PB94-964101
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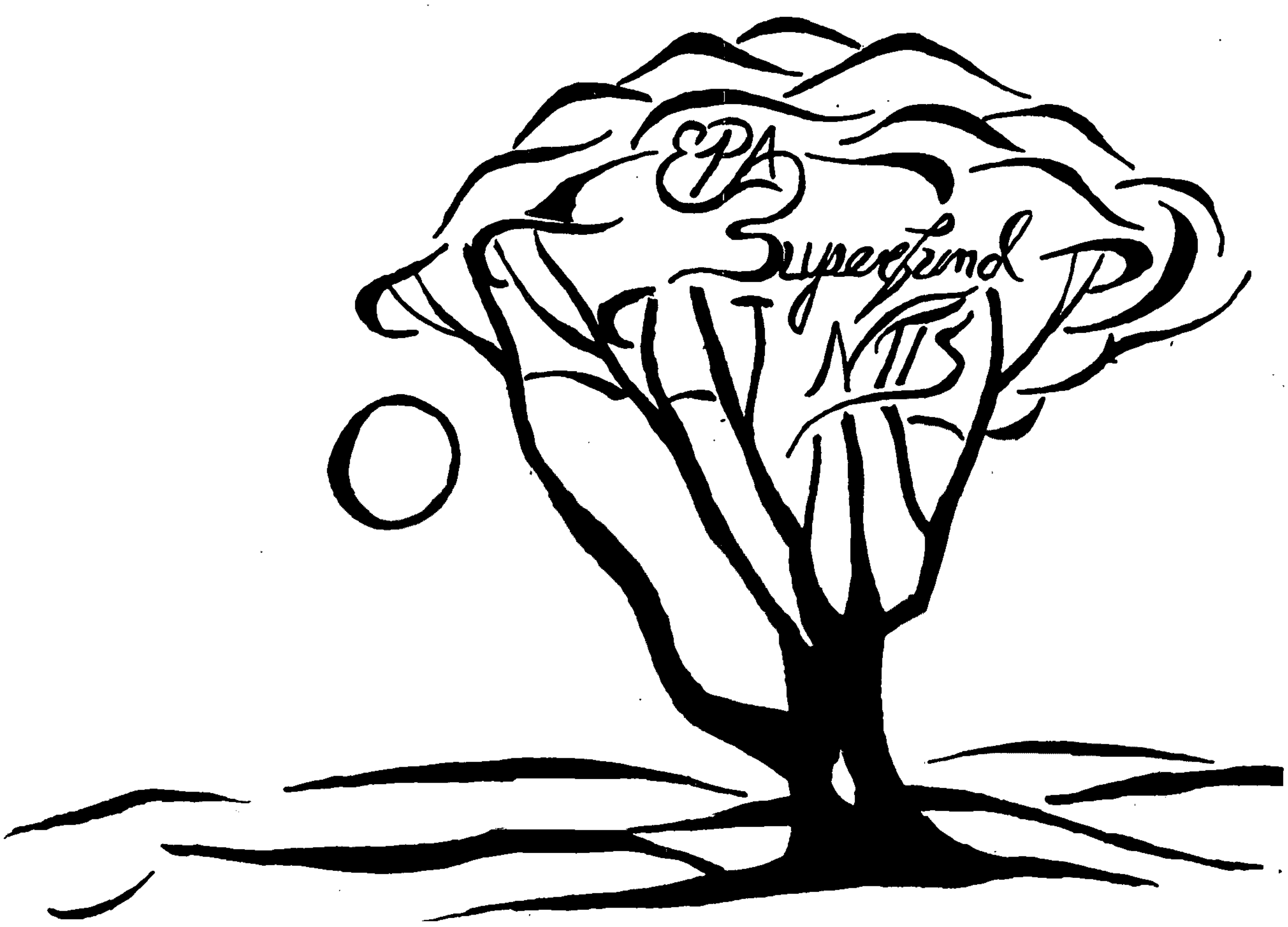
July 1994

EPA Superfund Record of Decision:

Perham Arsenic Burial Site, Perham, MN



DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Perham Arsenic Burial Site
Perham, Minnesota

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Perham Arsenic Burial Site, in Perham, Minnesota, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Minnesota Environmental Response and Liability Act of 1990 (MERLA), and, to the extent practicable, the National Contingency Plan (NCP). The decision is based on the Administrative Record for the Perham Arsenic Burial Site. The attached index identifies the items which comprise the administrative record upon which the selection of the remedial action is based.

The State of Minnesota has been consulted and concurs with the selected remedial action.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the remedial action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF SELECTED REMEDY

The selected remedial action for the Perham Arsenic Burial Site addresses the source of the contamination by remediation of groundwater. The major components of the selected remedial action include:

* Institutional Controls
* Recovery Wells
* Filtration
* Alumina Adsorption
* Infiltration Gallery
* Municipal Water to Resident

STATUTORY DETERMINATIONS

Consistent with CERCLA and, to the extent practicable, the NCP, 40 C.F.R. Part 300, the selected remedial action is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable and satisfies the statutory preference for remedies that employ treatment and reduces toxicity, mobility, or volume as a principal element. Because this remedy will result in hazardous substances remaining on site above health based levels, the five year review will apply to this action.

Michelle D Jordan
for Valdas V. Adamkus
Regional Administrator

3-31-94
Date

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ATTACHMENTS

DECISION SUMMARY

I. SITE NAME, LOCATION AND DESCRIPTION

The Perham Arsenic Burial Site is located in the southwest corner of the East Otter Tail County Fairgrounds in Perham, Minnesota. The City of Perham is an agricultural-based village in northwestern Minnesota with a population of 2,086. (See Figure 1). The East Otter Tail County Fairgrounds was used as a mixing station and as a depository for pure (unmixed) lead arsenate and unused arsenic-based grasshopper bait. In 1947, pure lead arsenate and unused arsenic-based grasshopper bait were buried in a shallow pit in the southwest corner of the fairgrounds. (See Figure 2). The shallow pit area, and associated groundwater plume which emanated from the pit area, are considered the Perham Arsenic Burial Site (site). Adjacent fairground properties are used for community and recreational purposes.

The topography around site is flat and gently slopes eastward toward the Otter Tail River which is approximately 1.8 miles to the east. The site surface consists largely of open, grassy fields and dirt roads. Several brick, wood, and aluminum buildings exist on the site. Subsurface features under the site are characterized by a massive unit of glacial outwash sands and gravel. In the Perham vicinity, a confining clay unit is reported to exist within the glacial overburden, however, the confining clay unit was not encountered during drilling at the Perham site.

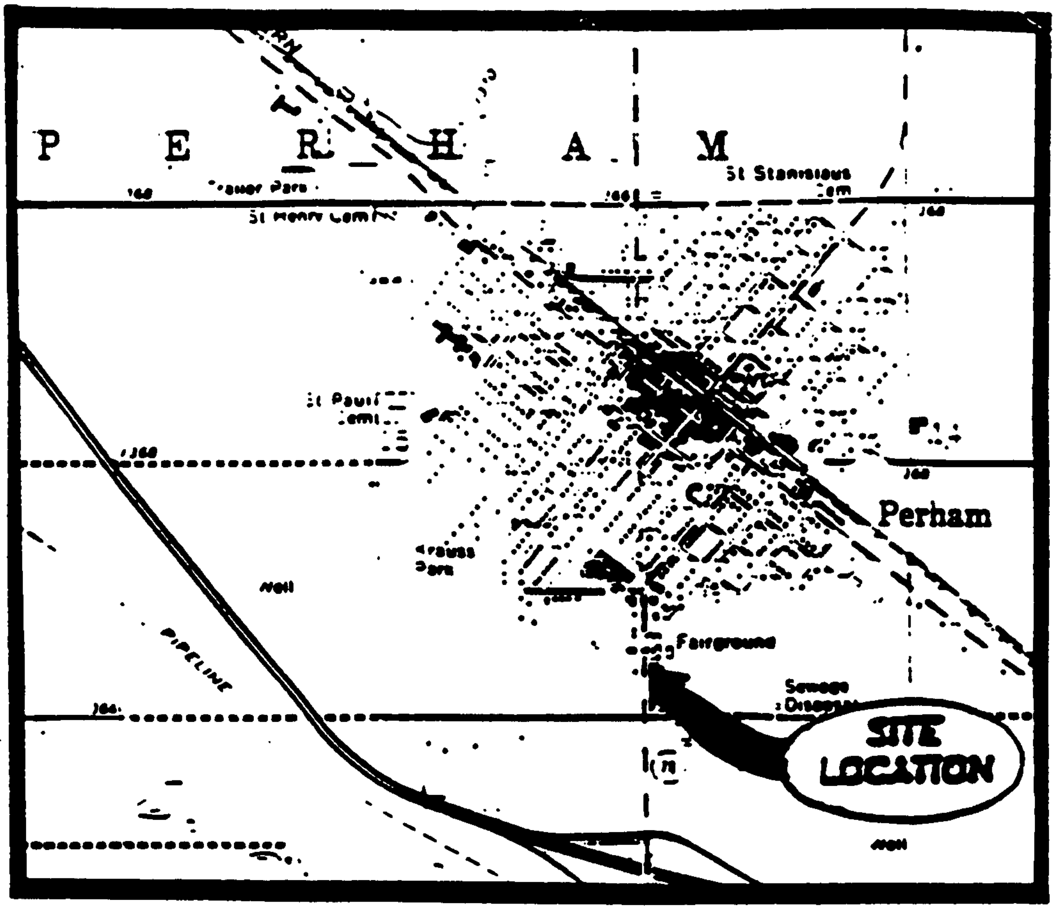
Groundwater in the vicinity of the site flows in an east to southeast direction towards the Otter Tail River.

The City of Perham uses a municipal well system to supply residents with potable water. A total of four municipal wells are used to supply residential and commercial demands. Two wells are located in the southern section of the city limits, approximately 1/2 mile due west (hydraulically upgradient with respect to groundwater) of the site. Two additional municipal wells are located to the north approximately 1/2 to 3/4 miles from the site. At the current operating conditions, the municipal well system is not expected to influence contaminant migration at the site.

II. SITE HISTORY AND ENFORCEMENT ACTIVITY

During the grasshopper infestation of the 1930s and 1940s, the U.S. Department of Agriculture distributed lead arsenate to be used as grasshopper bait to several counties in the state of Minnesota. Technical grade lead arsenate was mixed with sawdust and molasses to form the grasshopper bait. The bait was dispersed around farm fields to prevent crop loss. The East Otter Tail County Fairgrounds in Perham, Minnesota was a mixing

QUADRANGLE LOCATION



SOURCE: U.S.G.S. PERHAM, MN–OTTER TAIL CO.
7.5 MINUTE SERIES PHOTOREVISED 1973

SCALE 1:24000

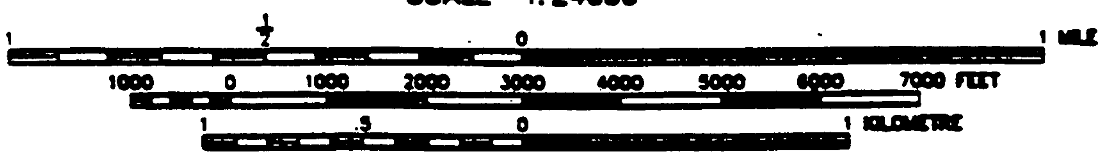


FIGURE 1

SITE LOCATION MAP

PERHAM ARSENIC BURIAL SITE

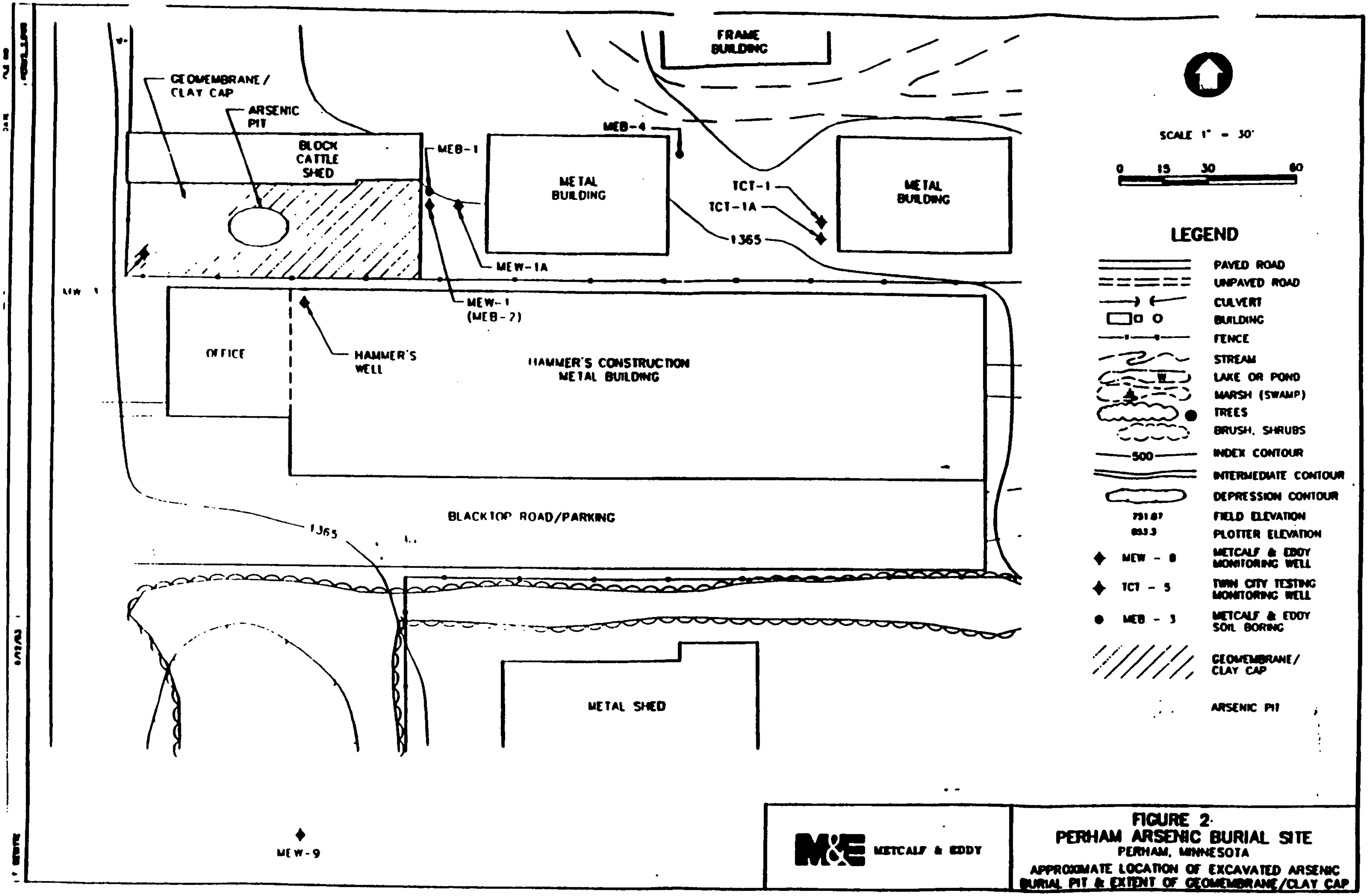


FIGURE 2
PERHAM ARSENIC BURIAL SITE
PERHAM, MINNESOTA
APPROXIMATE LOCATION OF EXCAVATED ARSENIC BURIAL PIT & EXTENT OF GEOMEMBRANE/CLAY CAP

station for the arsenic-laden grasshopper bait. In 1947, lead arsenate and unused grasshopper bait were buried in a shallow pit in the southwest corner of the fairgrounds. It is reported that between 200 and 2,500 pounds of grasshopper bait containing over 50 pounds of technical grade lead arsenate is thought to have been buried in the pit in burlap bags, wood or other decomposable material.

Groundwater samples from monitoring wells have been collected quarterly or semi-annually since 1980 by state and federal agencies. Analytical data does not indicate a significant decrease nor increase in arsenic concentration levels since monitoring began.

The following is a chronological summary of the history of the Perham Arsenic Burial Site, including site investigation and remedial activities.

1931: The Grasshopper Control Campaign Committee was founded by the Minnesota Department of Agriculture, University of Minnesota Agricultural Extension Service and State Entomologist.

1932: Five hundred railroad cars of arsenic bait were delivered to 55 of Minnesota's 87 counties.

1936-1947: The U.S. Congress spent $27.3 million on grasshopper control, $1.9 million of which was spent in Minnesota.

1947: Grasshopper control was terminated. Remaining lead arsenate and remaining arsenic bait were buried in the southwestern corner of the fairgrounds in Perham. It is estimated that approximately 200 to 2,500 pounds of grasshopper bait containing over 50 pounds of technical grade arsenic were buried in the pit.

1971: Hammers Construction Company purchased land from the City of Perham and erected an office and a construction warehouse, adjacent to the arsenic pit.

1972: In May, a 31-foot deep, 1.25-inch I.D. galvanized steel well was installed for Hammers Construction Company.

In June, eleven employees became sick as a result of drinking water from the well. Two employees suffered permanent effects.

In July, water samples were collected for arsenic analysis from Hammers' well, seven private wells that were within 120 to 1000 feet of Hammers' building, and three municipal wells within 1/2 mile of the site. The maximum arsenic concentration found in Hammers' well was 11,800 parts per billion (ppb). The well was capped and city water was extended to the building.

In August, the Minnesota Department of Agriculture collected soil samples at the burial site. Analytical results detected arsenic concentrations up to 12,600 parts per million (ppm).

In October, the Minnesota Department of Agriculture collected additional soil samples at the site to further define the extent of buried arsenic.

1974: Minnesota Department of Health continued a semi-annual groundwater sampling program for private and municipal wells within the site's vicinity.

1980: In September, U.S. EPA began soil sampling and monitoring well installation. The investigation discovered that arsenic-contaminated groundwater extended approximately 600 feet downgradient (east) of the burial pit on the fairgrounds. Elevated levels of soil contamination were found in a 15 by 40 foot area just north of Hammers Construction Company's property and well.

1982: The burial pit was capped with a clay cover to reduce the amount of rainwater infiltration thus reducing leaching of the arsenic.

1983: The Minnesota Pollution Control Agency (MPCA) issued a Request for Response Action (RFRA) to East Otter Tail County Fairboard and the City of Perham. The site was included on the MPCA's Permanent List of Priorities and on the U.S. EPA's National Priorities List (NPL).

1984: MPCA completed the first Remedial Investigation/ Feasibility Study (RI/FS) for the site. In 1984 the following remedial action was proposed, and in 1985, it was implemented.

1. Excavation of approximately 200 cubic yards of arsenic wastes and contaminated soils containing greater than 500 ppm, with subsequent disposal at an approved hazardous waste disposal facility.

2. Backfilling the excavated pit with clean fill material.

3. Reestablishment of the clay cap and impermeable membrane to minimize leaching of any residual arsenic.

4. Continuation of groundwater monitoring until levels of arsenic in the monitoring wells fell below the federal drinking water maximum contaminant level (MCL) of 50 micrograms per liter (ug/L).

After completion of this initial remedial action groundwater was expected to attenuate. Groundwater monitoring has continued on a semi-annual basis to the present.

1989: The Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, conducted a Health Assessment for the site and recommended post-remedial sampling of the groundwater to define the extent of the arsenic plume.

Because arsenic concentrations in groundwater have not significantly decreased, as assumed at the time of the 1985 remedial action, the EPA developed a RI/FS Work Plan to define the extent of the arsenic plume, and determine whether residual soil contamination remained.

1992/1993 EPA conducted a two phase RI of the site, which included the installation of twenty-five (25) monitoring wells and twelve (12) soil borings.

The Potentially Responsible Party (PRP) search for the site listed several persons and entities who could have exposure under CERCLA 107. However, to date, no general or special notice letters have been issued.

III. COMMUNITY RELATIONS HISTORY

Since the discovery of arsenic in Hammers' well, the Perham Arsenic Burial site has been a topic of conversation for the citizens of Perham. Citizens of Perham, members of Perham's municipal government, and civic organizations in Perham were active in lobbying the state legislature for passage of a Superfund law.

U.S. EPA and MPCA have kept Perham residents informed of all developments at the site. News releases, news media contact, and meetings have provided the community with information of various remedial events throughout the clean up process. Investigations regarding soil contamination were discussed with city staff and officials, and members of the Arsenic Action Committee on October 11, 1983. When the investigation commenced, MPCA issued a news release on the project, and members of MPCA staff were interviewed by local reporters. The City of Perham newspaper, The Enterprise Bulletin, provided frequent coverage of MPCA's progress.

At the conclusion of the first RI/FS in 1984, MPCA held a public meeting to discuss investigation results and invite comments on the proposed remedy to clean up soils. On July 19, 1984, approximately 30 people attended the meeting at which MPCA, U.S. EPA, and MPCA's contractors presented information and responded to questions. The meeting was covered by regional as well as local news media. Fact sheets outlining the results of the RI/FS and the Minnesota Superfund were available at the meeting.

On March 31, 1992, U.S. EPA and MPCA personnel visited Perham to meet with the city manager, city engineer, school district members, county fair board members, newspaper editor, and adjacent property owners. During the meetings attendees were informed of the upcoming investigation and the rationale for it. Also, a tentative schedule for completion of the RI/FS, Proposed Plan, public meeting, and Record of Decision was discussed. Meetings with various city and private personnel were held in July 1992, February 1993, and January 1994. An RI Fact sheet was issued explaining the findings of the investigation in January 1994.

Following completion of the second RI/FS in 1994, the U.S. EPA published a Proposed Plan for remedial action, on February 15, 1994. The RI/FS Report, Proposed Plan for remedial action and the Administrative Record, have been placed in an Information Repository located at the Perham Public Library, 100 3rd Street NE, Perham, Minnesota. Consistent with Section 113 of CERCLA, the Administrative Record includes all documents such as the work plan, data analyses, public comments, transcripts, and other relevant information used in developing remedial alternatives for the site. These documents were made available for public review and copying at the Perham Public Library.

To encourage public participation in the remedy selection process, consistent with Section 117 of CERCLA, the U.S. EPA set a 30 day public comment period from February 15, through March 16, 1994, on the Proposed Plan. A Public Meeting was held on February 22, 1994, to answer questions regarding the Proposed Plan and to accept verbal public comment on the Proposed Plan. Interested parties provided comments on the alternatives presented in the Proposed Plan and elaborated upon in the FS. The remedy for the Perham site described herein was selected after a detailed review of public comments received. The attached Responsiveness Summary addresses those public comments received.

IV. SCOPE AND ROLE OF REMEDIAL ACTIVITIES

In 1985, the first remedial action for the site was implemented. Approximately 200 cubic yards of arsenic wastes and contaminated soils were excavated and disposed of at an approved hazardous waste disposal facility. The excavated pit was backfilled with clean fill material. A clay cap and impermeable membrane to minimize leaching of any residual arsenic was installed. Groundwater monitoring was implemented and scheduled to continue until levels of arsenic in the monitoring wells fell below the MCL.

Because the source of arsenic contamination had been removed and surface water infiltration into the pit area was limited, the arsenic plume was expected to eventually dissipate. Groundwater samples, which have been collected twice a year since 1984, show that arsenic contamination has not decreased significantly since that time.

The RI/FS conducted in 1992/1993 was designed to determine the present extent and movement of arsenic contamination in the groundwater and whether residual levels of arsenic contamination were present in the soil. The 1992/1993 RI/FS concluded that arsenic is present in the groundwater at concentrations ranging from below detection limit (2 ppb) to 1260 ppb within a 600 X 400 foot plume. (See Figure 3). The vertical extent of contamination is approximately 85 feet below grade. (See Figure 4).

Residual soil level results indicate that arsenic concentrations are below published background concentrations for soils in Minnesota. U.S. EPA and MPCA agree that no further action on soils is necessary.

The remedial action selected for the site will eliminate the threats associated with ingestion and direct contact with contaminated groundwater. The remedial action, in combination with the 1985 remedial action regarding arsenic contaminated soils at the site, should be considered a complete site remedy. When this remedial action is completed, no further remedial action is expected, other than groundwater monitoring. The monitoring of groundwater would be conducted to assure that the arsenic concentration in groundwater remains below the cleanup level. Since the time to achieve the cleanup level is estimated to take longer than five years, a five year review would be necessary.

V. SUMMARY OF SITE CHARACTERISTICS

A. Soil Contamination

The source of contamination at the site was arsenic-laden grasshopper bait and technical grade lead arsenate buried in a pit located in the southwest corner of the East Otter Tail County Fairgrounds. The arsenic was buried approximately 3 to 6 feet below grade. The dimension of the burial pit was 10 by 20 feet. Soils around the pit area also became contaminated with arsenic.

The burial pit and surrounding soils are the only confirmed source of contamination. An additional source was reported under the Hammers construction company building. During the 1992/1993 investigation, borings were completed to determine if residual soil contamination existed below the pit area and under Hammers' building. Results of the soil investigation indicate that

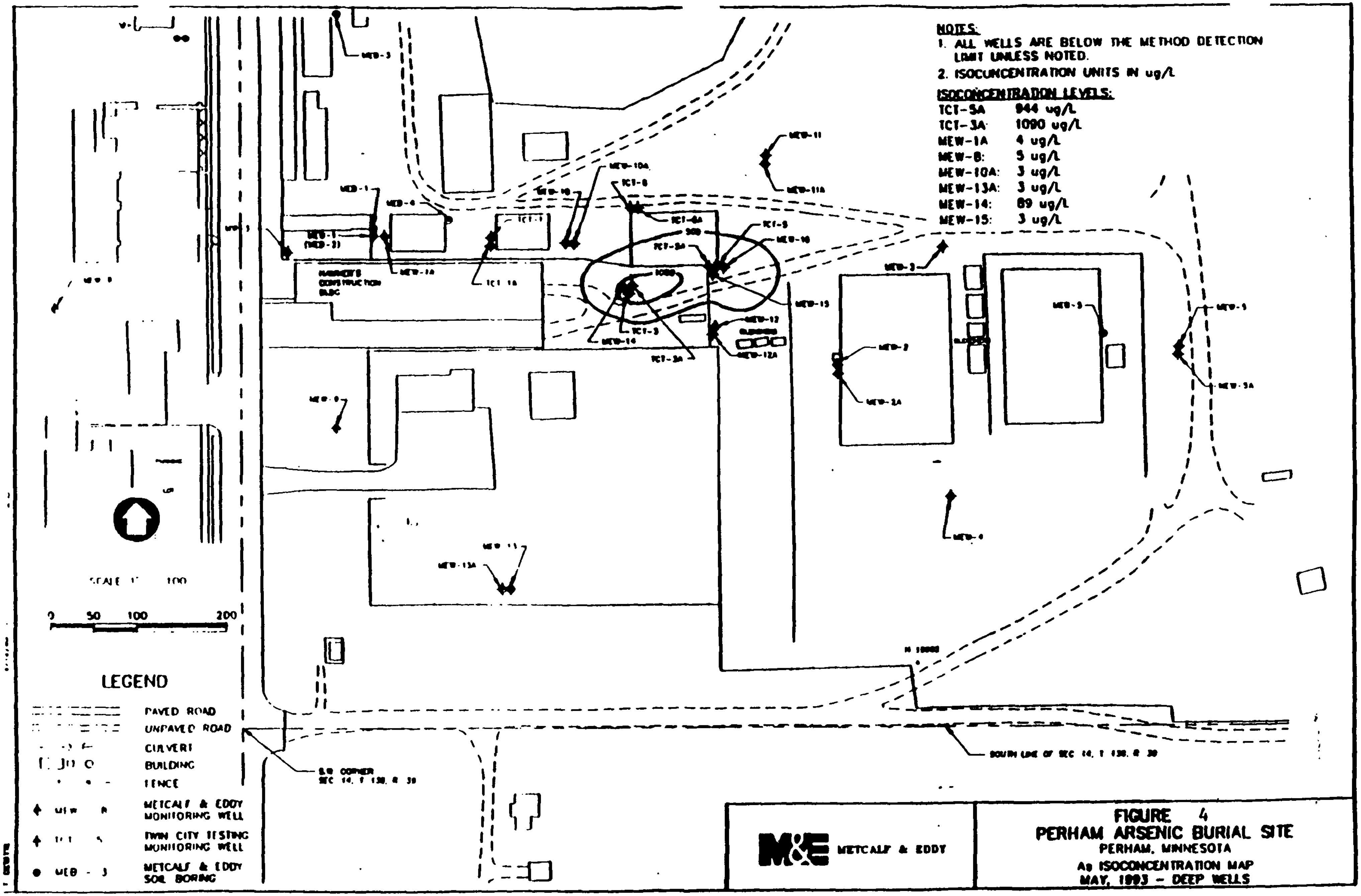


FIGURE 4
PERHAM ARSENIC BURIAL SITE
PERHAM, MINNESOTA
As ISOCONCENTRATION MAP
MAY, 1993 - DEEP WELLS

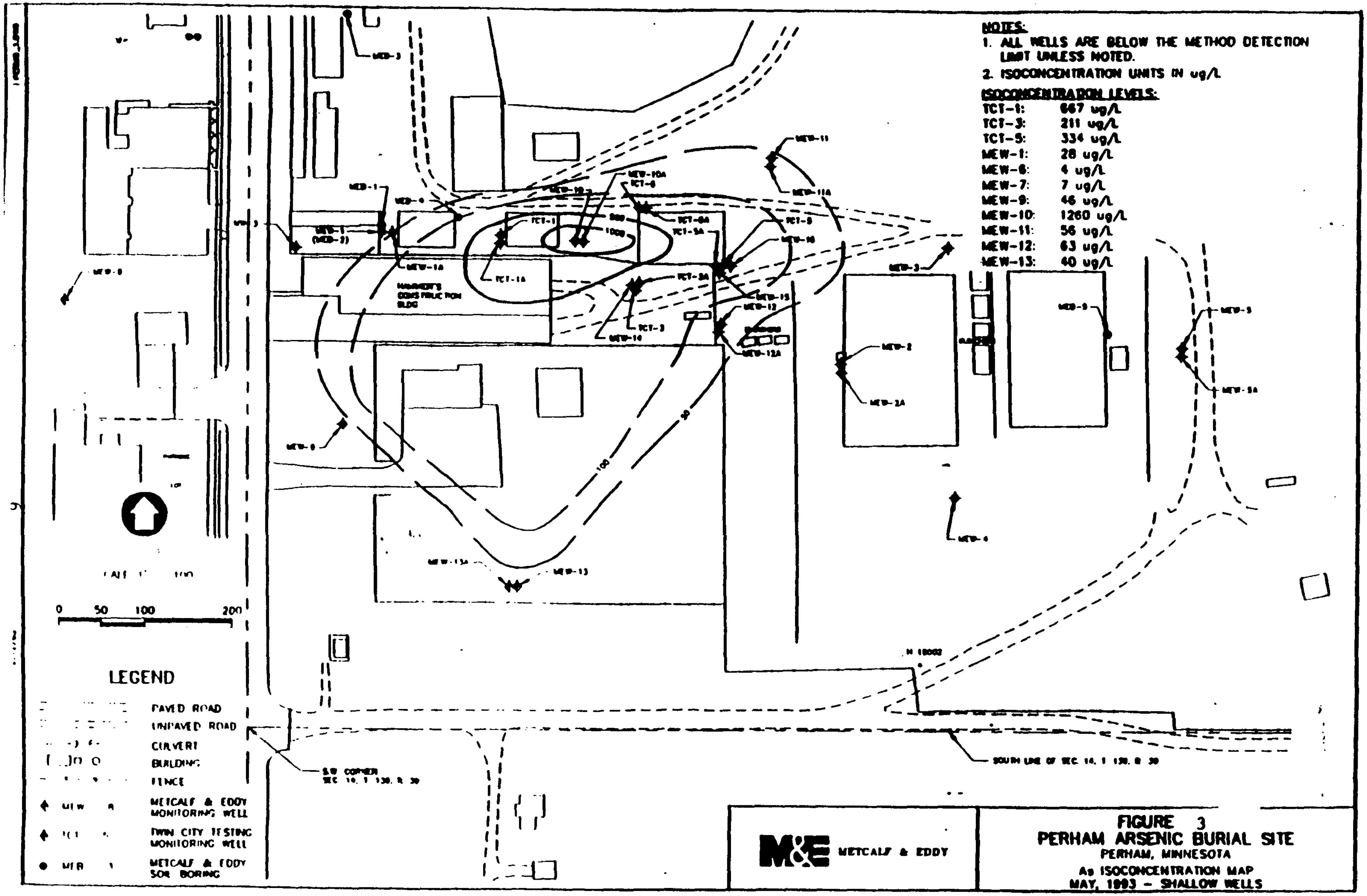


FIGURE 3
PERHAM ARSENIC BURIAL SITE
PERHAM, MINNESOTA
As ISOCONCENTRATION MAP
MAY, 1993 - SHALLOW WELLS

arsenic levels were below published background concentrations for soils in Minnesota and are not considered a direct contact threat or a source of groundwater contamination.

Due to the presence of lead in the unmixed lead arsenate, soil samples were also analyzed for lead. Lead analysis indicated that levels found were slightly above background levels in one soil boring. However, concentrations of lead in that boring did not pose an unacceptable risk.

B. Groundwater Contamination

Contaminated groundwater, resulting from water infiltrating through the former pit area prior to removal of unmixed lead arsenate and arsenic bait, is the media of concern. Arsenic in groundwater is at concentrations ranging from below detection limit (2 ppb) to 1260 ppb within a 600 X 400 foot plume. The vertical extent of contamination is approximately 85 feet below grade. Analytical results at the site indicated that 99% of the arsenic in groundwater is in the arsenate (As +5) state. Arsenic in this state strongly adsorbs and does not tend to move far. This appears to be the situation at the site. In 46 years, the edge of the plume has migrated approximately 600 feet downgradient of the initial source.

Because lead was in the unmixed lead arsenate, groundwater samples were analyzed for lead. Concentrations of lead in groundwater across the site do not indicate a clearly definable plume. However, since lead is site related, it was evaluated in the baseline risk assessment (BRA). The BRA determined that lead concentrations at the site did not pose an unacceptable risk.

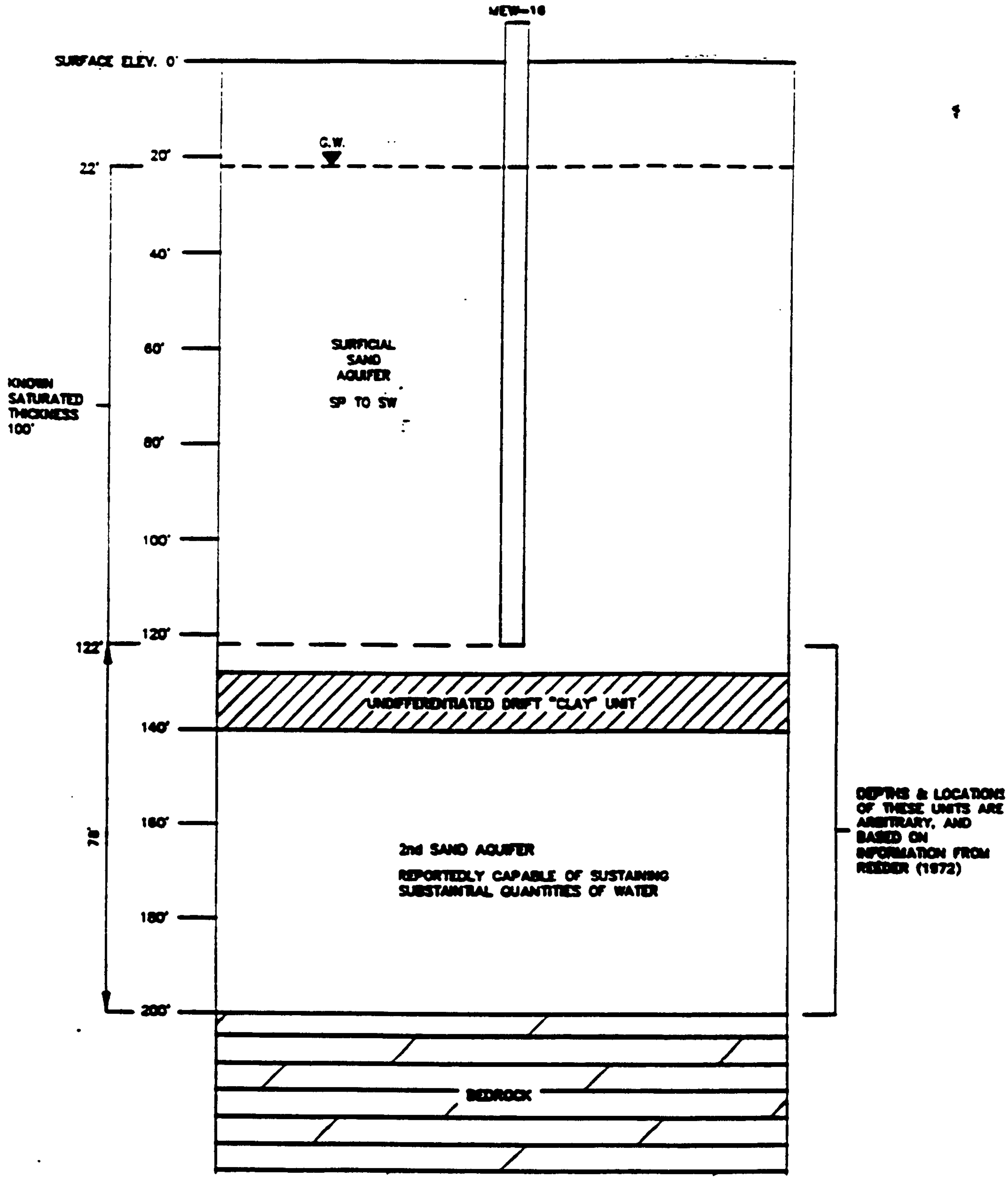
The groundwater recovery well network will be designed to capture the arsenic plume. Lead concentrations encompassed within this plume will be recovered and treated along with the arsenic.

Groundwater samples were collected and analyzed for the Target Analyte List (TALs), to confirm the presence or absence of other inorganic analytes. Results indicated that arsenic was the only contaminant of concern.

C. Geology/Hydrogeology

Site geology consists of a massive unit of outwash sands and gravels. Thickness of the outwash deposits under the site are greater than 122 feet below grade. A confining clay unit is reported to exist within the glacial overburden, however, the confining clay unit was not encountered at the site. (See Figure 5).

Groundwater in the vicinity of the site flows in an east to southeast direction towards the Otter Tail River which is approximately 1.8 miles to the east of the site. Groundwater levels at the site are approximately 22 to 24 feet below grade.



NOTE:
MEW-16 : DEEPEST WELL DRILLED AT THE SITE

M&E METCALF & EDDY

FIGURE 5
PERHAM ARSENIC BURIAL SITE
PERHAM, MINNESOTA

GENERALIZED STRATIGRAPHIC SEQUENCE

FILE NO PERMJS.1 DWG
DATE
APPROVED BY
DATE
CHECKED BY
DATE 8/12/83
DRAWN BY T. DEWITTE

The glacial outwash aquifer at the site is characterized by fine to coarse sands and gravels, admixed or interbedded, with sporadic silty areas. The sustained yield rating for this aquifer is estimated to be 100 to 500 gallons per minute.

D. Groundwater Use

Water supplies obtained from the aquifer present in the Perham vicinity are used for industry, agriculture (irrigation), municipal, and residential demands for potable water.

The nearest residential well currently in use as a domestic water source is located approximately 700 feet to the south of the former arsenic pit, perpendicular to the groundwater flow direction. The well was sampled and analyzed on three separate occasions during the course of the RI. Arsenic concentrations detected in the residual well averaged 6 ppb. Lead concentrations were below the instrument detection limit. The background concentration for arsenic was determined by analyzing groundwater samples collected from the upgradient well MEW-8. Background arsenic concentration is 5 ppb. Therefore, arsenic concentrations in the residential well are at background levels.

VI. SUMMARY OF SITE RISKS

A. Human Risks

Information contained in the BRA of the RI Report indicates that current and future potential health risks to individuals at the site are related to exposure of arsenic contaminated groundwater via ingestion and dermal contact. A current and future residential use scenario was used for arsenic in groundwater. Arsenic is classified as a Group A Human Carcinogen.

Concentrations of chemicals of concern (arsenic & lead), on which the risk assessment was based, were determined by following U.S. EPA guidance which requires a 95% upper confidence limit on the arithmetic mean, assuming a log-normal distribution. Exposure point concentrations were determined by either the maximum concentration within the contaminant plume, or the 95% upper confidence limit, which ever was lower. Maximum concentrations of arsenic from the existing residential well were used as the existing groundwater exposure source.

Exposure pathways considered were ingestion and dermal contact while showering with arsenic contaminated groundwater. Potentially exposed populations under the current use scenario identified the closest residential well. Under future use scenario, primary receptors were children and adults that would reside directly on site and would receive their drinking water from a groundwater well installed on site. Exposure intake variables used in the risk assessment were selected so that the combination of all intake variables resulted in an estimate of the Reasonable Maximum Exposure (RME) for each pathway.

Cancer potency factors (CPFs) have been developed by U.S. EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of (mg/kg-day)-1 are multiplied by estimated intake of potential carcinogen (mg/kg-day), to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upperbound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. CPFs are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

Reference doses (RFDs) have been developed by U.S. EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RFDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RFD. RFDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors assure that the RFDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

Excess lifetime cancer risks are determined by multiplying the intake level with the CPF. These risks are probabilities that are generally expressed in scientific notation (e.g., 1X10-6). An excess lifetime cancer risk of 1X10-6 indicates that, as a plausible upper bound, an individual has a one in a million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific conditions at the site.

Toxicity value information used in the risk assessment for chemicals of concern at the site are summarized in Tables 1 & 2.

The findings of the non-carcinogenic hazard assessment demonstrated that the total non-carcinogenic hazard indices for the future adult and child receptor populations exceed the criterion value of 1.0, and are above acceptable levels. Results indicate that ingestion of arsenic in groundwater is the exposure route primarily responsible for the increased hazard.

Unacceptable cancer risk estimates calculated in the risk characterization were associated with ingestion of groundwater for both the adult and child future receptor populations. (See Table 3).

Table 1 (1) Critical Toxic Effects for Chemicals of Concern at the Perham Site

ANALYTE	NONCARCENOGENIC EFFECTS		CARCINOGENIC EFFECTS (2)	
	ORAL	INHALATION	ORAL	INHALATION
Arsenic	keratosis hyperpigmentation	NA	skin (group A)	respiratory tract (group A)
Lead	central nervous toxicity	central nervous toxicity	NA (group B2)	NA (group B2)

(1) Source: Annual FY–1992 Health Effects Assessment Summary Tables
(2) U.S. EPA Weight of Evidence for Carcinogens:
Group A, Human Carcinogen
Group B, Probable Human Carcinogen
Group C, Possible Human Carcinogen
Group D, Not Classifiable
Group E, Evidence of Noncarcinogenicity
NA=Not Applicable

Table 2 TOXICITY VALUES FOR CHEMICALS OF CONCERN AT PERHAM ARSENIC BURIAL SITE

CHEMICAL	NONCARCINOGENIC RfDs: ORAL RfD (MG/KG/DAY) SUBCHRONIC	ORAL RfD (MG/KG/DAY) CHRONIC	ADJUSTED ORAL (DERMAL) (MG/KG/DAY) (a) SUBCHRONIC	ADJUSTED ORAL (DERMAL) (MG/KG/DAY) (a) CHRONIC	INHALATION RfD (MG/KG/DAY) SUBCHRONIC	INHALATION RfD (MG/KG/DAY) CHRONIC	CANCER SLOPE FACTORS: ORAL SLOPE FACTOR (MG/KG/DAY)-1	ADJUSTED ORAL (DERMAL) SLOPE FACTOR (b) (MG/KG/DAY)-1	INHALATION SLOPE FACTOR (MG/KG/DAY)-1 (b)	ORAL ABSORPTION FACTOR (UNITLESS) (c)	PC VALUE (CM/HR)
Arsenic	3 00E-04	3 00E-04	2 85E-04	2 85E-04	NA	NA	1 80E+00	1 89E+00	5 00E+01	0 95	1 00E-03
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	0 50	1 00E-03

*Sources U S EPA Integrated Risk Information System (IRIS) database accessed December 1992.
U S EPA Health Effects Assessment Tables (HEAST), Annual FY-1992 edition(Heast, 1992).

**NA/ND = Not applicable/not determined.

(a) Adjusted oral toxicity values used for calculation of dermal hazards
Adjustment of an administered to an absorbed dose RfD:
(Administered RfD) x (Oral Absorption Factor) = Absorbed Dose RfD

(b) Adjusted oral toxicity values used for calculation of dermal risks.
Adjustment of an administered to an absorbed dose CSF:
(Administered CSF)-1 / (Oral Absorption Factor) = Absorbed Dose CSF

(c) Oral absorption factors from chemical-specific Toxicological Profiles, Agency for Toxic Substances and Disease Registry, U.S. Public Health Service

Table 3 Summary of Risk and Hazard Calculations

Matrix	Route	Risk	Hazard
Existing Residential Adult (Korfen)			
Matrix	Route	Risk	Hazard
Groundwater	Ingestion	1.69E-04	7.31E-01
	Dermal	1.38E-07	5.97E-04
Total		1.69E-04	7.32E-01
Potential Future R[illegible]			
Matrix	Route	Risk	Hazard
Groundwater	Ingestion	6.34E-02	2.74E+02
	Dermal	5.18E-05	2.24E-01
Total		6.35E-02	2.74E+02
Potential Future Residential Child			
Matrix	Route	Risk	Hazard
Groundwater	Ingestion	2.31E-02	5.99E+02
	Dermal	1.42E-05	3.67E-01
Total		2.31E-02	5.99E+02

B. ENVIRONMENTAL RISKS

The ecological assessment in the RI concluded that environmental impacts on surface soil (0-2') and subsurface soil (2-10') were important because most exposure to site contaminants would occur through soil. Exposure pathways from on site soils involve three indicator species. Selected indicator species are not expected to be negatively impacted by contamination on site. Although concentrations of lead exceeded Minnesota background levels, a comparison of ingestion and uptake rates with toxicological values indicated that the risks associated with lead were at an acceptable level.

Conclusions made from site observation during the RI indicate that no signs of stress on indicator species (grasshoppers) or vegetative stress (yellow sweet clover) were observed.

VII. DESCRIPTION OF ALTERNATIVES

The objective of the FS and the Proposed Plan was to evaluate remedial alternatives consistent with the goals and objectives of CERCLA, as amended by SARA.

Health and environmental risks identified in the BRA for the site provide the basis for establishing the remedial action objectives for the site. The BRA indicates that the one significant contaminant pathway is exposure associated with ingestion of contaminated groundwater. All remedial action alternatives in the FS involved a combination of extracting groundwater and various treatment options. A treatability study was conducted in the RI phase. Results of the study were used to develop the treatment component of remedial alternatives.

A. Alternative 1

No Action

In this alternative, no remedial action would be performed at the site. No efforts would be undertaken to contain, remove, monitor, or treat contaminants in the groundwater at the site. Evaluation of the no action alternative provides a baseline against which action alternatives can be compared and evaluated.

B. Alternative 2

Institutional Controls, Recovery Wells, Precipitation, Filtration, Alumina Adsorption and an Infiltration Gallery

Alternative 2 involves institutional controls (e.g., deed restrictions), recovery wells, groundwater treatment by precipitation, filtration, and alumina adsorption, with treated groundwater discharge via an infiltration gallery.

Institutional controls (deed restrictions) would regulate the present and future use of groundwater at the site.

Institutional controls may be altered or entirely removed once the remedial objectives are satisfied.

Groundwater recovery wells would be installed to remove arsenic contaminated groundwater from the aquifer which exceeds the cleanup level.

The groundwater treatment process under alternative 2 consists of equalization tanks, pH adjustment units, a precipitation unit, a continuous backwash filter, and two activated alumina adsorption units. A backwash holding tank and a dewatering unit would be included for dewatering sludge obtained from the precipitation and filtration processes. (See Figure 6).

Treated effluent would be discharged to the aquifer through an on-site infiltration gallery.

Residual wastes generated under alternative 2 are solids associated with precipitation and filtration and spent alumina. In the FS, residual wastes were assumed to be hazardous and would require disposal at a hazardous waste facility. However, analytical results may indicate that residual wastes can be disposed of as non-hazardous waste. Cost estimates used in the FS assumed that residual wastes were hazardous. The estimated total present worth cost of this alternative is $ 2,681,894. (See Table 4).

C. Alternative 3

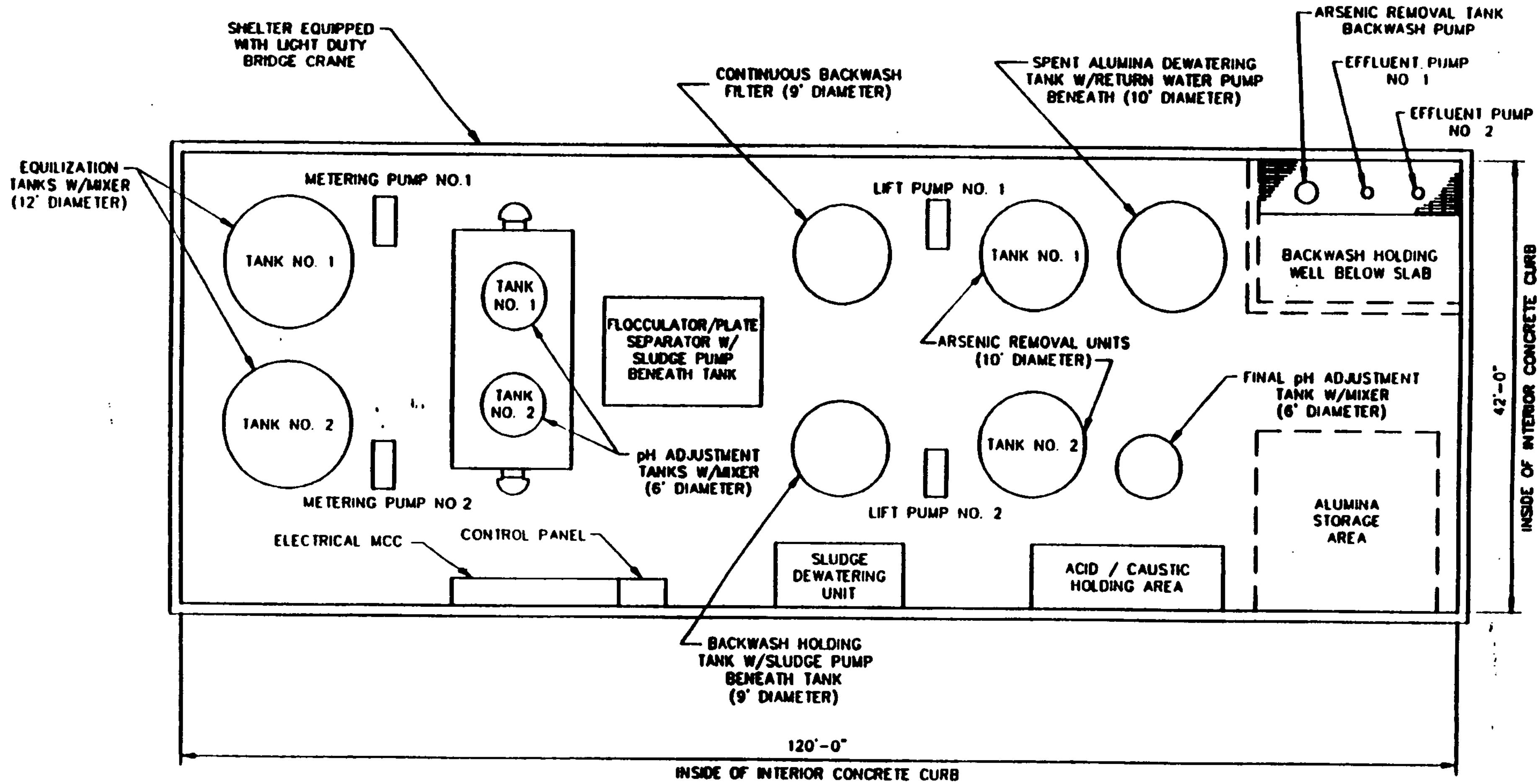
Institutional Controls, Recovery Wells, Filtration, Alumina Adsorption and an Infiltration Gallery

Alternative 3 involves institutional controls (e.g., deed restrictions), recovery wells, groundwater treatment by filtration, and alumina adsorption, with discharge of treated groundwater via an infiltration gallery.

Alternative 3 is very similar to alternative 2 except that precipitation is not included. A continuous backwash filter would be used to remove the suspended solids. Arsenic and/or lead adsorbed to suspended solids extracted by the recovery well network would be removed through filtration. Activated alumina adsorption would be used to remove the dissolved-phase arsenic. Since precipitation is not included in alternative 3, only two pH adjustment units would be required. (See Figure 7).

Treated effluent would be discharged to the aquifer through an on-site infiltration gallery.

Residual wastes generated under alternative 3 (filtered solids and spent alumina) were assumed to be hazardous and require disposal at a hazardous waste facility. Cost estimates in the



SCALE: 1" = 10'

METCALF & EDDY

FIGURE 6 ALTERNATIVE 2
PERHAM ARSENIC SITE
CONCEPTUAL SITE PLAN OF
WASTEWATER TREATMENT METHOD

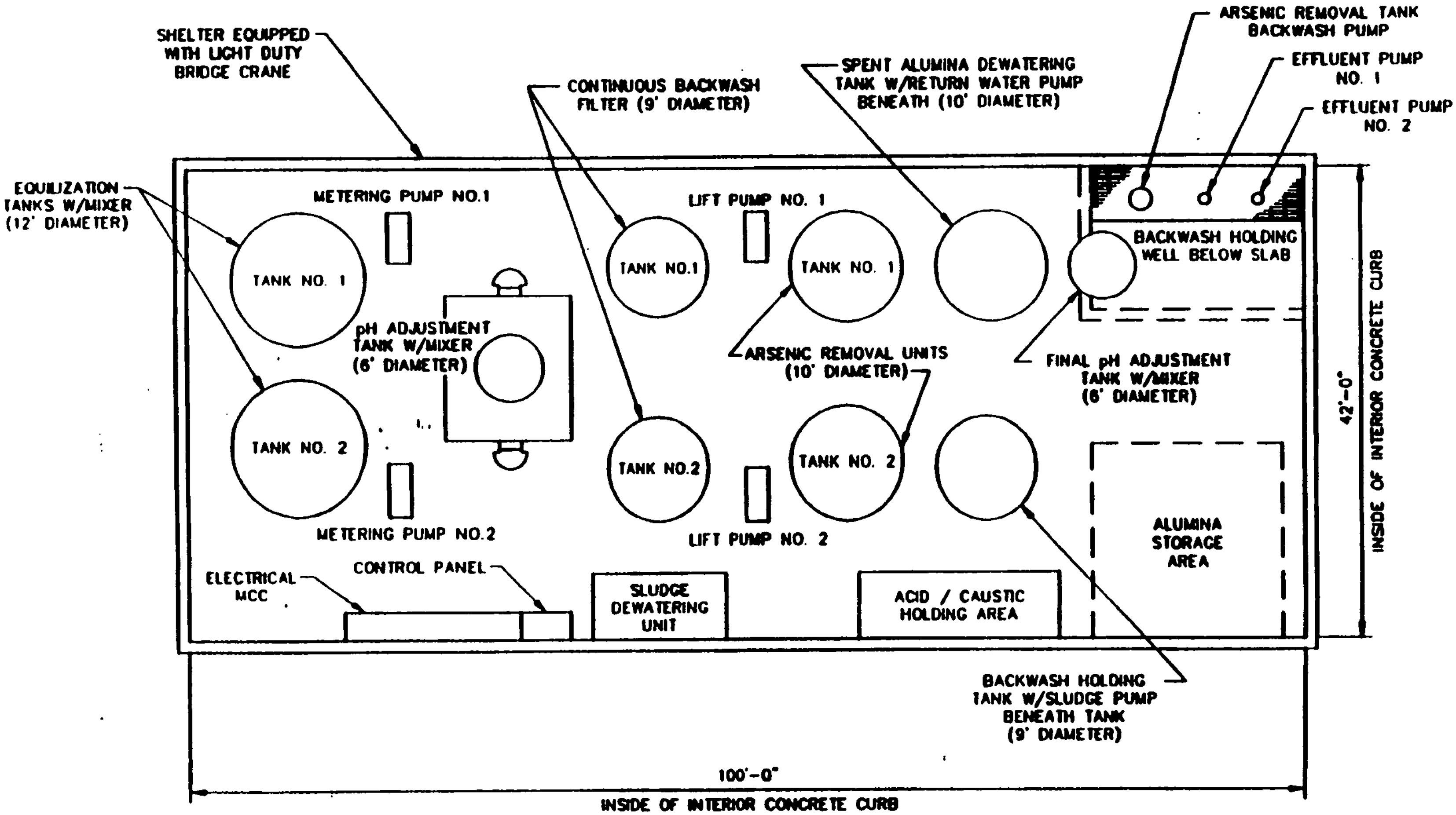
TABLE 4 PRESENT WORTH SUMMARY FOR ALTERNATIVE 2

Item	Capital Cost	Annual O&M Cost	Duration (years)	Present Worth O&M	Total Present Worth	Contingency (15 %)	Total Cost Estimate
Building	$100,800	$0	6	$0	$100,800	$15,120	$115,920
Foundation	$17,050	$0	6	$0	$17,050	$2,558	$19,608
Crane	$10,700	$0	6	$0	$10,700	$1,605	$12,305
Extraction Well System	$16,055	$0	6	$0	$16,055	$2,408	$18,463
Infiltration Gallery	$28,945	$0	6	$0	$28,945	$4,342	$33,287
Tanks	$89,700	$0	6	$0	$89,700	$13,455	$103,155
Pumps	$88,600	$8,400	6	$30,506	$119,106	$17,866	$136,972
Sludge Pumps	$5,400	$400	6	$1,907	$7,307	$1,096	$8,403
Mixers	$22,400	$1,600	6	$7,626	$30,026	$4,504	$34,530
Platform for Mixer	$13,350	$0	6	$0	$13,350	$2,003	$15,353
Sludge Dewatering Unit	$15,600	$1,100	6	$5,243	$20,843	$3,126	$23,970
Platform for Sludge Dewatering Unit	$2,700	$0	6	$0	$2,700	$405	$3,105
LOT Equipment *	$227,500	$16,500	6	$78,648	$306,148	$45,922	$352,070
Adsorbers (Alumina)	$144,000	$0	6	$0	$144,000	$21,600	$165,600
Additional Pilot Studies	$30,000	$0	6	$0	$30,000	$4,500	$34,500
Miscellaneous	$50,000	$0	6	$0	$50,000	$7,500	$57,500
Institutional Control	$23,540	$0	6	$0	$23,540	$3,531	$27,071
Piping & Valves	$116,000	$0	6	$0	$116,000	$17,400	$133,400
Electrical	$165,000	$0	6	$0	$165,000	$24,750	$189,750
Instrumentation	$62,000	$0	6	$0	$62,000	$9,300	$71,300
Building Demolition / Salvage of Scrap Metal	($30,000)	$0	6	$0	($22,887)	($3,433)	($26,320)
Electric Power	$0	$64,470	6	$307,299	$307,299	$46,095	$353,394
Staffing	$0	$13,000	6	$61,965	$61,965	$9,295	$71,260
Chemicals	$0	$10,000	6	$47,665	$47,665	$7,150	$54,815
Alumina Usage	$0	$60,225	6	$287,065	$287,065	$43,060	$330,125
Waste / Sludge Disposal – (Alumina & Precip.)	$0	$23,100	6	$110,107	$110,107	$16,516	$126,623
Analytical Approval for Landfill Disposal	$1,154	$0	6	$0	$1,154	$173	$1,327
Semi–Annual Well Monitoring	$0	$19,910	6	$94,902	$94,902	$14,235	$109,137
Effluent Discharge Monitoring	$0	$3,840	6	$18,304	$18,304	$2,746	$21,049
Engineering	$96,000	$0	6	$0	$73,238	$10,986	$84,224
Subtotal	$1,296,494	$220,545	–	$1,051,236	$2,332,082	$349,812	$2,681,894

Total Present Worth for Alternative 2 (with Hazardous Waste Disposal) $2,681,894

Solids disposal does not include the cost of solidification/stabilization.

Interest Rate = 7.00% Planning period is 6 years. * LOT Equipment includes two plate separators and one sand filter



SCALE: 1" = 10'

M&E METCALF & EDDY

FIGURE 7 ALTERNATIVE 3

PERHAM ARSENIC SITE

CONCEPTUAL SITE PLAN OF

WASTEWATER TREATMENT METHOD

TABLE 5 PRESENT WORTH SUMMARY FOR ALTERNATIVE 3

Item	Capital Cost	Annual O&M Cost	Duration (years)	Present Worth O&M	Total Present Worth	Contingency (15 %)	Total Cost Estimate
Building	$84,000	$0	6	$0	$84,000	$12,600	$96,600
Foundation	$14,920	$0	6	$0	$14,920	$2,238	$17,158
Crane	$10,700	$0	6	$0	$10,700	$1,605	$12,305
Extraction Well System	$16,055	$0	6	$0	$16,055	$2,408	$18,463
Infiltration Gallery	$28,945	$0	6	$0	$28,945	$4,342	$33,287
Tanks	$82,800	$0	6	$0	$82,800	$12,420	$95,220
Pumps	$88,600	$6,600	6	$31,459	$120,059	$18,009	$138,068
Sludge Pumps	$3,600	$300	6	$1,430	$5,030	$754	$5,784
Mixers	$21,000	$1,600	6	$7,626	$28,626	$4,294	$32,920
Platform for Mixer	$11,200	$0	6	$0	$11,200	$1,680	$12,880
Sludge Dewatering Unit	$15,600	$1,200	6	$5,720	$21,320	$3,198	$24,518
Platform for Sludge Dewatering Unit	$2,700	$0	6	$0	$2,700	$405	$3,105
LOT Equipment *	$195,000	$14,500	6	$69,115	$264,115	$39,617	$303,732
Adsorbers (Alumina)	$144,000	$0	6	$0	$144,000	$21,600	$165,600
Additional Pilot Studies	$26,000	$0	6	$0	$26,000	$3,900	$29,900
Miscellaneous	$50,000	$0	6	$0	$50,000	$7,500	$57,500
Institutional Control	$21,640	$0	6	$0	$21,640	$3,246	$24,886
Piping & Valves	$107,160	$0	6	$0	$107,160	$16,074	$123,234
Electrical	$151,700	$0	6	$0	$151,700	$22,755	$174,455
Instrumentation	$56,900	$0	6	$0	$56,900	$8,535	$65,435
Building Demolition / Salvage of Scrap Metal	($30,000)	$0	6	$0	($22,887)	($3,433)	($26,320)
Electric Power	$0	$64,470	6	$307,299	$307,299	$46,095	$353,394
Staffing	$0	$13,000	6	$61,965	$61,965	$9,295	$71,260
Chemicals	$0	$10,000	6	$47,665	$47,665	$7,150	$54,815
Alumina Usage	$0	$60,225	6	$287,065	$287,065	$43,060	$330,125
Waste / Sludge Disposal (Alumina)	$0	$22,160	6	$105,627	$105,627	$15,844	$121,470
Analytical Approval for Landfill Disposal	$1,154	$0	6	$0	$1,154	$173	$1,327
Semi-Annual Well Monitoring	$0	$19,910	6	$94,902	$94,902	$14,235	$109,137
Effluent Discharge Monitoring	$0	$3,840	6	$18,304	$18,304	$2,746	$21,049
Engineering	$58,300	$0	6	$0	$67,364	$10,105	$77,468
Subtotal	$1,191,974	$217,805	–	$1,038,178	$2,216,327	$332,449	$2,548,776

Total Present Worth for Alternative 3 (with Hazardous Waste Disposal) $2,548,776

Solids disposal does not include the cost of solidification/stabilization.

Interest Rate = 7.00%

Planning period is 6 years.

* LOT Equipment includes two sand filters

FS considered disposal at a hazardous waste facility. The estimated total present worth cost of this alternative is $ 2,548,776. (See Table 5).

VIII. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

In order to determine the most appropriate alternative for the site, the alternatives were evaluated against each other. Comparisons were based on nine evaluation criteria.

Threshold criteria must be met before an alternative can be carried forward. The threshold criteria are: overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements.

The recommended alternative will provide the best balance with regard following five criteria: long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; short-term effectiveness; implementability; and cost.

The two modifying criteria: state & community acceptance, are evaluated after comments on the recommended alternative are received.

A. Overall Protection of Human Health and the Environment

The No Action alternative (Alternative 1) does not provide protection of human health and the environment.

Alternatives 2 and 3 were determined to provide high levels of overall protection because remedial actions, when completed, would clean arsenic in groundwater to an acceptable level of protection. Short-term protection would be provided by the implementation of deed restrictions, which would immediately restrict current use of groundwater at the site.

B. Compliance with ARARs

Alternative 1 would fail to meet ARARs because arsenic in groundwater would continue to exceed the MCL. Remedial actions taken under alternatives 2 and 3 would comply with all ARARs except Minn. Rule 7060 Underground Waters. Minn. Rule 7060 applies to the discharge of treated effluent through a infiltration galley. A variance from Minn. Rule 7060 would be required.

ARARs specific to remedial actions under alternatives 2 & 3 are: Safe Drinking Water Act, 40 CFR 41, maximum contaminant levels (MCLs), Minn. Rule 7060, Underground Waters, and RCRA Subtitle C requirements regarding generation, transportation, treatment, and disposal of hazardous wastes generated in the course of remedial action.

C. Long-Term Effectiveness and Permanence

The No Action alternative offers no protection against future exposure of site contaminants to humans and the environment, and no means by which to reduce the levels of arsenic. Therefore, alternative 1 would be ineffective for the long-term.

The remedial actions under alternatives 2 and 3 are expected to provide reliable long-term protection of human health and the environment. Impacted groundwater would be permanently removed from the aquifer and treated on site. In the long term, this would reduce or eliminate the unacceptable human health risk which arsenic contaminated groundwater poses. Groundwater treatment would be effective in reducing arsenic concentrations equally for alternatives 2 and 3. Groundwater treatment is an irreversible process with regard to removal of dissolved-phase arsenic, therefore, it would be a permanent remedy. Groundwater modeling indicates that arsenic removal to the MCL (50 ppb) would be achieved in approximately 6 years.

D. Reduction of Toxicity, Mobility, and Volume

Alternative 1 employs no remediation, and therefore achieves no reduction in contaminant toxicity, mobility, or volume.

With alternatives 2 and 3 the use of a groundwater recovery well system would reduce the volume of arsenic contamination in groundwater.

E. Short-Term Effectiveness

The No Action alternative is not effective in the short term. Groundwater use would still pose an unacceptable risk at the site.

Assuming that residual wastes generated under alternatives 2 and 3 are considered RCRA characteristic for arsenic, transportation from the site to a hazardous waste landfill would be necessary. Off-site transport of residual wastes may present some risks to residents, if an accidental spill or release of these materials would occur.

When compared to alternative 3, alternative 2 would have a greater amount of residual wastes generated because of the precipitation unit. Therefore, short-term risks associated with transportation are greater in alternative 2 than alternative 3.

Construction activities associated with the implementation of alternatives 2 and 3 will not result in any health risks to nearby residents or employees of nearby commercial facilities. Site workers could be exposed to impacted groundwater during remedial activities. However, impacts to site workers during remediation will be controlled with the use of the appropriate personal protective equipment (PPE), and by ensuring that site workers have the appropriate training. No significant environmental impacts are expected for either alternative.

It is expected that both alternatives 2 and 3 can be implemented within 16 to 24 months.

F. Implementability

The No Action alternative has no technical feasibility considerations.

Alternatives 2 and 3 are technically feasible. Alternative 2, when compared to alternative 3, may be more difficult to implement due to the installation of a precipitation unit. Both alternatives utilize proven technologies which are commonly used in the wastewater and water treatment industry.

Treated groundwater under both alternatives 2 and 3 would be discharged by means of an infiltration gallery which would require a variance from the MPCA.

G. Cost

The No Action alternative has no cost associated with it.

The capital and O&M costs associated with alternative 2 are higher than costs associated with alternative 3 because of the precipitation unit. In addition, due to a greater volume of residual wastes generated from the precipitation unit, transportation and disposal costs are greater under alternative 2 than under alternative 3.

The cost benefit of alternative 3 over alternative 2 derives from the difference between solids removal from filtration vs filtration and precipitation.

Results indicated that installation and O&M costs associated with the precipitation unit were greater than the increased costs of filtration, if the precipitation unit is not installed. In addition, another residual waste stream is created from the filtration and precipitation alternative.

H. State Acceptance

Alternative 1 is unacceptable to the MPCA. The MPCA has been consulted and concurs with the selected remedial action.

I. Community Acceptance

Based on available information, community acceptance of alternative 1 is unacceptable. Community acceptance of the remaining alternatives is addressed in the attached Responsiveness Summary.

IX. THE SELECTED REMEDY

Alternative 3

Institutional Controls, Recovery Wells, Filtration, Alumina Adsorption and an Infiltration Gallery

Alternative 3 involves institutional controls (e.g., deed restrictions), recovery wells, groundwater treatment by filtration, and alumina adsorption, with discharge of treated groundwater via an infiltration gallery.

Institutional controls in the form of a deed restriction will restrict groundwater use at the site.

Vertical groundwater recovery wells will be installed to remove arsenic contaminated groundwater above the clean up level (50 ppb).

A continuous-backwash filtration unit will be used to remove arsenic (suspended solids phase) in extracted groundwater. Groundwater would then be treated on site by activated alumina adsorption units. Extracted groundwater would flow through an activated alumina bed contained in a vessel. Arsenic would be adsorbed onto the activated alumina. A treatability study conducted in the RI indicated that alumina absorption is the most efficient method of removing dissolved phase arsenic from groundwater at the site.

The used alumina filter media and filtered solids may require disposal in hazardous waste landfill. Residuals generated under alternative 3 were considered to be a hazardous waste in the FS for the site. Final determination as to whether the residual waste is considered RCRA hazardous will be based on the laboratory analytical results. Cost estimates for this alternative assumed that residual waste would be transported and disposed of as RCRA hazardous waste.

Treated effluent would be discharged to the aquifer through an on-site infiltration gallery. The infiltration gallery could be placed either upgradient or downgradient of the extraction system, depending on the desired effect upon the impacted portion of the aquifer. If the infiltration gallery is placed upgradient, the groundwater gradient should increase, accelerating the rate of groundwater flow though the contaminated area and reducing the clean up time required.

To determine approximate time to achieve then MCL for arsenic, the FS took into account the fact that after arsenic (suspended solid & dissolved phase) is removed, some desorption of arsenic from the aquifer may occur. The removal rate for the suspended solid and dissolved phase arsenic combined with desorption calculations provides a total arsenic removal time of approximately 6 years. The estimated total present worth cost of this alternative is $ 2,548,776. Costs are summarized in Table 5.

The Safe Drinking Water Act establishes MCLs for drinking water quality. The MCL for arsenic is currently 50 ppb. The MCL for arsenic is applicable at the residential drinking water tap. The MCL for arsenic is considered relevant and appropriate for establishing cleanup levels in the groundwater at the site because under a future residential use scenario, groundwater from the site may be used for residential drinking water.

The Minnesota Department of Health (MDH) Recommended Allowable Drinking Water Limits, MDH Release #3, 1/91, of 0.2 ppb for arsenic is a guideline to be considered. This potential clean up level does not take into account the fact that arsenic is present in background concentrations at 5 ppb. U.S. EPA and MPCA agree that this guideline is not considered appropriate for establishing clean up levels at the site.

According to ATSDR, the MCL for arsenic may be lowered in the future. In that case, the five year review for the site would address this potential change in cleanup level.

In response to a comment received during the public comment period, U.S. EPA plans to provide municipal water to the residence located approximately 700 south of the site. Although the present groundwater flow direction is east, a change in flow could put that resident at risk. The long-term effectiveness and cost benefits associated with a municipal water supply hook up are greater than implementing a quarterly monitoring program which would be required under a long-term monitoring plan.

XI. STATUTORY DETERMINATIONS SUMMARY

1. Protection of Human Health and the Environment

The selected remedy satisfies the requirement of CERCLA Section 121(b) and (d), 42 U.S.C. § 9621(b) and (d), that a remedial action be protective of human health and the environment. Based on the results of the Remedial Investigation (RI), the medium of concern at the site is groundwater, and the contaminant of concern is arsenic. The pathway for exposure to the affected human population is through ingestion of, and dermal contact with, contaminated groundwater. The pathway for exposure to other populations is the ultimate anticipated migration of contaminated groundwater to the Otter Tail River.

The remedy contemplates the removal and treatment of all groundwater contaminated with arsenic at levels above MCLs. This will eliminate the risk to all affected populations. Pending completion of remedial action, institutional controls would prevent use of groundwater at and in the vicinity of the site, and any well installation that would have an impact on groundwater flow direction. The arsenic is contained in a defined plume that is traveling at a relatively slow rate, and no effect on nonhuman populations pending completion of the remedy is anticipated.

Any short-term risks associated with implementation of the selected remedy would be eliminated by using sound construction and waste transportation practices. Additionally, air monitoring will be conducted during the remedial action to assess any possible exposure through inhalation. Therefore, no unacceptable short-term risks or cross-media impacts will result from implementation of the selected remedy.

2. Attainment of ARARs

The selected remedy complies with all applicable or relevant and appropriate requirements (ARARs), as required by CERCLA Section 121(d)(2), 42 U.S.C. § 9621(d)(2). ARARs identified for the site are as follows:

a. Chemical Specific

Safe Drinking Water Act Maximum Contaminant Levels (MCLs) (applicable)

Resource Conservation and Recovery Act Identification and Listing of Hazardous Wastes, 40 C.F.R. Part 261 (applicable)

b. Location Specific

(none)

c. Action Specific

Minn. Rule 7060.0600-0900 [prohibition on waste filtration galleries, and variance from the prohibition where necessary to protect public health, safety or welfare, or where strict conformity with the prohibition would be unreasonable]. (applicable)

Resource Conservation and Recovery Act Generator Standards, 40 C.F.R. Part 262 (applicable)

Resource Conservation and Recovery Act Transporter Standards, 40 C.F.R. Part 263 (applicable)

While not ARARs because the contemplated activity will occur off-site, it is noted that it may be necessary to ensure that residual wastes from the treatment process are disposed of at a hazardous waste facility that complies with RCRA Subtitle C requirements and, if the pertinent standard for arsenic is exceeded, RCRA land disposal restrictions (LDRs), 40 C.F.R. Part 268, because these wastes may contain arsenic in concentrations prompting such protectiveness.

3. Cost Effectiveness

The selected remedy provides overall cost-effectiveness, as required by CERCLA Section 121(b), 42 U.S.C. § 9621(b). The incremental benefit of the precipitation component of the second alternative has been determined not to justify the increased cost of adding this component. Rather, the cost benefit achieved by extraction and treatment via filtration and alumina adsorption of arsenic-contaminated groundwater is greater than that achieved by extraction and treatment via filtration, precipitation and alumina adsorption.

4. Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The selected remedy utilizes permanent solutions and treatment technologies to the maximum extent possible, as required by Section 121(b)(1) of CERCLA, 42 U.S.C. § 9621(b)(1). The remedy contemplates on-site treatment of arsenic-contaminated groundwater through filtration and alumina adsorption. When the remedial action is complete, the contamination will be removed to levels at or below the MCL for arsenic, and the unacceptable threat to human health and the environment would thereby be eliminated.

It also provides the best balance of factors considered under the nine evaluation criteria. The remedy is a permanent one, intended to leave no residual risk to the affected populations once the clean-up levels have been met. In the short-term, the remedial construction and remedial action phases are expected to be relatively brief and, through the employment of sound engineering practices, should present no threat to human health or the environment.

The affected municipality and the State of Minnesota both support the selected remedy. U.S. EPA has fully apprised the City of Perham of the proposed course of remedial action and has secured the cooperation of the Minnesota Pollution Control Agency, and anticipates no controversy at any phase of the proposed remedial action.

5. Preference for Treatment as a Principal Element

The selected remedy uses groundwater recovery and on-site treatment through alumina adsorption as its principal element to eliminate the principal threat of ingestion of groundwater at the site. This requirement of CERCLA Section 121(b) is therefore satisfied.

ATTACHMENT 1

MPCA LETTER OF RESPONSE

Minnesota Pollution Control Agency

Post-it™ Fax Note 7671 | Date 3/31/94 | # of pages ▶
To Tom Bloom | From Todd Goeks
Co./Dept. EPA | Co. MPCA
Phone # 886-1967 | Phone # 612/296-7778
Fax # | Fax #

March 31, 19

Mr. Valdus
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C

, Ottertail County, Minnesota, Record of Decision

...ollutoion Control Agency (MPCA) has received and reviewed the Record of Decision ...erham Arsenic Superfund Site in Ottertail County, Minnesota. The MPCA concurs with th... of Alternative 3 for remedial action at this site. The selected remedial action includes the follow... components:

- institutional controls;
- ground water extraction through recovery wells;
- filtration to remove suspended solids;
- alumina adsorption to remove dissolved phase arsenic;
- discharge of treated ground water through an infiltration gallery; and
- one residential hookup to the municipal water supply.

Estimated present worth cost of this remedial action is $2.5 million. Estimated present worth cost of operation and maintanence $173,000 per year for six years.

The MPCA believes that the selected remedial action for the Perham Arsenic site provides the best balance among the alternatives when evaluated against the nine criteria set forth in the National Contingency Plan.

Sincerely

Gordon E. Wegwart

for Charles W. Williams
Commissioner

CWW:ch

cc: Thomas Bloom, U.S. Environmental Protection Agency

520 Lafayette Rd. N.; St. Paul, MN 55155-4194; (612) 296-6300 (voice); (612) 282-5332 (TTY)
Regional Offices: Duluth • Brainerd • Detroit Lakes • Marshall • Rochester

ATTACHMENT 2

RESPONSIVENESS SUMMARY

I. OVERVIEW

The public reacted agreeably to the proposed plan for remediation of groundwater at the Perham Arsenic Burial Site. Questions posed during the public meeting on February 22, 1994, were mostly directed toward the technical aspects of the site. Questions also were asked about absorption and desorption properties of arsenic at the site. All questions and concerns were addressed during and after the public meeting. One oral comment was received during the public comment portion of the public meeting, and is addressed in this responsiveness summary.

II. BACKGROUND ON COMMUNITY INVOLVEMENT

Through news releases, news media contact, and meetings with public and private citizens of Perham, U.S. EPA and MPCA have kept Perham residents informed of all developments at the site. In 1983, issues associated with the RI/FS, were discussed with city staff and officials, and members of the Arsenic Action Committee. Through meetings with city personnel, fact sheets, articles published in the city newspaper, and the public meeting, recent remedial activities have been presented.

III. SUMMARY OF PUBLIC COMMENTS AND LEAD AGENCY RESPONSE

One comment regarding the site was made during the public comment portion of the public meeting. Written comments on the proposed plan were not received. A response to the comment is available in this Responsiveness Summary.

In addition to the formal comments made on the proposed plan, discussions with state personnel, during the public comment period, were held. The discussions were in regard to the adjacent residential well and the possibility of providing municipal water to the adjacent residence. The possible hook-up to the municipal water supply would act as a safeguard, should groundwater flow direction change in the future. Public and state comments are addressed in this response.

Comment

1. My name is Tom Hammers. I think it's imperative and my comment is that this mess get cleaned up as soon as possible. This pit is a killer. It crippled my uncle, I've got permanent disability, and I believe it caused the cancer that killed my dad.

This thing is a killer and I think we ought to get it cleaned up. We've got to make sure we understand and know that it's as cleaned up as it could possibly be so it don't kill somebody 50 years from now.

Response

Results of the most recent investigations indicate that the pit area no longer poses a threat. However, arsenic contaminated groundwater, which originated from water infiltrating through the former pit area, does pose an unacceptable risk. U.S. EPA and MPCA plan to begin remedial design phase of the clean up in September of this year. The site clean up schedule allots one year for design, followed by a construction and start up period ranging from sixteen months to two year. Completion of the remedial action is scheduled for the fall 1997.

Comment

2. Taken from Conversation Record with between Thomas Bloom, U.S. EPA and Todd Goeks, MPCA, dated March 11, 1994.

Todd and I spoke about the possibility of providing municipal water to the resident just south of the site. We agreed that currently there is no threat to the resident from the groundwater plume on site. However, if in the future, a farmer were to install a high-yield agricultural type well in the farm fields south of the resident, the groundwater plume from the site could be pulled south towards the residential well.

I told Todd that I have already discussed the possible hook up with Bob Louiseau, the City Manager. I told Todd that he (Bob Louiseau) told me that since there is already a water supply line running along adjacent to the street, the hook up operation would be an easy one.

Todd and I also discussed the fact that it may be more cost effective to hook the resident up to a municipal drinking water supply, than to monitor the well quarterly as part of the remedial action monitoring plan.

Response

U.S. EPA agrees that if groundwater flow conditions change at the site due to installation of an agricultural well to the south of the adjacent resident, the resulting change in plume direction could put the adjacent resident at risk. U.S. EPA concurs with the state on this issue and plans to include the hook up to municipal water supply for the adjacent resident in the remedial action.

ATTACHMENT 3

INDEX OF THE ADMINISTRATIVE RECORD (REVISION 1)

DATE	DOCUMENT TITLE	AUTHOR	RECIPIENT	TYPE
10/92	FINAL RI/FS WORKPLAN	M&E	USEPA	PLAN
11/92	FINAL QAPP	M&E	USEPA	PLAN
11/93	FINAL REMEDIAL INVESTIGATION	M&E	USEPA	REPORT
11/93	FINAL ALTERNATIVES ARRAY	M&E	USEPA	REPORT
2/94	FINAL FEASIBILITY STUDY	M&E	USEPA	REPORT
2/15/94	PROPOSED PLAN	USEPA	PUBLIC	PLAN
2/22/94	TRANSCRIPT OF PUBLIC MEETING	USEPA	PUBLIC	TRANSCRIPT