternate Residential Water Supply Alternatives Retained From Initial Screening

Alternative 1 - Point-of-Use Treatment

Point-of-use treatment utilizes a single activated carbon treatment system for each domestic (water supply) well being treated. It is a reliable and effective method for treatment of the organic compounds presently detected in

the drinking water supplies of the four affected residences at the Mead Site. This technology is readily implemented and currently being used at the Mead site for treatment of affected homeowner wells.

Alternative 2 - Establishing a Community Water Supply

Under this alternative, provisions would be made for the four homeowners to receive water from an existing, private well. This well is in current use and supplies several homes and businesses in the area. The effectiveness of this option is dependent on the capacity or yield of the well, the quality of the water obtained from this well, the willingness of the current owner to sell the system or supply the needed water and approval from appropriate regulatory authorities.

Alternative 3 - Extending an Existing Community Water Supply

This alternative consists of connecting the four affected homes to an existing community water supply system owned and operated by the Town of Highland. This water supply would have to be extended approximately 1.5 miles and would have an adequate capacity to supply additional existing needs along this water distribution extension. This alternative is a reliable and effective method for a potable residential water supply. Its implementability would be dependent on the capacity of the Highland Water District System, which would be responsible for the systems operation and maintenance.

E. Final Screening of Alternatives

In this section, the relevant information for the selection of a remedy is presented. Each of the alternatives retained by the screening process for the combined waste material, groundwater, and alternate residential water supply is analyzed with respect to the seven criteria specified by NYSDEC in its Technical and Administrative Guidance Memorandum (TAGM) #4030 Selection of Remedial Actions at Inactive Hazardous Waste Sites. These criteria encompass statutory requirements and include other gauges of the overall feasibility and acceptability of remedial alternatives. Each criterion is examined both qualitatively in the text and tables as well as quantitatively in the NYSDEC alternative evaluation scoring sheets.

F. Description of Whole-Site Remedial Alternatives

The Feasibility Study identified six whole-site remedial alternatives (alternatives which address groundwater and soil/waste remediation of the site). These six alternatives are based on combining the three site-specific groundwater and six soil/waste alternatives which were retained following the initial screening process. Table 2 identifies these alternatives along with their associated costs.

All alternatives except "no action" include implementation of institutional controls and an alternate residential water supply alternative. All alternatives including "no action" call for long-term groundwater monitoring to gauge the effectiveness of the alternatives. Costs are also presented separately for the three residential water supply alternatives.

Table 2

Remedial Alternative	Present Worth (Including Capital Cost, Operation and Maintenance Expenses) in thousands of dollars*
1. No Action	$ 986
2. Capping Groundwater Pump and Treat	2,331
3. On-Site Incineration Groundwater Pump and Treat	11,216
4. Off-Site Incineration Groundwater Pump and Treat	44,271
5. Off-Site Disposal Groundwater Pump and Treat	5,013**
6. Low Temperature Thermal Desorption Groundwater Pump and Treat	10,561
Residential Water Supply Alternative	
1. Point-of-Use Treatment	198
2. Establishing a Community Water Supply	380
3. Extending an Existing Community Water Supply	634

* Figures are based on a 30-year period, at a discount rate of 5%.

** This cost assumes that pre-treatment of RCRA waste will not be required. In the likely event that treatment is required, costs would be similar to Remedial Alternative 4, Off-Site Incineration if treatment is required for all contaminated waste/soil.

G. Selection of the Preferred Alternative

The preferred remedial action for the Mead Property Site is Alternative 3, on-site incineration, groundwater pump and treat and institutional controls. In addition, this alternative calls for point-of-use treatment, the preferred alternate residential water supply option. A detailed assessment of the costs associated with Alternative 3 is presented in Table 3. Discussions are also underway with the Town of Lloyd concerning extension of the Highland Water District to the affected residences. This residential water supply alternative will be considered an option, and replace point-of-use systems, if determined to be cost effective. As an interim remedial measure (IRM), a temporary cover will be placed over the septage pits to minimize infiltration and provide a barrier until final remediation of the site takes place. This cover design will also include surface water controls to channel water away from contaminated areas. Costs for this IRM are not included in Table 3.

Based on an evaluation of existing data, this package of remedial alternatives best meets the response objectives as outlined in the RI/FS and best satisfies the seven screening criteria, meeting the NYS Superfund objective of protecting human health and the environment.

Table 3

Alternative 3: On-Site Incineration
Groundwater Pump and Treat
Point-of-Use Treatment
Institutional Controls

Remedial Alternative Component	Costs ($)
Waste Material and Soil	
Surveying	3,000
Access Road	60,000
Site Preparation/Clearing/Grubbing	5,000
Gravel Area	19,360
Decontamination Pad	2,500
Utility Hookup	25,000
Staging/Storage Area	15,000
Treatability Study	10,000
Incineration	5,500,000
Excavation	220,000
Dust Control	20,000
Treatment Verification Sampling	100,000
Hazardous Waste Off-Site Disposal	
RCRA Facility	840,000
Transportation	378,000
Backfill Site with Clean Fill	143,000
Revegetation/Restoration	10,000
Subtotal	**7,350,860**
Groundwater	
Bench-Scale Column Treatability Study	10,000
Install Four Bedrock Wells	60,000
Carbon Canisters	3,300
Shipping Costs	1,000
Instrumentation/Housing	50,000
Pumps	10,000
Electrical Hook-Up	15,000
Piping (2" Diameter)*	6,800
Subtotal	**156,100**
Total	**7,506,960**
Contingency (20%)	**1,501,392**
Engineering (15%)	**1,351,253**
Present Worth of O&M Costs**	**856,395**
Grand Total Cost	**11,216,000**

* Includes cost of carbon steel pipe, fittings, insulation, pipe supports, ball valves, and pipe installation

** Includes O&M of the on site and homeowner point-of-use groundwater treatment system and monitoring of residential wells. Figures based on a 30-year period, at a discount rate of 5%.

H. Detailed Assessment of the Preferred Alternative

As part of the Final Screening of Alternatives, each alternative was assessed based on the seven previously described criteria including:

1. Overall protection of human health and the environment;
2. Compliance with ARARs;
3. Long-term effectiveness and permanence;
4. Reduction of toxicity, mobility, or volume through treatment;
5. Short-term effectiveness;
6. Implementability; and
7. Cost.

The following section provides a technical discussion of each element of the preferred alternative as well as an assessment of this alternative with respect to these seven screening criteria. Those wishing to learn more about how each of the six whole-site remedial alternatives compared based on these screening criteria are encouraged to refer to the RI/FS report.

Technical Consideration - On-Site Incineration

On-site incineration is the chosen alternative for treatment of approximately 11,000 yd^3 of contaminated soil/waste material at the site. Under this alternative, this waste would be excavated and treated on site by a thermal destruction unit.

The specific type of incinerator to be used would be determined in the remedial design phase after competitive bidding has taken place. The incinerator would be mobilized, operated and closed according to the specific hazardous waste incineration requirements of RCRA, Subpart O (40 CFR 264.340), Toxic Substances Control Act Requirements (TSCA), 40 CFR Part 761 and 6 NYCRR, Part 373; and the air pollution control requirements of 6 NYCRR, Parts 201 and 212. Because incineration activities would be conducted entirely on site for NYSDEC, NYS and RCRA permits would not be required (ECL Article 27, Title 13). However, the remedial activities must comply with all performance standards that would otherwise be in a permit (i.e., comply with the substantive requirements of the permitting process). Since TSCA is not delegated to New York State, the mobile incinerator would be required to have a TSCA permit.

On-site incineration would require extensive site preparation activities (e.g., establishment of utilities and construction of an access road) due to the topography and relatively rural location of the site. It has been assumed that the incinerator would be operated continuously, although some down time would be required for regular maintenance. Due to the need to maintain continuous operation, excavated material would be temporarily stored in a designed staging area equipped with an impermeable liner, surface water controls, leachate collection system, and a cover. Staging of excavated materials would also promote drainage of excess water and facilitate sampling.

An incineration feed rate of approximately 4 tons per hour has been assumed because of the relatively small volume of waste material, the presence of PCBs, and the waste material moisture content. At this feed rate, it would take approximately one year to incinerate the estimated 11,000 yd^3 of waste material and contaminated soil at the Mead Property Site.

It is assumed that the incinerator would be operated to achieve a destruction and removal efficiency (DRE) dictated by RCRA (99.99% DRE for hazardous wastes) and TSCA (99.9999% DRE for PCB wastes). Specific operating parameters to meet the performance standards of 6 NYCRR, Part 373-2.15(d) and federal and state guidance; to comply with short- and long-term ambient air concentrations dictated by NYSDEC; and to be protective of human health and the environment, would be determined through a trial burn at the site after installation of the incinerator. Specific air-pollution control equipment would be determined by the incineration system vendor in conjunction with NYSDEC. The use of a wet scrubber would require a significant source of potable water (ranging from 30 gpm to more than 100 gpm).

Any wastewater from emission controls and decontamination procedures would be treated utilizing conventional wastewater treatment techniques (e.g., carbon adsorption). The incinerated waste material and contaminated soil has been assumed to be hazardous based on the "derived-from" rule assuming the waste is classified as a listed hazardous waste. These wastes would remain a listed hazardous waste, requiring disposal in a RCRA-permitted disposal facility. All excavated areas would be backfilled with clean fill and properly restored.

Technical Consideration - Groundwater Pump and Treat

Groundwater pumping and treatment is the selected alternative for remediating contaminated groundwater at the Mead site. This alternative would call for installation of four additional 6-inch bedrock pumping wells (one extraction well was installed during the remedial investigation) for the purpose of extracting contaminated groundwater and controlling the migration of contaminants off site. Water would be pumped at an approximate rate of 10 gallons per minute (gpm) and treated through two in-series granular activated carbon filtration units. The optimum pumping rates and cycles along with the carbon filter size and specifications would be determined during the remedial design. The treated groundwater would be discharged to the surface water on the west side of the site.

Assuming that the volume of contaminated groundwater within the bedrock is 4.7 million gallons, and using an average pumping rate of 10 gpm, it would take approximately one year to exchange a pore volume of water from the bedrock aquifer. The exchange of at least several pore volumes would be required to achieve a substantial/significant reduction in groundwater contaminant mass. It is, therefore, assumed that the groundwater extraction and subsequent treatment would be required for six years.

On-site groundwater monitoring of selected wells will be required for at least two years after pumping has ceased. A review of the groundwater analytical data would be made to evaluate the effectiveness of the pump-and-treat alternative and to assess the necessity for any further action (e.g., continue pumping and treating for a longer period of time).

Technical Consideration - Point-of-Use Treatment

This alternative, which has already been implemented, includes installation of liquid-phase activated carbon (LPAC) adsorption systems for the four affected homeowners.

The LPAC treatment system consists of several canisters (usually three) containing LPAC, placed in series. Contaminated groundwater pumped form the residence's well passes through these canisters before reaching the household tap, thereby treating all water entering the house.

Twice a year, for a three canister system, the lead LPAC canister (the canister furthest from the home) is removed and replaced by the second canister. A new third LPAC canister is placed furthest downline. This ensures that an unused canister is always located downstream (or closest to the home) to prevent contaminants from entering the home. To further ensure the effectiveness of these treatment systems, water samples are collected from the homes three to four times per year.

Technical Consideration - Institutional Controls

This alternative involves restricting groundwater usage and access both on site and in the vicinity of the site through the implementation of institutional controls such as deed restrictions, regulatory restrictions, and/or well-use advisories. For example, regulatory restrictions could be implemented to prohibit future drilling of residential drinking water wells in the site vicinity. This alternative would be no more effective in reducing groundwater contamination than the no-action alternative.

This alternative would minimize the potential for exposure to contaminated groundwater. Implementation of institutional controls would be required until the groundwater has been restored to drinking water quality.

Overall Protection of Human Health and the Environment

Alternative 3 provides adequate protection of human health and the environment through on-site treatment of the primary source of contaminati the waste material and contaminated soil. By removing the source, further degradation of the groundwater would be eliminated.

Implementation of a groundwater pump and treat system in the bedrock would serve to significantly decrease the levels of VOC contamination in both the bedrock and surficial aquifers, thus decreasing contamination levels at all current receptors. This groundwater treatment alternative is not intended or expected to reduce contaminant concentration in the groundwater to levels which meet current NYS groundwater quality standards. It is expected, however, that a significant reduction in risk to human health and the environment will be achieved in the short-term. Natural attenuation, over the long-term, would achieve these goals.

Further protection of human health would be achieved through use of an alternate water supply, institutional controls and long-term monitoring by limiting the risk to present and potential users of the contaminated groundwater. Long-term monitoring would include sampling and analysis of on-site monitoring wells and off-site residential wells.

Compliance with ARARs

The treatment storage and disposal of the soil/waste material would be in compliance with federal and State hazardous waste requirements. Soil cleanup goals have been established for this site and would be achieved by on-site incineration. Groundwater pump and treat, in itself, would not achieve NYS groundwater standards. It is expected that natural attenuation processes would require several decades to achieve these groundwater standards. Groundwater at those homeowners currently affected by contamination, is currently being treated to achieve NYS health and groundwater standards.

Long-Term Effectiveness and Permanence

On-site incineration provides the highest level of long-term effectiveness and permanence through contaminant source removal and treatment. Incinerated soil/waste material may require disposal in a RCRA-permitted disposal facility.

Groundwater pump and treat would provide permanent treatment for contaminated groundwater; however, this treatment technology would not reduce contaminants to meet NYS Groundwater Standards. Long-term effectiveness would be achieved through natural attenuation and would require several decades.

An alternate water supply for the four homes presently affected by groundwater contamination would eliminate risk of exposure to contaminated groundwater. Continued long-term residential well monitoring would be necessary to ensure that any newly affected receptors be properly addressed.

Institutional controls implemented to prevent exposure to contaminated groundwater (such as deed restriction, well-use advisories, etc.) may not be effective with a high degree of certainty in the long term.

Reduction of Toxicity, Mobility or Volume Through Treatment

On-site incineration provides for reduction of toxicity and volume by removing and destroying organic contaminants contained in the waste material and soil. In addition, this alternative satisfies the statutory preference for permanent treatment technologies.

Groundwater pump and treat will serve to reduce the toxicity, mobility and volume of contaminants in the groundwater although NYS Water Quality Standards will not be met. Once pump and treat is deemed to be no longer effective, natural attenuation will provide further reduction of toxicity.

Short-Term Effectiveness

On-site incineration requires a great deal of waste handling in conjunction with excavation and on-site treatment, increasing the short-term potential for particulate/VOC releases. Dust-suppression techniques would substantially control any dust that would be generated. This alternative would require approximately one year from start-up before the risk from direct contact with contaminated wastes is controlled and further degradation of the groundwater is curtailed.

Operation of an incinerator is mechanically complex and has stringent monitoring requirements to provide proper performance. The complex equipment of an incineration system could increase the risk to workers in the event of failure. Careful implementation of standard safety protocols would lessen this risk.

Implementation of groundwater pump and treat has no impact on short-term effectiveness; however, an alternate water supply and institutional controls will be very effective in reducing the risk of exposure in the short-term.

Implementability

On-site incineration will require considerable design and verification sampling to demonstrate effectiveness. This alternative is relatively complex to construct and operate; however, is very reliable in meeting the cleanup goals for organic contaminants. This alternative would require securing a proper disposal facility and treatability testing to demonstrate its effectiveness. Meeting the regulatory guidelines, as well as achieving public acceptance, may require considerable approval time.

The implementability of an alternate water supply and institutional controls should pose no difficulty.

Cost

While on-site incineration is a costly alternative, it is the least expensive, most implementable technology which will result in the elimination of the contaminant source. In addition, it satisfies the statutory preference for permanent treatment technologies. O&M costs associated with this alternative, because the source will be removed, will be minimal.

Groundwater pump and treat is the only well demonstrated technology which will accelerate cleanup of a contaminated aquifer as compared to natural attenuation processes. The cost of this technology is dependant on a number of factors including treatment method (air stripping, carbon adsorption, etc.), length of treatment and cleanup criteria, number of extraction wells, pumping rate, location of discharge, etc.

Costs used in the Feasibility Study are expected to provide an accuracy of +50% to -30% and are based on the following:

* Estimation of capital, operation and maintenance (O&M) and institutional costs.
* Present worth analysis using a 5% discount rate

Operation and Maintenance (O&M) costs, along with point-of-use treatment systems for the affected homeowners, are based on a 30-year implementation period.

VII. SUMMARY OF THE GOVERNMENT'S DECISION

The preferred remedial alternative, on-site incineration of soil/waste, groundwater pump and treat of the contaminated aquifer, point-of-use treatment of affected homeowners using carbon adsorption and institutional controls includes proven treatment technologies. The recommended soil/waste treatment technology would effectively eliminate contaminants through thermal destruction, thus eliminating further contamination of the groundwater aquifer. Other alternatives which meet the technical and regulatory requirements for remediation of the Mead soil/waste and comply with TAGM #4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites, may be considered before start of the remedial design.

The recommended groundwater remediation technology would effectively remove organic contaminants, while limiting migration of contaminants outside the site boundary. Groundwater pump and treat is expected to operate for six years with the goal of removing a significant portion of the contaminant mass.

The use of carbon adsorption treatment systems at each affected homeowner would effectively treat groundwater contaminants to below NYS Groundwater Quality Standards. In addition, discussions are underway with the Town of Lloyd concerning extension of the Highland Water District to the affected residences. This residential water supply alternative will be considered an option, and replace point-of-use systems, if determined to be cost effective.

Institutional controls would be implemented to restrict site access and groundwater usage through deed restrictions, regulatory restrictions and/or well-use advisories. Such controls would be required until the groundwater has been restored to drinking water quality standards.

As an interim remedial measure (IRM), a temporary cover will be placed over the septage pits to minimize infiltration and provide a barrier until final remediation of the site takes place. This cover design will also include surface water controls to channel water away from contaminated areas.

The remedies selected represent a sound balancing of cost considerations with the need to protect public health and the environment by eliminating, reducing or controlling risk through treatment, engineering or institutional controls. Long-term monitoring would ensure the performance of these remediation technologies.

APPENDICES

APPENDIX A FIGURES

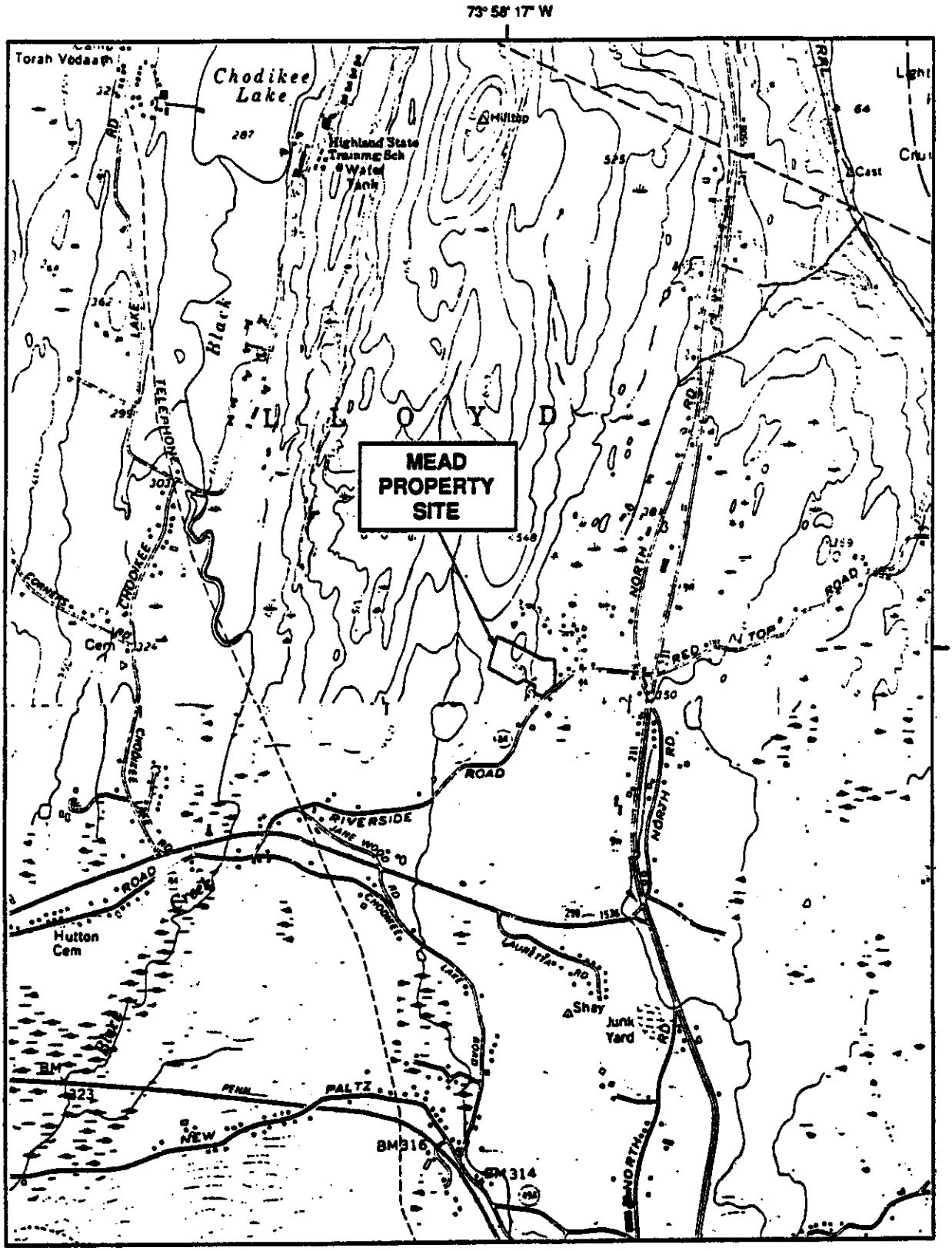
APPENDIX B CONCEPTUAL DESIGN

APPENDIX C RESPONSIVENESS SUMMARY

APPENDIX D ADMINISTRATIVE RECORD

APPENDIX A

FIGURES



SOURCE: D.O.T. 7.5 Minute Series (Topographic) Quadrangle, Hyde Park, NY 1973; Poughkeepsie, NY, 1973.

SCALE 1:24,000

0 .5 1 Mile

0 .5 1 Kilometer

Figure A-1 SITE LOCATION MAP


MEAD PROPERTY SITE
TOWN OF LLOYD
ULSTER COUNTY, NEW YORK
REGISTRY SITE NUMBER 356019
LOCATION MAP
N.T.S.
LEGEND
CONTOUR INTERVAL = 5 FEET
OPEN FIELD
STONE WALL
MUSCARELLA PROPERTY
STANDING WATER
GARAGE
N

FigureA-2

APPENDIX B

CONCEPTUAL DESIGN

CONCEPTUAL DESIGN

This section presents the conceptual design of the recommended remedial alternative for the combined waste material and groundwater remedial alternatives, Alternative 3: On-site Incineration and Groundwater Pumping and Treatment with Institutional Controls.

Initial Tasks

Prior to the actual implementation of remedial actions for the Mead Property Site, the following will be required:

* Background soil samples should be collected downgradient of the orchards and just outside of the north and west Mead Property Site boundaries. These samples should be analyzed for pesticides to determine if the upgradient orchards are the source of chlorinated pesticides detected in soil sample K-6. If pesticides are not detected in the background samples, then the area of disturbed ground located in the vicinity of K-6 should be included as an area of contamination to be addressed during remedial activities.

* Soil samples should be collected in the vicinity of soil sample K-13 collected in conjunction with the Phase I RI and analyzed for TAL metals. The result of the analyses should be used to assess/verify the anomalously high chromium concentration of 456,000 ppm detected in soil sample K-13. If chromium concentrations in this area are significantly elevated relative to the incinerator's air-pollution-control system's ability to handle chromium, an evaluation should be made as to whether the waste material excavated from this area should be incinerated. If the chromium concentrations are found to preclude incineration, the contaminated material in the vicinity of soil sample K-13 (approximately 130 yd^3) would be transported to a RCRA-permitted TSD facility for treatment (e.g. solidification) and/or disposal. Furthermore, if the waste material is classified as an F002 waste, TCLP testing on the collected soil sample(s) would be recommended to ensure compliance with RCRA treatment standards for an F002 waste.

* Bench-scale treatability testing should be performed to identify waste characteristics that may cause problems either of regulatory compliance, cleanup implementation, system operation, or ash disposal.

* Commence with the process to obtain federal and state approvals necessary for on-site incineration of the waste material and contaminated soil, and the preparation and approval of the trial burn plan. During this necessary approval process, NYSDEC may re-evaluate the implementability of on-site incineration at the Mead Property Site as this approval process has proven to be lengthy for on-site incineration, especially of PCB-containing material.

* Mobilization and site preparation activities should be implemented, including, but not limited to, the following:

  - Site support utilities, including provisions for a potable water supply and electricity;

- Office trailer;

- Decontamination pad and personnel decontamination facilities;

- Access road;

- Securement of all necessary permits, easements, and approvals, including a SPDES permit for the discharge of treated groundwater;

* Site Security Plan.

* Site-Specific Health and Safety Plan.

* Definition of any quality assurance/quality control requirements.

Remedial activities and tasks specific to on-site incineration and groundwater pumping and treatment are provided below.

On-site Incineration

There are a number of elements to be addressed in the development of construction plans and specifications to accomplish the on-site incineration remedial alternative for the waste material and contaminated soil. These elements include, but are not limited to, the following:

* Securing a vendor to conduct the on-site thermal treatment;

* Installation of the transportable incineration unit (Figure B-1);

* Start-up and shakedown operations to verify piping integrity and instrument continuity and functionality;

* Perform/approval of test burn;

* Soil excavation activities would necessarily be sequenced with incineration activities (e.g., commencement of incineration and incinerator through-put rates). Excavation would also include staging/ dewatering of excavated materials, provisions for dust control, etc.

* Incineration of excavated materials and subsequent testing of incinerator ash to assess disposal options;

* Off-site disposal of the incinerator ash will require a transportation plan (to be developed by a contractor) and securement of an appropriate disposal facility. Ash derived from listed hazardous wastes would require disposal in a RCRA-permitted facility. Ash derived from characteristic and non-hazardous wastes could be disposed of in a solid-waste or industrial waste disposal facility, assuming the ash does not exhibit the hazardous characteristic of toxicity for metals;

* Decontamination/demobilization of the incineration system; and

* Restoration of the site, including backfilling of all excavated areas, regrading, and reseeding of the site and disturbed areas adjacent to the site (if any).

Groundwater Pumping and Treatment

The elements to be addressed in the development of construction plans and specifications for implementation of the Groundwater Pumping and Treatment Alternative include, but are not limited to, the following:

* Conduct a bench-scale column treatability study to more accurately predict a site-specific carbon usage rate. Carbon usage rates for the pump-and-treat alternative have been estimated using carbon adsorption isotherms presented in Carbon Adsorption Isotherms for Toxic Organics (EPA 1980) for the organic contaminants concentrations detected in PW-1-C collected during the pump test. The estimated carbon usage is 1,500 pounds of carbon per month, assuming a flow rate of 10 gpm and contaminant concentrations similar to those detected in PW-1-C.

* Install four 6-inch I.D. stainless steel bedrock wells so that the bottom of each well will be at an elevation of 300 feet (the estimated depth to which the bedrock aquifer is contaminated; the actual depth of contamination within the bedrock is not known). The overburden will be cased with a 6-inch I.D. stainless steel casing, and screen may need to be inserted into the well upon completion to keep the borehole open due to the nature of the shale beneath the site (i.e., high-angle bedding planes). On-site well MW-8B was completed in such manner.)

* Install carbon adsorption treatment system and associated necessary piping and ancillary equipment. The carbon adsorption treatment system will consist of two carbon canisters placed in series. The amount of carbon needed will be determined based upon bench-scale column testing, but it has been estimated that two 2,000 pound carbon canisters (in series) will be required. Based on previously calculated carbon usage rates, it is estimated that the lead canister will need to be replaced every month. The spent carbon would most likely be incinerated or otherwise treated/regenerated by a RCRA-permitted facility.

* Determination of pumping cycles and rates.

* Monitoring of treated groundwater to ensure compliance with the SPDES permit.

* Monitoring of on-site and residential wells to judge the effectiveness of the system.

* The estimated time frame for groundwater pumping and treatment is six years. Groundwater monitoring will continue for at least two years after pumping has been stopped. When it has been determined that the groundwater pump-and-treat system has served its purpose (i.e., groundwater contaminant-mass reduction) and the system is no longer required at the Mead Property Site, all pumping and monitoring wells will be properly grouted.

* Long-term monitoring of residential wells will be required.

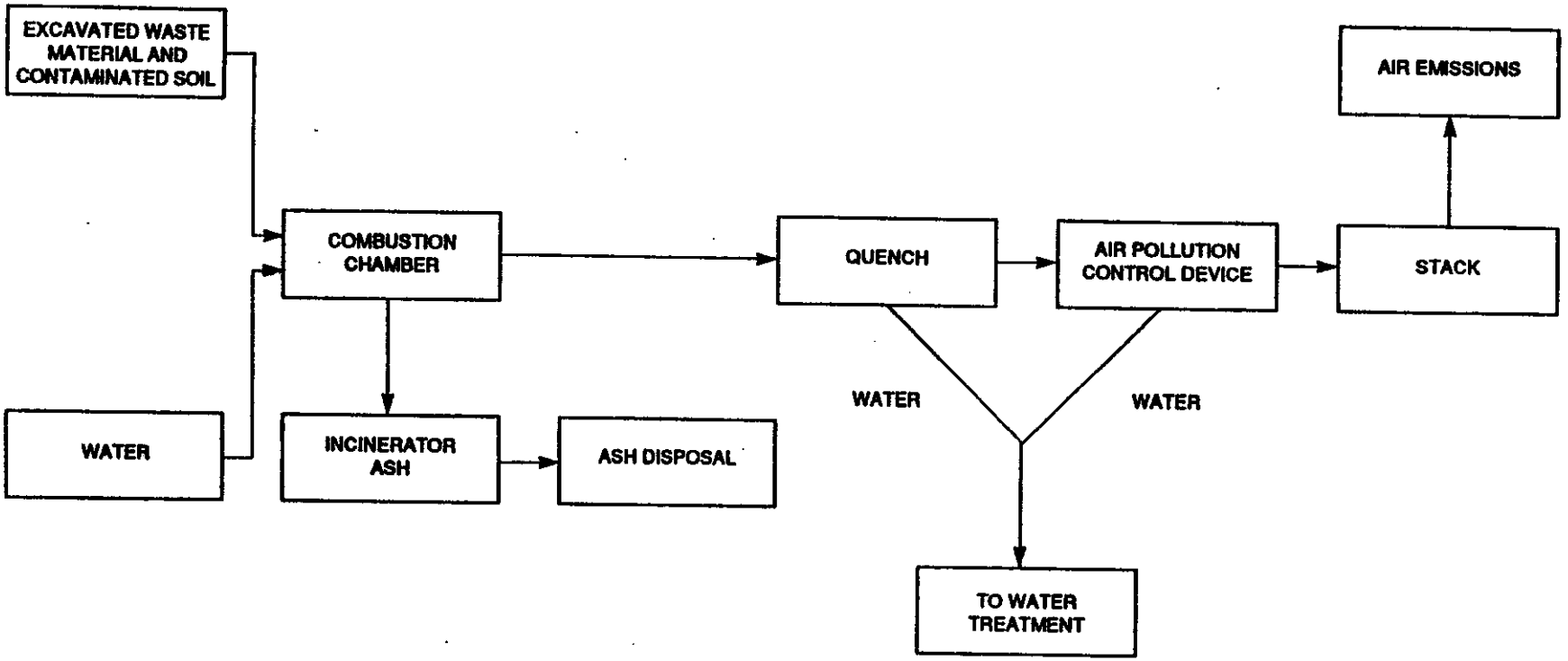


Figure B-1
SIMPLIFIED BLOCK FLOW DIAGRAM FOR ON-SITE INCINERATION
MEAD PROPERTY SITE

APPENDIX C

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY

The New York State Department of Environmental Conservation (NYSDEC) held a public meeting on February 19, 1992 at the Lloyd Town Hall to discuss the findings of the Mead Property Site Remedial Investigation/Feasibility Study (RI/FS) and NYSDEC's Proposed Remedial Action Plan (PRAP). This study was performed by Ecology and Environment Engineering, P.C. under contract to the NYSDEC. Present at the meeting were representatives from NYSDEC, New York State Department of Health (NYSDOH), Ulster County Health Department, Ecology and Environment Engineering, P.C., Ulster County, Town of Lloyd, concerned citizens and news media.

The RI/FS was made available for public review on February 7, 1992 at the following locations:

* Lloyd Town Hall, Highland, NY
* NYSDEC Region 3 Office, New Paltz, NY
* Highland Public Library, Highland, NY

SUMMARY OF PUBLIC CONCERNS AND NYSDEC RESPONSES

The following is a summary of the questions, comments and responses received during the comment period, either at the public meeting or through written correspondence. Written correspondence were received from Reta Behnke and IBM Corporation on March 9, 1992. Their comments and questions are included as Q20, Q21 and C1 through C27, respectively. A copy of the transcript for this meeting as well as other written or verbal comments received during the comment period will be available with the Administrative Record.

QUESTIONS AND RESPONSES

Q1 During the discussion of the public health assessment, risk data was presented in which exposure to groundwater is considered hazardous, with a greater than one-in-a-million chance of contracting cancer. Please explain what this means.

R With respect to domestic use of groundwater, cancer risk associated with exposure to untreated groundwater are greater than 1×10^{-6} (one-in-a-million). Risks greater than 1×10^{-6} are generally considered unacceptable by regulatory agencies. Of the four affected homeowners, the greatest risk was determined to be 6×10^{-4} (six per ten thousand). These wells are all currently being treated by carbon filtration systems to remove volatile organic contaminants (VOCs) to comply with regulatory guidelines.

Q2 Isn't it likely that the affected homeowners were ingesting contaminated water for a period of 20 to 30 years?

R There was a time period where it is likely that homeowners were ingesting VOC-contaminated water.

Q3 What effect will 10 gallons per minute (gpm) groundwater pumpage for the pump test have on the aquifer and nearby homeowner wells? Is it possible that their wells might go dry?

R The groundwater will be treated and disposed of at the ground surface on-site, allowing the water to recharge the aquifer. This will help to maintain the existing water level in the area. In addition, based on the pump test conducted for the site, a pump rate of 10 gpm is not expected to impact homeowner wells. If a significant impact was observed at the homeowners wells, the pump rate would be decreased.

Q4 Water requirements for the incinerator are expected to be 30 to 100 gpm. Where do you anticipate obtaining this water?

R Water demands for the incinerator are high and are of some concern. These demands are expected to be met using one, or a combination of, the following: 1) Treated water from the pump and treat system (up to 10 gpm), 2) drilling of additional supply wells (up to 20 to 25 gpm) 3) on-site streams, and 4) truck in water. If water usage from the pump and treat system or supply wells adversely affect homeowner supplies, usage rates would be decreased.

Q5 What is the cost of groundwater treatment of the contaminated aquifer?

R The capital costs for installing the pump and treat system are estimated to be $156,000. The operation and maintenance costs for this system for a six year operational period are estimated to be $48,000.

Q6 What institutional restrictions would be imposed on the Mead Property and adjacent properties?

R Property access prior to and during soil/waste remediation would be restricted. In addition, groundwater use in the affected area would also be restricted.

Q7 What if homeowner wells, which are presently unaffected by contamination, become affected as a result of migration from the Mead Site?

R It is likely that NYSDEC would install carbon filtration systems on any wells which become contaminated above existing groundwater quality standards.

Q8 Point-of-use carbon treatment systems for the four affected homeowners are estimated to cost $198,000 for a 30 year period. For an additional $400,000, a permanent water supply could be installed. Why wasn't this option chosen, as it would also serve to supply water needs for the incinerator?

R The carbon systems which have already been installed are very efficient at removing VOCs down to levels which are protective of human health. This alternative, as compared to providing a public water supply, is one-third the cost and offers the same level of protection. However, NYSDEC will be happy to discuss this alternative with the Town of Lloyd. The State has provided financial assistance to many communities in establishing or extending water supplies.

Q9 Will the water from the groundwater pump and treat system be treated on- or off-site?

R The water is proposed to be treated on-site.

Q10 Ultraviolet ozonation is being used in the State of Florida as a very cost-effective treatment for VOC-contaminated water in large cities and small communities. Has the State considered this technology for use at the Mead Site?

R The State considered this technology and found that it is not effective for treating all VOCs found at Mead. It has a difficult time oxidizing organic compounds with single bonds such as 1,1,1-trichloroethane and 1,1-dichloroethane found at Mead. In addition, these systems have a very high capital cost and are generally not cost-effective for treating relatively small volumes of water as we would here.

Q11 There is a small supply well located at 241 Upper North Road which is owned and operated by Mr. Constantino and supplies about seven families. Has this well been tested and could it have a contaminant problem?

R This well was sampled on July 26, 1989 and was found to be clean. This is the well that was used to evaluate residential water supply alternative #2 for establishing a community water supply.

Q12 Is there a risk of releasing contaminants into the air through excavation activities and also from the incinerator?

R A health and safety plan would be prepared prior to any construction activities which would establish "action levels", health-based air quality guidelines which, if contravened, would cause a shut-down of all construction activities. Air monitoring would be done during all site activities to ensure that impacts to human health are at the safest levels possible. Controls to minimize contaminants released to the air would be implemented throughout the construction period.

Q13 How will further water contamination be minimized during construction activities?

R With respect to the waste staging area, a cap and liner will be utilized to minimize infiltration of precipitation and capture any water that drains from the staged waste and soil. In addition, berms will be constructed to direct surface runoff to collection basins where it can be treated using the on-site carbon adsorption system. Monitoring wells would also be sampled to ensure that no significant impact to the groundwater has occurred.

Q14 During excavation activities, is it possible that significant releases of contaminants into the groundwater could occur and affect our wells? Given the long turn-around time (several months) between sampling and obtaining the results, we could be drinking contaminated water while we are waiting for the results to come back.

R The soils in which the septage disposal pits were constructed consists of a very dense clay material called glacial till which is quite impervious to groundwater movement. It is unlikely that excavation activities would cause significant releases of contamination vertically, through the overburden, into the bedrock. It is more likely that during rain events, pits may overflow down the hill to the west where contaminated surface water could enter the bedrock in the thin, more permeable overburden at the base of the hill, or drumlin. As previously indicated, water flow at the surface can easily be controlled through the construction of berms and collection basins. From here it would be treated though on-site carbon adsorption units. So long as waste material is left in the ground, it will continue to be a source and continue to contaminate private wells.

Q15 The water supply needs to operate an on-site incinerator are enormous - in the millions of gallons over a one year period. If this water were to be brought to the site (i.e., truck), the costs would be very high. Shouldn't this cost be figured into determining whether extending the community water supply is a cost-effective alternative?

R NYSDEC believes that there is strong justification for establishing a permanent water supply to the affected homeowners. We have done this in other communities with similar problems on a cooperative basis where the State and the town have contributed in the effort. We will be happy to discuss this option with the Town of Lloyd.

Q16 Why bother to clean up the contaminated water when you say that, after your groundwater remediation efforts, it may continue to be contaminated for many, many years. Why not just put in a water supply system and be done with it?

R As indicated previously, we will look into the community water supply issue further. If costs were not a factor, a permanent water supply would be preferable to installing carbon filters. With respect to contaminants in the groundwater and our ability to get them out, this is a difficult problem. Once contamination has infiltrated soil and groundwater within the overburden and bedrock, it is very difficult to remove. While no system to remove these contaminants will ever remove them all, the best we can hope for is to achieve a significant reduction of the contaminant mass.

Q17 Is the contamination getting worse at the site, in the homeowner wells?

R We now have about five years of groundwater data, having begun our sampling program in 1987. The levels have been consistent over these five years which seems to indicate that there continues to be a source of contamination. Unless the source is removed, contamination levels are expected to remain unchanged.

Q18 If community water was supplied to the site, would it be necessary to implement the pump and treat option?

R While a public water system may ensure a clean water source for the user of that water, there is no guarantee that all potential receptors of site-related contamination would be tied into public water. In addition, a public water supply would not protect other potential receptors such as fish and wildlife on or near the site, nor would it keep contaminants from migrating off site to streams and/or ponds. In addition, we are obligated under NYS Environmental Conservation Law to attempt to restore the environment to its pre-contamination conditions.

Q19 Is there a plan to monitor homes, previously sampled during the RI, on a long-term basis?

R The monitoring program will focus primarily on those homes which are current or potential receptors, primarily those homes sampled during the RI and are situated along John White Road, North Riverside Road and 9W. This sampling would be conducted for a minimum of 30 years. Sampling frequency would be on a quarterly basis initially, and decrease to biannual or annual sampling toward the later part of the monitoring period.

Q20 Will the alternatives recommended include buying up development rights in the area and/or rezoning the area to light industrial or commercial?

R It is not the practice of the State to buy hazardous waste properties, however, it is possible in some instances that the State could end up with properties as a result of a property settlement. The State has no authority with respect to zoning changes.

Q21 The costs in the FS for the point-of-use treatment systems are based on four contaminated well. What if other wells become contaminated?

R Additional systems will be installed.

COMMENTS AND RESPONSES

C1 As you know, IBM was not made aware of the availability of the RI/FS nor the 2/19/92 public hearing until 2/18/92. This prevented IBM from being able to review the RI/FS in a timely manner and raise serious concerns at the public hearing, as detailed below, regarding the manner in which the RI/FS was performed and the selected remedy.

R NYSDEC is required to allow a 30-day public comment period. Public notice is required to be published in a local newspaper at the onset of the public comment period. Public notice was made on February 7, 1992 in the Poughkeepsie Journal. The public comment period was from February 7 to March 9, 32 days. The RI/FS document was available for public access during this comment period at three public repositories.

C2 The RI/FS fails to define sources, pathways, and receptors of contamination The study never defines a mechanism or pathway for migration of chemicals found in the pits to receptors.

R NYSDEC believes that it very clearly does define sources, pathways and receptors of contamination.

C3 It is not clearly stated nor understood by NYSDEC or its consultant, Ecology and Environment, if residential well water quality will be even marginally improved after the enactment of the proposed remedy. Moreover, the report acknowledges that domestic well contamination may be caused by sources other than the Mead site, yet these sources remain undefined and unaddressed.

R It is likely that if the source of contamination is eliminated that residential water quality would improve. The report acknowledge that one homeowner may be affected by a source other than the Mead site.

The following two comments question the appropriateness of the selected groundwater alternative:

C4 The FS has selected an inappropriate remedy that is inconsistent with the NCP because it is not cost effective in achieving permanence and reduced mobility. Sufficient site characterization data have not been developed in order to predict performance or goals of the recommended pump and treat remedy.

C5 Because the hydrogeology has not been adequately characterized, the selection of a pump and treat option is premature.

R The remedies selected in the FS are consistent with NCP with respect to cost-effectiveness in achieving permanence and reduced mobility. No amount of site characterization will predict the absolute performance of a pump and treat system. The level of investigation carried out during this study suggests that our goal to remove the bulk of contamination in the groundwater is achievable.

The following eight comments question interpretations in the RI/FS concerning groundwater flow and the relationship between on-site contamination and contamination in homeowners wells.

C6 Site geology suggest, and field data confirmed, that contaminant migration from the waste pits into the soil is minimal.

C7 The RI data provided are insufficient to define groundwater flow and quality at the site.

C8 The data which were obtained have not been properly interpreted. The RI report states that the groundwater flow regime in the bedrock aquifer at the site is radial. Examination of the horizontal hydraulic gradients indicates that the preferential groundwater flow direction is from the northeast and towards the west. Therefore, the theory that the bedrock aquifer and the homeowner wells have become contaminated from overland flow recharging to the bedrock in the western portion of the site and then flowing east is unsubstantiated.

C9 Available data suggest that contamination in the bedrock aquifer is possibly migrating onto the site from the northeast from another source and is being introduced to the homeowner wells.

C10 The RI has failed to establish a pathway mechanism for material in the pits to reach the domestic wells. The absence of contaminants in the subsurface suggests that there is minimal vertical contaminant movement. This observation is substantiated by remarks made on Pages 8-2, 8-4 and 8-6 of the report.

C11 The RI Report erroneously concludes that contamination in well MW-9B is emanating from the waste pits. This conclusion is questioned upon examination of the concentration of organic compounds (less than detection limits) in wells 5S, 4S, 2S and GR1. There is significant evidence that groundwater contamination within the overburden is not migrating to the east.

C12 The RI has failed to explain the relevance of less than detection limits of organics found in MW-2B and 9B, yet 63 ppb TCA in MW-1B (east of 2B, 9B and the pits). This would indicate that a source other than the Mead pits is influencing MW-1B.

C13 Groundwater data from wells located between the residential wells and the site contradicts the RI conclusions.

R The drumlin on which the septage pits are located causes local groundwater within the bedrock and overburden to move radially, away from the topographic high. Due to the nature of the overburden, a very dense till, precipitation largely flows at or near the ground surface towards topographic lows. The overburden along the edges of the drumlin is considerably thinner (0 to 20' thick) and more porous. Surface water can easily find its way into the bedrock under these peripheral conditions. Regionally, groundwater in the deeper bedrock flows easterly towards the Hudson River, only 1.25 miles to the east. Monitoring well 9B was installed to investigate this deep bedrock and indeed did find low levels of 1,1,1-trichloroethane at 5.7 ppb. There are no contradictions between groundwater flow models and analytical results described in the report.

The following three comments question interpretations in the RI/FS concerning the hydraulic relationship between the surficial and bedrock aquifers.

C14 The hydraulic connection between the overburden and bedrock aquifers has not been substantiated. Work conducted to date is technically flawed and the data obtained is incorrectly interpreted.

C15 The use of a well screened across both the overburden and the bedrock aquifers in the pump test is questioned (MW-7I). Understanding the hydraulics of a single aquifer is difficult enough without compounding the problem by simultaneously pumping from two different aquifers.

C16 The FS has failed to establish a contaminant transport mechanism between the overburden and bedrock aquifers.

R Under an ideal investigation, pump tests screened within the overburden and bedrock aquifers, independently, would provide the best information with regards to answering questions concerning this hydraulic relationship. Costs constraints only allowed one pump test. Because we had enough well pair data and slug test data to develop a good understanding of the interaction between these two aquifers, we chose to screen a single well over both intervals within zones which are likely to display the highest hydraulic conductivities; the lower overburden and upper bedrock. As a result of this test, we were able to define an area of influence within both the bedrock and surficial aquifers.

C17 The FS has failed to address the likelihood that the introduction of recovery wells to depths of up to 300 feet may introduce contaminants to previously unaffected portions of the bedrock aquifer.

R It is likely that recovery wells would be vertically restricted to the very shallow bedrock aquifer (the upper 50 feet) and areally restricted to areas of known, high level contamination.

The following four comments address the possible relationship between the Gruner waste pits and the Mead pits, the potential contribution of contaminants from the Gruner pits during groundwater remediation and the potential impact of the Gruner pits on groundwater quality.

C18 The FS has failed to address the hydraulic influence of the pumping wells on drawing contaminants from known sources (Gruner Property) and any unknown sources.

C19 The FS has failed to consider potential contaminant contribution from the Gruner waste pits. GR-2 was the only well to have chlorobenzene in it and the only significant sources of this material identified in the RI came from Gruner waste pit samples GR-7 and GR-9.

C20 The FS has failed to explain the interaction between the contaminants common to both the Mead pits and the Gruner pits, namely PCB arochlor 1254. The FS has only considered the Mead pits PCBs.

C21 The FS has failed to consider the fact that the pump test indicated a drawdown at MW-6B which indicates that the Gruner pits were within the cone of influence. Therefore, proposed extraction well PW-3 will likely encompass an area including the Gruner pits.

R The FS calls for implementing a remedy to address contamination which is derived from the Mead Property Site. If prior, during or subsequent to remediation of the Mead Property Site, additional sources of hazardous constituents are identified which are unrelated to the Mead Site, and which directly impact the cleanup effort of this site, then the necessary enforcement action will be taken.

The following three comments question the cost effectiveness and implementability of an on-site incinerator.

C22 The FS does not address the fact that the characteristics of the pit wastes vary significantly and will severely hamper the effectiveness and operational efficiency of an incinerator.

C23 Given the topography of the site, the establishment of on-site incinerator operations on the Mead Property without first excavating and stockpiling wastes will be impractical. The size and terrain of the property suggest that the only reasonable location for the incinerator operation is also the location of the waste pits. In addition, there are inherent environmental concerns of additional releases attendant with a stockpiling operation that have not been addressed.

C24 The cost estimate and logistical difficulties provided in the FS for on-site preparation and construction for the incineration option are substantially understated. The establishment of a roadway and utilities, particularly water, to the site will require major disruption of the site and adjoining properties.

R NYSDEC has talked with incineration experts concerning the amenability of the waste to incineration, staging of the incinerator and waste and costs of this alternative. While obstacles can be expected in carrying our this alternative under the most ideal conditions, there is no indication thus far that these can't be overcome. Obviously, the above concerns will be addressed at considerably more depth during the remedial design.

C25 For the near term, and perhaps long-term, it is recommended that NYSDEC consider remedial alternatives for the groundwater to be the establishment of institutional controls and monitoring. The RI establishes that contaminant migration from the waste pits is minimal in all potential pathways. Near term effort to provide a clean water supply to homeowners and remediating all the potential contaminant sources in a manner compliant with the goals of the NCP, while the groundwater system is further studied and monitored, is clearly a more prudent approach and consistent with consensus of the public's comments made at the 2/19/92 public hearing.

R The issue of implementing point-of-use water treatment systems verses introducing a community water supply is well taken and is addressed in previous questions #8, #15 and #16.

The following two comments request that options be made available in the ROD for alternative treatment methods (i.e., if some of the waste material at the Mead Property Site is determined not to be an F002 waste).

C26 Notwithstanding the possible application of the RCRA "derived from rule," we recommend that flexibility be afforded in the Record of Decision permitting the use of various disposal methods and treatment technologies based on the characterization of "manageable bits" of the contaminated material. Limiting available remedial options based on an assumed application of the RCRA rule will incur needless risk and cost.

C27 If the ROD is issued, it should be written to accommodate additional work to be done prior to the remedial design phase so that appropriate remedial techniques can be evaluated and utilized.

R The RI/FS and ROD discuss this possibility under "Off-site Land Disposal" as part of the screening process. While the report provides a discussion on the possibility that some of the waste may be classified otherwise, the likelihood was considered remote. If justification of waste segregation and alternative treatment technologies can be established, the ROD provides the opportunity to implement these other alternatives.

APPENDIX D

ADMINISTRATIVE RECORD

ADMINISTRATIVE RECORD

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