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United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R05-87/059
September 1987

104639

EPA

Superfund Record of Decision:

FMC Corp., MN

RECEIVED
AUG 19 88
MPCA, Ground Water
& Solid Waste Div.

with attachments

TECHNICAL REPORT DATA
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1. REPORT NO. EPA/ROD/R05-87/059	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE SUPERFUND RECORD OF DECISION FMC Corporation, MN Second Remedial Action - Final		5. REPORT DATE September 30, 1987
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT NO.
		11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460		13. TYPE OF REPORT AND PERIOD COVERED Final ROD Report
		14. SPONSORING AGENCY CODE 800/00
15. SUPPLEMENTARY NOTES		

16. ABSTRACT

The FMC site is located in the City of Fridley, Minnesota. The site is approximately 1,000 feet east of the Mississippi River, just north of he City of Minneapolis, and upstream of the City of Minneapolis drinking water intake which serves approximately 500,000 people. This ground water operable units addresses those portions of the site known as the FMC lands (13 acres) and the Burlington Northern Railroad Company (BNR) lands (5 acres). From 1941 to 1964 Northern Ordnance, Inc. operated as a naval ordnance manufacturing complex at the site. Between 1945 and 1969 a tract of land south of the complex was used for the burning and disposal of wastes, including plating wastes, paint, paint sludges, oils, bottom ash, and chlorinated and non-chlorinated solvents. In 1964 the FMC Corporation purchased the property and continued to use the waste disposal area. Disposal was discontinued by FMC in 1969. In November 1980 MPCA staff received a hot line compliant alleging past waste disposal at the FMC and BNR lands. Further investigation revealed historical waste disposal practices and found contamination of the ground water and Mississippi River. By June 1983 approximately 38,6000 yd^3 of contaminated soil with VOC concentrations greater than 1 mg/kg were excavated from the unsaturated zone beneath and in the area of the waste burn and disposal pits and placed in a RCRA onsite containment and treatment facility. Currently underlying ground water and alluvial aquifers with discharge to the Mississipi River (See Attached Sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision FMC Corporation, MN Second Remedial Action - Final Contaminated Media: gw Key contaminants: TCE, PCE, VOCs		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report) None	21. NO. OF PAGES 66
	20. SECURITY CLASS (This page)	22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

EPA/ROD/R05-87/059
FMC Corporation, MN
Second Remedial Action - Final

16. ABSTRACT (continued)

are contaminated with TCE, PCE, benzene, toluene, xylene and other VOCs. TCE has been estimated to account for 98 percent of the contaminant loading.

The selected remedial action for this site includes: ground water pump and treatment with discharge to a POTW (sewer system); ground water monitoring; and implementation of institutional controls with land use restrictions to mitigate against near-term usage of contaminated ground water between the site and the Mississippi River. The estimated capital cost for this remedial action is $773,935 with present worth O&M of $744,870.

Record of Decision
Remedial Alternative Selection

Site: FMC, Fridley, Minnesota

Documents Reviewed

The following documents, which describe the physical characteristics of the FMC site, FMC and Burlington Northern Railroad (BNR) Lands Ground Water Operable Unit, and which analyze the cost-effectiveness of various remedial alternatives, have been reviewed by the United States Environmental Protection Agency (U.S. EPA) and form the basis for this Record of Decision (ROD):

- "Report on Phase I Investigation Program, FMC Northern Ordnance Division Plant", S.S. Papadopulos & Associates, Inc., November 1983.

- "Final Report, Phase I & II Investigation Program, Northern Ordnance Division, FMC Corporation", S.S. Papadopulos & Associates, Inc., August 1984.

- "Summary of Analytical Data for FMC Northern Ordnance Plant", Conestoga-Rovers & Associates Limited, May 1984.

- "Supplemental Calculations", Conestoga-Rovers & Associates Limited, December 24, 1985.

- "Feasibility Study, FMC and BNR Lands Groundwater Regime", Conestoga-Rovers & Associates Limited, January 1985.

- "Evaluation of Remedial Action Alternatives, FMC and BNR Lands Groundwater Regime", Conestoga-Rovers & Associates Limited, May 1985.

- "Response Action Plan", Conestoga-Rovers & Associates Limited, October 1986.

- "FMC Site Enforcement Decision Document", Minnesota Pollution Control Agency, September 10, 1986.

- "FMC Site Summary of Remedial Alternative Recommendation", U.S. Environmental Protection Agency, August 1987 (document undated).

- Public comments received during the 21-day comment period, and the Responsiveness Summary.

- Summary of Remedial Alternative Selection.

I have also considered other documents which are included in the administrative record.

Description of Selected Remedy

The selected remedial alternative for the FMC and BNR lands groundwater operable unit is groundwater interception and reduction of the contamination source, and discharge of extracted groundwater to the sanitary sewer system. The selected alternative includes the following major components:

- Groundwater extraction and discharge to the sanitary sewer system.
- Monitoring to assure the effectiveness of the remedy and to define termination of the extraction system.
- Institutional controls and existing land use to mitigate against near-term usage of contaminated groundwater between the FMC and BNR lands and the Mississippi River by private wells.

Consistent with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and reauthorization Act of 1986 (SARA), and National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, I have determined that, at the FMC site, FMC and BNR lands groundwater operable unit, the selected remedial alternative is cost-effective, consistent with a permanent remedy, provides adequate protection of public health, welfare and the environment, and utilizes treatment to the maximum extent practicable.

The action will require operation and maintenance activities to ensure continued effectiveness of the remedial alternative as well as to ensure that the performance objectives meet applicable State and Federal surface and groundwater quality criteria.

I have determined that the action being taken is consistent with Section 121 of SARA.

In accordance with Section 121(c) of SARA, the remedial action taken at FMC site, FMC and BNR lands groundwater operable unit, shall be reviewed no less often than every five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. A review is expected after two years of operation at this site to assure that a review is completed before the extraction system is eligible for shut-down under the State Consent Order.

Valdas V. Adamkus
Regional Administrator

September 30, 1987
Date

Attachment: (1) Summary of Remedial Alternative Selection
(2) Responsiveness Summary

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION
(FMC and BNR Lands Ground Water Operable Unit)

I. Site Location and Description

The FMC Site (see Attachment I, site plan) is located in the City of Fridley, Anoka County, Minnesota (see Attachments II and III, location maps). The site is approximately 1000 feet east of the Mississippi River; just north of the City of Minneapolis; and about 1/2 mile from, and upstream of, the City of Minneapolis (Minneapolis) drinking water intake which serves approximately 500,000 people. The FMC Site is located on a portion of the Mississippi River flood plain which is essentially flat, and lies on the east bank of the Mississippi River at an elevation of about 835 feet [National Geologic Vertical Datum (NGVD)].

The area west of the FMC Site was purchased by Anoka County from FMC on July 7, 1982 for development as park land under the federally funded Great River Roads Project. It is zoned "Single Family Dwellings," although there are no occupied structures on the property, and it is expected to be used as a park. The areas on the other sides of the site are zoned heavy industrial.

The portions of the FMC Site addressed by this operable unit are known as the FMC lands (13 acres) and the Burlington Northern Railroad Company (BNR) lands (5 acres). They are located immediately south of the FMC ordnance manufacturing complex at 4800 East River Road. The BNR lands were owned by FMC, who sold them to Glacier Park Company, a subsidiary of BNR, in 1969. This operable unit addresses a ground water action for the FMC and BNR lands. Other actions at the FMC Site include: 1) the completed soil removal for the FMC and BNR lands, 2) addressing the Naval Industrial Reserve Ordnance Plant (NIROP), which is located directly north of the FMC

and BNR lands and which is being done by the Department of the Navy, and 3) addressing the land north of NIROP, if necessary (NIROP investigations are expected to clarify the situation.) The Department of the Navy has submitted a remedial investigation, dated June 1987, to the MPCA. More field work is proposed and work is progressing on the feasibility study.

II. FMC and BNR Lands History

The FMC and BNR lands history follows:

1940 - 1941	The naval ordnance manufacturing facility was constructed.
1941 - 1964	Northern Ordnance, Inc., a subsidiary of the Northern Pump Company operated a naval ordnance manufacturing complex in Fridley, Minnesota. From approximately 1945 to 1969 a tract of land (the FMC and BNR lands) south of the manufacturing complex was used for the burning and disposal of wastes, including plating wastes, paint, paint sludges, oils, bottom ash, and chlorinated and non-chlorinated solvents.
1964	FMC purchased the manufacturing complex property including the disposal areas from the Northern Pump Company.
1964 - 1969	FMC continued to use the FMC and BNR lands for waste disposal.
1969	Disposal of waste at the disposal areas was discontinued by FMC.
1969	A portion of the FMC Site (the BNR lands) is sold to a BNR affiliate, Glacier Park Company.
November, 1980	The MPCA staff received a "hot line" complaint alleging past waste disposal at the FMC Land BNR lands.
December, 1980	FMC, at the request of the MPCA initiated an investigation of the FMC and BNR lands.
April, 1981	FMC investigation revealed historical use of the FMC and BNR lands for waste disposal and found ground water contamination and contamination of the Mississippi River.
May, 1981	FMC, at the request of the MPCA staff, initiated a detailed investigation and study at the FMC and BNR lands.

1982	FMC Site was first included on the proposed National Priorities List (NPL).
May, 1983	FMC proposed an interim remedial action to MPCA and U.S. EPA to excavate contaminated soil and place the soil in a containment and treatment facility located at the FMC lands.
June 8, 1983	FMC, the MPCA and U.S. EPA executed an Administrative Order And Interim Response Order By Consent (Order) regarding implementation of the contaminated soil excavation, containment and treatment previously proposed by FMC. The Order also required the completion of a Remedial Investigation/Feasibility Study (RI/FS) to define the extent and magnitude of ground water contamination and to evaluate alternatives for a ground water contamination remedy for the FMC and BNR lands.
May-June, 1983	FMC initiated and completed contaminated soil excavation and containment. FMC also initiated the ground water RI/FS.
June-Sept., 1983	From June through September 1983 a remedial action to address contaminated soils in the FMC and BNR lands was undertaken by FMC under an Administrative Order by Consent between FMC, MPCA and U.S. EPA. Around 38,600 cubic yards of contaminated soils were excavated and placed in an on-site containment and treatment facility by June 30, 1983. Soils having a volatile organic compound (VOC) concentration of 1 part per million (ppm) or greater were excavated to the ground water table. The on-site facility was constructed in compliance with the Resource Conservation and Recovery Act (RCRA) requirements for an in-ground storage facility. It is doublelined, provides for leachate collection and leak detection, and includes a gas extraction and activated carbon treatment system for volatile contaminants. Drummed wastes on the FMC and BNR lands were disposed of at a RCRA permitted disposal facility. Excavated areas were restored and revegetated.
October, 1984	FMC completed the ground water RI pursusant to the Order.
October, 1984	FMC Site was first included on MPCA Permanent List of Priorities (PLP).
January, 1985	FMC submitted a proposed Feasiblity Study (FS), which it believed fulfilled the June 8, 1983 Consent Order, but which was incomplete.
May, 1985	FMC submitted an addition to the proposed ground water FS to MPCA and U.S. EPA.

August, 1985	MPCA Director staff reviewed FMC's proposed FS, and selected the ground water gradient control and treatment alternative as the most appropriate response action. MPCA approved the feasibility study as modified.
January, 1986	FMC submitted additional health risk assessment data to U.S. EPA and MPCA.
February, 1986	FMC submitted a Remedial Action Plan (RAP) Work Plan to MPCA and U.S. EPA.
April, 1986	MPCA staff approved the RAP Work Plan.
September, 1986	FMC and MPCA negotiated a ground water Response Action Plan.
October, 1986	MPCA executed an Enforcement Decision Document, and executed a Response Order by Consent between the MPCA and FMC for implementation of the Response Action Plan.
December, 1986	Specifications were submitted by FMC to implement the Response Action Plan.

III. Results of the Remedial Investigation

Investigations at the FMC site, FMC and BNR lands, began as a result of discussions with the MPCA in December 1980. The work involved the following:

- Review and evaluation of historical disposal practices and related company records.
- Site excavation surveys, including testpits and trenches, and magnetometer and ground-penetrating radar.
- Soil sampling to define soil contamination.
- Ground water monitoring wells to determine lithological characteristics and water levels.
- Aquifer sampling to determine ground water quality.
- Pumping tests to define ground water flow rates.
- River and drinking water intake sampling to define the impacts of contamination.

In 1983, approximately 38,600 cubic yards of contaminated soil were excavated from the unsaturated zone beneath and in the area of the waste

burn pits and disposal pits located at the FMC and BNR lands. The RI/FS indicated that ground water beneath and in the area of the FMC and BNR lands is contaminated with trichlorethylene, which has been estimated to account for 98 percent of the contaminant loading, and several other hazardous substances including: 1,1-dichloroethane; 1,2-dichloroethane; 1,1,1-trichloroethane; 1,1,2-trichloroethane; 1,1-dichloroethylene; 1,2-dichloroethylene; tetrachloroethylene; benzene; toluene and xylene.

The site hydrogeology consists of a surficial sand and gravel (alluvial) aquifer system underlain by a bedrock system. All of these aquifers discharge to the Mississippi River, which acts as a discharge zone for both systems. From the surface down, the surficial sand and gravel aquifer system consists of: 1) a surficial sand and gravel aquifer, which is discontinuous because the clay aquitard rises above the ground water table at some locations, 2) a clay aquitard, which is generally thicker than 15 feet thick and which is generally continuous under the FMC and BNR lands (the clay thins from east to west), and 3) a confined sand aquifer, which reaches a thickness of around a hundred feet. The water table is 20 to 30 feet from the surface. The bedrock aquifers are the Saint Peter sandstone, which does not appear in a north well, underlain by the Prairie du Chien. The Prairie du Chien is the major exploited water supply aquifer in the region. The bedrock aquifers are used as drinking water supplies by approximately 70,000 people located within three miles of the FMC and BNR lands. Releases from the FMC and BNR lands have not contaminated these ground water drinking supplies.

Contamination associated with the FMC and BNR lands is shown in Attachment IV. The contamination extends from beneath the former burn pits and disposal pits to the alluvial aquifers which discharge to the Mississippi River. There

are two distinct zones of alluvial contamination; the surficial sand and gravel aquifer near well 36 and the confined sand aquifer between wells 15 and 30.

The contaminated surficial sand and gravel aquifer has a maximum thickness of about 35 feet near well 36 and is underlain by a clay aquitard which is about 30 feet thick. Large areas of the clay unit which surround the surficial aquifer are above the water table. The flow through this aquifer is towards the south along a channel cut into the clay aquitard in the vicinity of well 50.

The contaminated confined sand aquifer is overlain by the clay aquitard and is underlain by the shaley basal portion of the St. Peter Sandstone. The confined sand aquifer is about 75 feet thick. Flow through this aquifer is generally towards the west. Additionally, there is a slight upward flow of ground water from the underlying Prairie du Chien aquifer in the vicinity of the Mississippi River.

The contaminated aquifers discharge to the Mississippi River.

The estimated total VOC masses remaining in the unsaturated soils are 388 pounds in the BNR lands and 82 pounds in the FMC lands. The percentage of given compounds are: benzene, total for FMC and BNR lands 2.7% (FMC lands 0.1%/BNR lands 2.6%) [2.7 (0.1/2.6)], 1,2-dichloroethane 1.0 (0/1.0), ethyl benzene 1.8 (0/1.8), methylene chloride 28.2 (15.4/12.8), toluene [illegible] (0.2/5.8), trans-1,2-dichloroethylene 52.0 (0/52.0), 1,1,1-trichloroethane 1.2 (0.1/1.1), and trichloroethylene 6.4 (1.3/5.1). Over half of the remaining contamination is trans-1,2-dichloroethylene which occurs in the BNR lands.

Contaminants in the ground water at the site include: trichloroethylene [up to 47,000 parts per billion (ppb)]; tetrachloroethylene [up to 1200 ppb]; 1,2-dichloroethylene [up to 2480 ppb]; 1,2-dichloroethane [up to 86 ppb]; 1,1-dichloroethylene [up to 327 ppb]; and benzene [up to 16 ppb]. Acetone [up to 15 ppb] reported in the samples appears to have been a sampling or laboratory artifact and is therefore not considered a contaminant at the site.

Based on 12 samples collected from four wells from September to November, 1983, contaminants at wells adjacent to the Mississippi River, and generally thought to be downgradient of the site include: 1,1,1-trichloroethane [found five times from 1 to 64 ppb]; 1,2-dichloroethylene [found four times from 1 to 16 ppb]; and 1,1-dichloroethylene [found twice at 2 ppb].

Based on 40 samples collected between 1981 and 1983, contaminants at the Minneapolis drinking water supply intake include: trichloroethylene [found 26 times at 0.2 to 1.7 ppb; 1,1,1-trichloroethane [found twice at 1.2 and 1.4 ppb]; 1,2 dichloroethylene [found five times at around 0.6 ppb]; and 1,1-dichloroethylene [found once at 0.3 ppb]. Per MPCA staff, trichloroethylene has also been sampled at 3.1 ppb.

The concentrations of hazardous substances in the contaminated ground water vary by several orders of magnitude within the contamination plumes. Trichloroethylene (TCE) comprizes about 98% of the mass of hazardous substances. The concentration of TCE ranges from none detected up to 47,000 parts per billion (ppb) in the surficial aquifer and from none detected up to 15,000 ppb in the confined aquifer.

There is one existing receptor exposed to hazardous substances released from the FMC and BNR lands—the Minneapolis drinking water intake located on the Mississippi River.

IV. Risk to Receptors via Exposure Pathways

The primary concern resulting from contamination at the BNR and FMC lands is ingestion of contaminants in the ground water, either by directly ingesting the ground water or by ingesting river water contaminated by the ground water discharges to the river.

At the one existing receptor, the Minneapolis drinking water intake located on the Mississippi River approximately one-half mile downstream of the FMC and BNR lands, measureable though low amounts of TCE have been sampled. The FMC and BNR lands are among sources of TCE contamination reaching the Mississippi River. The FS submitted by FMC as modified by the MPCA Director indicates that the FMC and BNR lands contribute to a threatened exceedance at the Minneapolis drinking water intake of the national drinking water standard for TCE (Maximum Contaminant Level) established under the Safe Drinking Water Act for public water supply systems. The RI/FS data indicates a present health risk of up to 1.1×10^{-6} (1.1 additional cancer deaths out of one million persons exposed over an average lifetime) associated with the releases of TCE which are found at the Minneapolis drinking water intake. Given the RI/FS data, there could be a future exceedance of the 10^{-6} risk level at the Minneapolis drinking water intake as a result of the combined releases from the FMC Site, Naval Industrial Reserve Ordnance Plant (NIROP) and other sources.

Presently, ground water receptors do not exist at the FMC and BNR lands or between the FMC and BNR lands and the Mississippi River because the ground water is not being used. The FMC and BNR lands, and the land between the site and the river are of concern because contaminated ground water could be accessed through wells. Two types of possible wells are of primary concern: 1) general potable water supply wells and 2) auxiliary water supply

wells for the City of Minneapolis.

Recently, the City of Minneapolis has been working with the U.S. Geological Survey (USGS) to further evaluate the feasibility of utilizing wells (potentially between the FMC and BNR lands and the Mississippi River) as an auxiliary water supply source. Through this investigation the USGS is evaluating a 3 mile segment along the Mississippi River near the Minneapolis Water Works. The investigation considers use of numerous wells along this river segment. These wells would augment the existing water supply during the summer.

In the short-term, there are no potential receptors, except potential wells to supplement the City of Minneapolis water supply, due to land-use factors. The area adjacent to the site in the direction of the Mississippi River consists of a park, and the City of Minneapolis Water Works property. In addition, there are institutional controls which restrict use of wells in this area. The Minnesota Department of Health has approval authority over well construction and location. Also a City of Fridley Ordinance prohibits installation of a potable water supply well when municipal service is in reasonable proximity. Because a water main runs through the Anoka County property and because the Anoka County Park Development Division has indicated the land will be serviced by the City water supply, there is no expectation in the short-term that private drinking water wells will be installed. However, because wells could be placed on the Anoka County Park property in the future, U.S. EPA considers such wells potential receptors. The potential wells to supplement the City of Minneapolis water supply are not being constructed at this time. Consequently, it is apparent that, in the short-term, use of the ground water in contaminated areas is not expected. The continued operation of controls over the long-term is of concern, however.

Releases of TCE to the Anoka County Park property are attributable to the FMC Site at the extreme southern portion of the Anoka County property near well 20. The concentration of TCE in well 20 is approximately 6 ppb with an associated potential health risk of 2.2×10^{-6}. Because wells could also be placed on the other off-site property, the maximum TCE levels which are at well 45 for the confined sand aquifer and well 50 for the surficial sand and gravel aquifer are used. Well 45, at 430 ppb of TCE, has an associated health risk of 1.6×10^{-4}. Well 50, with 2100 ppb, has an associated health risk of 7.8×10^{-4}.

V. Alternatives Evaluation

A. Response Objective.

The feasibility study addressed the following receptors or potential receptors: 1) City of Minneapolis drinking water intake, and 2) Wells that could be placed between the site and the River (both general supply wells and auxiliary water supply wells for the City of Minneapolis).

The primary concern is ingestion of contaminants from the FMC and BNR lands either from directly ingesting ground water or by river water contaminated by the ground water discharges to the River.

The response objective is to minimize ingestion of contaminated ground water and river water contaminated by the ground water.

Institutional controls and existing land use presently mitigate against direct ingestion of ground water in the short-term. The Response Alternatives were evaluated as long term solutions for ground water contamination and control of contaminant discharges to the Mississippi River through the ground water.

The goal is to keep the ingestion risks from exceeding 10^{-6} additional lifetime cancer deaths at any existing receptor.

B. Alternatives Considered.

1. No Action

This alternative defines actual and potential impacts caused by contamination from the FMC and BNR lands if no cleanup actions are taken. It is used as a baseline against which other alternatives are compared.

2. Long-term Monitoring

This is basically a no action alternative that involves continued monitoring of the site to assure that contaminantion levels continue not to pose risks that would require an action.

3. Excavation and disposal

This alternative involves excavation of saturated contaminated materials with disposal at an off-site Resource Conservation and Recovery Act (RCRA) facility or an on-site containment facility.

4. Capping

This alternative involves placing a low permeability cover over identified areas to reduce infiltration through the unsaturated zone and thereby reduce contaminant loadings to the ground water.

5. Physical Containment

This alternative involves putting a low permeability barrier wall around contaminated areas to contain contamination with pumping within the wall. The pumping will cause water pressure to be greater outside the wall than inside it, thereby keeping contamination from leaking out in the event of a leak. The walls must be keyed into a confining layer to avoid leakage under the walls.

6. Hydraulic Containment

This alternative involves extraction of the ground water to cause it

and the contamination it carries to flow to the extraction area, thereby keeping contamination in the area influenced from flowing off-site.

7. Ground Water Treatment and Disposal

Alternatives 3, 5 and 6 require extraction of the ground water. This item discusses methods for treating and/or disposing of the extracted water.

a. Treatment

1) biological - involves biological reduction of contaminants. Organic materials are required to maintain biological activity.

2) carbon adsorption - involves flow of water over an activated carbon bed where close contact will cause contaminants to adsorb to the carbon.

3) air stripping - involves flow of air through the contaminated water which will cause volatile compounds to enter the air.

b. Ground Water Disposal

Once ground water is extracted it may or may not require treatment, but ultimately it will require disposal.

1) discharge to the Mississippi River.

2) discharge to the Publicly Owned Treatment Works (POTW).

8. Alternative Water Source Supply

This alternative involves supplying an uncontaminated source of water to receptors and potential receptors.

9. In-situ Biological Treatment

This alternative involves use of microbes to degrade contaminants in-place.

C. Compliance with Legally Applicable or Relevant and Appropriate Requirements (ARARs)

Because this remedial action addresses contaminated ground water that is

or may potentially be ingested, Federal and State health-based drinking water standards are ARAR for those alternatives that do not preclude ingestion of the ground water. As discussed in Section VII below, such standards include Safe Drinking Water Act MCLs and Minnesota Department of Health RALs.

Alternatives 1, 2, 4 and 8 would not meet MCLs at the site boundary as they do not involve containment of existing source contamination in the ground water.

Alternatives 3, 5 and 6 involve ground water extraction, and treatment and/or disposal which could meet MCLs at the Site boundary. If the ground water is treated and discharged to the Mississippi River, treatment must meet the NPDES permit requirements. If it is discharged to the sanitary sewer, treatment, if any, must meet pretreatment requirements under the Federal Clean Water Act.

Alternatives 3, 5 and 6 could result in air emissions either through disturbance of the soil or through ground water extraction, in which case Federal Clean Air Act and/or State requirements must be met.

D. Reduction of Toxicity, Mobility, or Volume

Alternatives 1 and 2 do not reduce the toxicity, mobility, or volume of contaminants.

Alternative 8, while not affecting contamination in the ground water, removes receptors.

Alternatives 3, 5 and 6 remove contamination from the ground water, thereby reducing the volume and toxicity of contamination in the ground water. If discharges of extracted ground water enter the Mississippi River upstream of the City of Minneapolis drinking water intake, additional risks to that receptor

would occur. The volume reduction would be greater for alternatives 3 and 6 than for alterntive 5, since groundwater extraction in alternative 5 would be designed only to maintain an inward gradient, not to remove contamination. Ground water extraction would only be for dewatering in alternative 3, but alternative 3 involves physically removing contaminated soil.

Alternative 4 would reduce contaminant loading to the ground water from the unsaturated zone, thereby reducing the mobility and the volume of those contaminants. Unsaturated zone loadings are no longer as significant since a soil removal down to one part per million in the unsaturated zone over the FMC and BNR lands has been completed.

E. Short-term Effectiveness

Alternatives 1 and 2 would be effective in the short-term, only to the extent the City of Minneapolis drinking water intake does not experience increase contaminant levels and to the extent potential receptors do not materialize.

Alternative 3 would provide the quickest removal of contaminants, but would pose the greatest short-term risks due to handling and exposure of contaminated soils. The amount of excavation required to reach the confined aquifer contamination would also pose construction difficulties and risk.

Alternative 4 would pose minimal short-term risk as contaminated soils above one part per million total volatile organic compounds have already been removed [illegible] the unsaturated soil.

Alternative 5 would pose some short-term risk to workers placing the barrier wall. Contamination would be contained.

Alternative 6 would pose some short-term risk during construction to workers . Contamination would be contained and reduced.

Alternative 8 would protect users of potable water, but would not address ground water contamination.

F. Long-term Effectiveness and Permanence

Alternative 1 does not address risks at the site.

Alternative 2 would monitor existing conditions. However, continuous professional management would be required in order to assure that necessary responses occur. The timeliness of required actions would also be of concern. The reliability of this alternative alone is suspect due to the complexity of the management required.

Alternative 3 would remove contaminants from the ground water rapidly and reliably as the soil would actually be removed. Short-term exposure during excavation would occur to workers and nearby populations. If disposed off-site, risks due to accidents and redisposal would occur. If contained on-site, some spreading of contamination and leakage of the containment facility are possible. As the soil is saturated, significant dewatering would be required. This increases handling and thereby increases volatilization and the opportunity for exposure and accidents. Long-term care of an on-site facility would be required.

Alternative 4 only reduces contamination from the unsaturated zone. It does not address the contamination in the ground water moving off-site. Long term care of the cap would be required.

Alternative 5 would require long-term management and constant monitoring of the low permeability barrier wall. Contamination would be contained. Breaches in the wall could be discovered by the increased pumping rates necessary to maintain an inward gradient. Replacement would be expensive.

Alternative 6 requires minimal construction, removes contaminants while not causing the significant short-term risks associated with excavation, is commonly used, and reliable. It does take longer to remove contaminants than excavation, however. Replacing wells is relatively inexpensive, although long-term operation and maintenance of the system is required.

Alternative 8 requires minimal management and is reliable: however, it does not address contamination of the ground water and Mississippi River.

G. Implementability

Alternatives 1 and 2 are easily implemented, but would be less reliable that other alternatives.

Alternative 3, 5, and 6 would require either a National Pollutant Discharge Elimination System permit for discharges to the River or an agreement with the publicly owned treatment works to discharge into the sanitary sewer system.

Alternative 3 would be difficult from an engineering standpoint due to the depth of excavation required to remove confined aquifer contamination.

Alternative 4 would be easily implementable, but would not address ground water contamination now in the saturated zone.

Alternative 5 could be difficult to construct such that adequate containment is assured. Flow through or under the barrier would reduce its ability to contain the wastes.

Alternative 6 is common and easily constructed. Capture zones can be measured to assure adequate coverage.

Alternative 8 is also common and easily constructed, although ground water contamination would not be addressed.

H. Cost

Alternative 1 has no cost.

Alternative 2 is included to some extent in other Alternatives under operation and maintenance ("O & M") and monitoring capital costs. It was not evaluated for cost by itself as any alternative is expected to require long-term monitoring.

Alternative 3 would have capital construction costs of $4,644,880 to excavate soils in the BNR lands and dispose of them in an on-site containment facility on the FMC lands. The present worth of operation and maintenance costs is $988,880. An added $15,000 for monitoring wells brings the total present worth to $5,648,760. The BNR lands requires excavation of about 66,000 cubic yards of overburden. The FMC lands would require excavation of 300,000 cubic yards of overburden and was therefore not considered further. Off-site disposal at a RCRA facility was two orders of magnitude greater in cost that an on-site facility.

Alternative 4 was not evaluated for cost because the FMC lands contamination is already beneath a clay aquitard, and FMC and BNR contamination in the unsaturated zone is not a major concern due to the already completed soil removal.

Alternative 5: A soil bentonite slurry wall for the BNR lands would have a capital construction cost of $1,003,550, monitoring capital cost of $18,000, and present worth of $1,557,735. For the FMC lands, a grout curtain was chosen due to the depth of construction and would have a capital construction cost of $5,[illegible],945, monitoring capital cost of $48,000 and present worth O & M costs of $567,630 for a total present worth of $5,813,575.

Alternative 6: Extraction wells for the BNR lands would have a capital

cost of $216,180, monitoring capital cost of $18,000, and present worth for O & M of $133,625 for a total present worth of $367,805. For the FMC lands, extraction wells were chosen at a capital construction cost of $491,755, monitoring capital cost of $48,000, and present worth for O & M of $611,245 for a total present worth of $1,151,000.

Alternative 7: For air stripping and discharge to the River a cost of $0.25 per 1000 gallons was used for the larger hydraulic containment volumes, while a publicly owned treatment works discharge had a cost of $1.80 per 1000 gallons for the smaller physical containment volumes. Air stripping was initially expected to be cost-effective. However, because discharging upstream of the drinking water intake was not environmentally acceptable and because construction of a discharge line to a location below the water works was impractical due to cost and easement difficulties, an untreated discharge to the sanitary sewer was chosen.

Alternative 8 was not evaluated for cost because no receptor is in need of an alternative water supply and the alternative does not address ground water contamination.

I. Community Acceptance

Community involvement in this project has not been strongly against or in favor of any alternative. The only comments submitted to U.S. EPA on the remedial alternative recommendation were from FMC.

J. State Acceptance

The MPCA agrees with the selected remedial alternative and have signed a Consent Order with FMC to implement it. However it does not believe that the land between the site and the Mississippi River will be used for drinking

water wells. Consequently, in determining a cleanup standard for the extraction system, the MPCA focused on the Mississippi River and Minneapolis drinking water intake as receptors. U.S. EPA's remedy requires the attainment of drinking water quality (MCLs) at the site boundary and an acceptable risk level at any receptor including any that are located between the site boundary and the River.

K. Overall Protection of Human Health and the Environment

Alternatives 1 and 2 do not provide for protection of any receptor or potential receptor. Alternative 2 does provide information on which the need for such protection could be made, although the long-term management and timeliness would be of concern.

Alternative 3 provides rapid reduction in contamination, but has high short-term impacts due to significant handling and site disruption. The cost is high.

Alternative 4 provides a reduction in contaminant loadings from unsaturated soils, but because substantial soil removal has already occurred and because significant contamination is in the saturated soils, this alternative would not be sufficient.

Alternative 5 provides containment of the contamination on site although the potential for breaching the barrier wall would exist.

Alternative 6 provides a unique combination of contamination reduction through extraction of ground water, containment of contamination such that it does not migrate off-site in the ground water, and low cost. It does take longer than Alternative 3, but does not have as significant short-term impacts.

Alternative 7 becomes discharge to the POTW without treatment primarily

because the levels expected would not require pretreatment and because discharge to the River would involve the difficulty and expense of discharging below the City of Minneapolis drinking water intake to avoid further loading at the intake.

Alternative 8 is not protective because existing receptors do not require a new supply based on existing loadings, and this does not address the ground water contamination.

In-situ biological treatment was considered possible with the addition of nutrients and oxygen; however, data is insufficient to evaluate a specific system. Evidence indicates this degradation may occur naturally at slow rates due to soil microbes.

VI. Recommended Alternative

U.S. EPA's recommended solution consists of hydraulic containment through ground water extraction wells (Alternative 6), discharge of untreated ground water to the publicly owned treatment works (POTW) (Alternative 7.b.2) and long-term monitoring (Alternative 2). The existing institutional controls and land-use are to be used to assure ground water is not used in land between the FMC and BNR lands and the Mississippi River during the period the extraction system is operating and until the plume has sufficiently dissipated.

The proposed ground water pump-out system is further defined in the Response Action Plan (RAP). The ground water pump-out is designed to reduce contamination source areas and to reduce general offsite migration of elevated contaminant levels. This will protect the existing Minneapolis drinking water intake receptor and potential future receptors by providing practical remediation of the alluvial aquifers beneath and downgradient of the FMC and BNR lands. The plume to the Mississippi River will be allowed to dissipate,

because, in the short-term, use of the aquifers between the FMC and BNR lands and the Mississippi River is not anticipated. The City of Fridley ordinance restricting private wells and the Minnesota Department of Health-required review of well locations for public health impacts assure that no wells will be placed on the land between the FMC and BNR lands and the Mississippi River at least during the short term. These institutional controls also restrict well use on the FMC and BNR lands. The proposed remedy addresses long-term concerns. If the City of Minneapolis places wells in this area, or for any reason there appears to be a likelihood of placement of wells in this area during the period of dissipation of the plume, reevaluation of the remedy will be required.

The selected alternative will ensure that MCLs or health-based cleanup levels are met at the site boundary. In addition, after two years of pumping and every five years therafter, a protectiveness determination and a transport analysis will be performed to ensure that the exposure risk of the carcinogens falls within the Agency's acceptable risk range of 10^{-4} to 10^{-7}. The risk at at the receptor will be at or below the 10^{-6} level.

The ground water pump-out system consists of five wells (Attachment VI) which will extract contaminated ground water from the surficial aquifer (two wells in the BNR lands) and the confined aquifer (three wells in the FMC lands). Each pump-out well will extract approximately 20-30 gallons per minute (gpm) and will produce capture zones of about 110-120 feet in the aquifer. Upon implementation, the pump-out system will prevent migration of highly contaminated ground water from the FMC and BNR lands property boundaries. The wells in the BNR lands (RW1 and RW2) and the well closest to the BNR lands in the FMC lands (RW3) will also reduce contaminant levels in contaminated areas thought to be source areas.

Ground water extracted by the pump-out wells will be discharged to a gravity drain system to the sanitary sewer for treatment at the Pigs Eye Wastewater Treatment Facility which is owned and operated by the Metropolitan Waste Control Commission (MWCC). The discharge will consist of about 100-150 gpm with a TCE concentration of no more than 10,000 ppb for 2 months and 5,000 ppb therafter. Concentrations of the other contaminants will be substantially lower and the total volatile organic compound concentration will be no more than 20,000 ppb for the first 2 months and 15,000 ppb thereafter. The TCE concentration will rapidly decrease and is expected by the MPCA to reach around 270 ppb within 5 years.

The effectiveness of the ground water pump-out and treatment system will be assessed through monitoring of receptors, ground water levels, ground water contaminant concentrations, and discharge to the sanitary sewer.

The monitoring system is as follows:

1. Extracted Ground Water Monitoring. Extracted ground water will be monitored to determine flow rate and contaminant concentration. Volatile organic compounds will be monitored through sampling ports in the well chamber manholes in each of the three wells in the more highly contaminated areas (RW1, RW2, and RW3--see Attachment VII).

2. Hydraulic Containment Monitoring. Hydraulic containment monitoring will consist of collection of water level data from bundle piezometers and existing monitoring wells (see Attachment VIII). Water levels will be measured to assure the extraction system is adequately containing contamination through inward gradients towards the extraction wells.

3. Ground Water Monitoring. The surficial sand and gravel aquifer

will be monitored at well 51 (see Attachment IX), and the confined sand aquifer will be monitored at well 45 and two new wells (also see Attachment IX). The wells are downgradient near the site boundary and will be used to determine site boundary contamination levels.

4. Receptor Monitoring. A surfical aquifer and a confined aquifer well will be monitored near the Mississippi River just south of the Water Works and Anoka County property boundary, along with the City of Minneapolis drinking water intake. This monitoring is intended to provide data on risks to receptors and the plume.

VII. Clean-up Standards and Other Environmental Requirements

Section 121(d) of SARA requires that remedial actions comply with legally applicable or relevant and appropriate requirements (ARARs) of Federal environmental laws and more stringent, promulgated State laws.

"Applicable" requirements are cleanup standards, standards of control and other substantive environmental protection requirements, criteria or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a site. A requirement is "applicable" if the remedial action or circumstances at the site satisfy all the jurisdictional prerequisites of the requirement. "Revelant and appropriate" requirements are cleanup standards, standards of control and other environmental protection requirements, criteria or limitations promulgated under Federal or State law that, while not "applicable" to the remedial action or circumstances at the site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the remedial action at the site.

Non-promulgated advisories or guidance documents issued by Federal or State governments do not have the status of potential ARARs; however, where ARARs do not exist, or for some reason may not be sufficiently protective, non-promulgated advisories or guidance documents may be considered in determining the necessary level of cleanup for protection of human health and the environment. See Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements dated July 9, 1987.

This section identifies the requirements of environmental laws, regualations and policies that are applicable or relevant and appropriate standards for the recommended alternative for remediating contaminated ground water at the FMC and BNR lands.

Because of the potential for the placement of wells in the contaminated ground water to provide additional drinking water to the City of Minneapolis, (and the long-term uncertainty of existing prohibitions on placement of private wells in the Anoka County parkland) and because the Minneapolis drinking water intake has measurable, though low level amounts of TCE contamination, Federal and State health-based standards for drinking water were considered in determining the cleanup level required for the contaminated ground water. These include standards established under the Federal Safe Drinking Water Act (SWDA), Resource Conservation and Recovery Act (RCRA) and Clean Water Act and the State of Minnesota Recommended Allowable Limits (RALs) for drinking water.

The SWDA establishes Maximum Contamination Levels (MCLs) and Maximum Contaminant Levels Goals (MCLGs) for specific contaminants to ensure the quality of drinking water supplies. Maximum Contaminant Level Goals are nonenforceable health goals, set at levels where no known or anticipated adverse health effects will occur in exposed people and which allow for a margin of safety. Technical feasibility or cost are not taken into account. Maximum Contaminant Levels are

limits for the concentration of certain contaminants in public water supplies. They are required to be at levels as close to MCLGs as feasible taking into account use of the best available treatment technologies and costs to public water systems and analytical limits of detection.

The MCLs and MCLGs apply at the tap to "public water systems," which are water systems having at least 15 service connections or regulatly serving at least 25 individuals. They would thus be applicable to water supplied to users of the Minneapolis Public Water Supply. However, they would not be applicable to the ground water in the aquifers under the FMC site unless the aquifers were being accessed directly for public drinking water. At this time there are no wells down-gradient of the site supplying public drinking water. The Minneapolis water supply intake receives some portion of the ground water but this is diluted with river water, and the water is treated before delivery to the user. The SDWA standards would apply after such dilution and treatment at the tap.

The SDWA standards are "relevant" cleanup standards for the remediated groundwater, however, because the ground water may in the future be accessed through wells for a drinking water supply and because it may be drawn into the Minneapolis public water supply intake in the Mississippi River downstream of the site. The MCLGs for TCE and certain other volatile organic compounds ("VOCs") found in the ground water under the FMC and BNR lands are zero. The MCLs promulgated for TCE and other VOCs found at this site are set at slightly higher levels which, with respect to each contaminant, have been determined to be fully protective of public health. U.S. EPA has determined that MCLs are relevant and appropriate standards for ground water that may be used for drinking water unless, under the circumstances at the site, more

stringent standards must be applied to ensure protection of public health or the environment. (See July 9, 1987 "Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements" and May 21, 1987 letter from Lee M. Thomas to the Honorable James J. Florio.)

Ground water protection standards have been established under RCRA, at 40 CFR Section 264.94. RCRA regulations apply to facilities treating, storing and disposing of hazardous waste as of November 19, 1980. Such facilities were required to apply for an operating permit by that date. Such facilities are further required under Section 3004(u) of RCRA and 40 CFR 264.101 to institute "corrective action" as set forth in the permit, to remedy releases of hazardous waste and constituents from any "solid waste management unit" at the facility. The ground water protection standards at 40 CFR 264.94 are to be established in permits and apply to any solid waste management units which received waste after July 26, 1982. The ground water standards serve both as a trigger for requiring corrective action to remedy a release from such a solid waste management unit, and as clean-up standards for the corrective action. However, because no waste was placed in this area after July 26, 1982, the ground water protection standards of 40 CFR 264.94 are not "applicable" under RCRA to this solid waste management unit. They may, nevertheless, be "relevant and appropriate" as clean-up standards for this ground water remedial action.

There are three types of standards established under 40 CFR §264.94: Background levels, Listed Maximum Concentration Limits and Alternate Concentration Limits (ACLs). The regulations specify that the standard for concentrations of hazardous constituents in ground water in a facility permit must not exceed the background level or a listed maximum concentration limit or an ACL established by the Regional Administrator.

1. Listed Maximum Contaminant Levels. To date, Maximum Concentration Limits under RCRA have been established for fourteen chemicals. These limits are based on and are identical to the Safe Drinking Water Act MCLs for these chemicals. None of these listed chemicals are contaminants in the ground water at the FMC site.

2. Background Levels. The background level is that level of a chemical in the ground water in an area not impacted by contamination from a specific source.

3. ACLs. U.S. EPA may establish ACLs in lieu of background levels or listed maximum concentration limits if the ACL "will not pose a substantial present or potential hazard to human health or the environment as long as the [ACL] is not exceeded." 40 CFR 6264.94(b).

The clean-up levels which have been selected at this site are listed in Table I on the following page. Where SDWA MCLs have been established for a contaminant in the ground water, the MCL has been selected as the relevant and appropriate clean-up standard. MCLs are considered appropriate for protection of public health. These levels would also be appropriate as ACL limits under RCRA. (Since these clean up levels do not assume a point of exposure beyond the site boundary, the prohibition in Section 121(d)(2)(B)(ii) of CERCLA which restricts the use of ACLs in certain circumstances would not apply.)

Where no MCL under the SDWA has been established, the clean-up level has been established using the Minnesota Department of Health's Recommended Drinking Water Limits (RALs). Although these recommended contaminant levels are not promulgated state standards, and therefore are not ARARs, such

non-promulgated Federal or State advisory levels may be considered in determining an appropriate protective remedy. Like the MCLs these levels are in the 10^{-4}-10^{-7} cancer risk range which U.S. EPA has determined to be acceptable for carcinogens. Therefore, these levels are appropriate to consider as ACLs under RCRA.

TABLE I

Hazardous Substance	CONCENTRATIONS Maximum* On-Site	CONCENTRATIONS Maximum** @Intake	CRITERIA MCLs	CRITERIA RALs
1,1-Dichloroethane	1,200	--	--	--
1,2-Dichloroethane	86	--	5	
1,1,1-Trichloroethane	11,300	1.4	200	
1,1,2-Trichloroethane	25	--	--	5.1
1,1-Dichloroethylene	327	0.3	7	
1,2-Dichloroethylene	2,480	0.6	--	7
Trichloroethylene	47,000	3.1	5	
Tetrachloroethylene	1,010	--	10	
Benzene	16	--	5	
Toluene	5.1	--	--	2,000
Xylene	2.5	--	--	440

* On-Site is defined as the FMC and BNR lands.

** @Intake is defined as the City of Minneapolis drinking water intake on the Mississippi River.

One possible situation where more stringent standards than MCLs might be appropriate for ground water used as drinking water, is where multiple contaminants in the ground water present extraordinary risks. See July 9, 1987, Interim Guidance on Compliance with ARARs. Although a number of chemical contaminants have been detected in the ground water under the FMC and BNR lands, TCE constitutes 98 percent of the contaminant mass in the aquifers. Under these circumstances, it is expected that if the TCE concentration is reduced to the MCL of 5 ppb, the concentrations of the other chemicals will be reduced to non-detectible or near non-detectible levels. Thus U.S. EPA believes that upon completion of the remedial action there will be no additive risk from the other contaminants. However, as stated above, if upon reaching the MCL for TCE, additional concentrations of other contaminants remain in the ground water, and that water has the potential to be used as drinking water, an additive risk assessment will be conducted to determine whether more stringent standards must be met to be protective of public health.

The Federal Clean Water Act, 33 U.S.C. §1251, et seq.; as amended, requires U.S. EPA to establish water quality criteria for bodies of water, including ground water, based on effects of pollutants on human health and aquatic life. 33 U.S.C. §1314. Section 121 of CERCLA states that remedial actions shall attain these water quality criteria where they are relevant and appropriate under the circumstances of the release, based on the usage or potential usage of the water receiving the release. Federal water quality criteria have been established for TCE and certain of the other contaminants found in the ground water under the FMC and BNR lands; however, they are less stringent than the SWDA MCLs for these contaminants. Therefore, the selected clean-up levels achieve Federal Water Quality Criteria standards.

The contaminated ground water extracted by pumping will be discharged to the sanitary sewer for treatment at the Pigs Eye Wastewater Treatment Facility, a publicly owned treatment works (POTW). Section 307(b) of the Clean Water Act, 33 U.S.C. §1317(b), and regulations promulgated thereunder (40 CFR 403) require POTWs to develop and enforce pre-treatment standards (specific effluent limitations regulating the amounts of pollutants that may be discharged to the POTW) so as to prevent interference with operation of the POTW and pass through of the pollutants through the system. These requirements are applicable to this remedial action because it is a source of indirect discharge to a POTW. The MWCC has established a discharge limit for TCE of 5,000 ppb (10,000 ppb for the first two months), and a limit of 15,000 ppb (20,000 ppb for the first two months) for total VOCs, to be met at the point of discharge to the existing sewer prior to mixing with the NIROP facility wastewater.

In order to discharge from a Superfund site to a POTW, these requirements must be met, and certain factors must be considered which are identified in a policy memorandum dated April 15, 1986, "Discharge of Wastewater from CERCLA Sites into POTWs" from Henry L. Longest, Director, Office of Emergency and Remedial Response, Rebecca Hanner, Director, Office of Water Enforcement and Permits, and Gene Lucero, Director, Office of Waste Programs Enforcement, to Waste Management Division Directors, Regions I-X. These factors are discussed below.

1. <u>Potential of pollutants to cause pass through or interference, including a health hazard to employees at the POTW.</u> The pollutants in the discharge to this POTW are VOCs, which volatilize and migrate from the sewer to the air as the water travels to the POTW--a distance of 13 miles. They will further volatilize during treatment at the POTW. VOCs will not "pass through" or remain in the water after treatment at the POTW. High levels of VOC in a

discharge could result in sufficient volatilization to present a health threat to POTW workers. That is not the case here. The total average flow to this POTW is around 220 million gallons per day (MGD). The flow from the ground water pump-out will be around .144 to .216 MGD. Even assuming that no VOCs volatilized on route from the discharge point to the POTW, dilution at the POTW will result in a VOC concentration in the water (after the first two months) of less than 5 ppb. At these concentration levels volatilized VOCs would be far below the OSHA Permissible Exposure Limit for TCE in the workplace of 100 parts per million per 29 CFR 1910.1000. TCE does not pose an explosion hazard at this site because it is inflammable.

2. <u>The ability of the POTW to ensure compliance with applicable treatment standards and requirements</u>. The MWCC and FMC entered into an agreement on May 29, 1987 (amended on July 10, 1987), that sets forth the pretreatment standards, monitoring and other conditions for the discharge of ground water extracted from the site to the POTW. This agreement was approved by resolution at a Commission meeting on May 19, 1987 in accordance with state law.

3. <u>The POTW's record of compliance with the NPDES permit and pretreatment program requirements</u>. The MPCA has advised U.S. EPA that the POTW's compliance record is good.

4. <u>The potential for volatilization of the wastewater and its impact upon air quality</u>. U.S. EPA has calculated that the FMC site discharge to the sanitary sewer will result in emissions to the air of TCE not exceeding one to two tons per year. These emissions will occur through volatilization as the water passes through the sanitary sewer and the treatment works. The FMC and BNR lands are located in an "attainment area" for ozone, as defined under the Federal Clean Air Act, i.e., the area meets the National Ambient Air Quality Standard for ozone. In areas with air quality better than the National Ambient Air Quality Standards, Section 160-169 of the Clean Air Act, 42 U.S.C.

§§7470-7479, requires states or U.S. EPA to regulate the construction and operation of new industrial "major sources" of air pollution (generally sources with the potential to emit 250 tons per year or more), to prevent significant deterioration (PSD) of air quality in such areas. The PSD requirements are not directly applicable to the emissions from the POTW because it is not a new industrial source emitting or with the potential to emit more than 250 tons per year of volatile organic compounds. Such requirements could be "relevant and appropriate" however, if emissions from the sanitary sewer were great enough to to impact air quality in the area. The emissions from the FMC ground water pump-out are, however, substantially below the threshold for regulation of new stationary sources in attainment areas under the Clean Air Act and are below levels that would impact air quality in the area.

5. The potential for ground water contamination from transport of CERCLA wastewater to the POTW, and the need for ground water monitoring. The levels of VOCs in the sanitary sewer are not expected to cause any significant contamination of ground water on route to the POTW because of volatilization and the probability of infiltration instead of exfiltration to the sewer.

6. The potential effect of the CERCLA wastewaters upon the POTW's discharge into receiving waters. Due to volatilization of the VOCs in the sewer or the POTW, there will be no impact on the POTW's receiving waters.

VIII. Enforcement Status

The RI/FS for the FMC and BNR lands was performed by FMC Corporation pursuant to a consent order that was entered into between U.S. EPA, MPCA and FMC in June 1983. This tract of land was used by FMC for burning and disposal of hazardous waste between 1964 and 1969. Just North of the FMC and BNR lands is located the U.S. Naval Industrial Reserve Ordnance Plant (NIROP). FMC owns part of the land

on which the NIROP is located and the U.S. Navy owns the other part. FMC operates the NIROP. The NIROP has been manufacturing Navy weapons systems since 1941. Hazardous wastes generated by the NIROP were disposed in areas in this portion of the site resulting in both soil and ground water contamination. The U.S. Navy is currently conducting an RI/FS for the NIROP portion of the Site. Future remedial action, constituting a separate operable unit, will address both the soil and ground water contamination at this portion of the site.

Following completion of FMC's RI/FS for the FMC and BNR lands in May 1985, the MPCA and FMC negotiated a State Consent Order under which FMC agreed to undertake remediation of the ground water contamination pursuant to a Response Action Plan approved by the MPCA. As discussed above, the MPCA approved a response action alternative consisting of hydraulic containment of the contaminated ground water and discharge of the extracted ground water into the Minneapolis wastewater treatment system. The MPCA approved a ground water clean-up standard of 270 parts per billion (ppb) for TCE to be met at the site boundary. Under the Consent Order, the ground water pump-out must continue until the TCE concentration in the ground water extracted from these wells reaches and maintains this concentration.

The MPCA determined that this 270 ppb standard would be protective of the public health at the Mississippi River and at the actual receptor (the Minneapolis drinking water intake), because the remaining on-site contamination would degrade by natural physical and biological mechanisms and disperse and attenuate as it migrated to eventual discharge in the Mississippi River. The FS concluded that concentrations of TCE in the ground water would be reduced by at least one order of magnitude between the site and Anoka County parkland due to dispersion, and that additional significant dilution and volatilization

of VOCs would occur upon discharge to the River, resulting in a further reduction in contaminant concentration at the Drinking Water intake by at least two orders of magnitude. The projected concentration of 28 ppb in the County lands corresponds to a cancer risk level of 10^{-5}; and the projected concentration of 2.8 ppb at the drinking water intake corresponds to a cancer risk level of 10^{-6}.

U.S. EPA also has determined that the ground water pump-out alternative is the appropriate remedy for the FMC and BNR lands (See discussion in Section VI above). However, U.S. EPA has determined that a clean-up standard equivalent to the Federal Safe Drinking Water Act MCLs and RALs is the "relevant and appropriate" standard for this remedial action, applicable at the site boundary, pursuant to Section 121 of CERCLA. See previous discussion at Section VII, above. Because ground water under the land between the site boundary and the Mississippi River may be used for drinking water in the long term, U.S. EPA is unable to conclude from the data derived in the RI that a 270 ppb limit at the site boundary will be protective for those potential receptors (i.e., assure that contaminant concentrations under these lands will attenuate to the MCL or levels corresponding to the 10^{-6} risk level from the 270 ppb level at the site boundary). Therefore, if FMC proposes to cease pumping without meeting the MCLs at the site boundary, U.S. EPA will assess at that time the necessity for Federal enforcement action to require continuation of the ground water pump-out.

IX. Operation and Maintenance

Operation and maintenance associated with the ground water gradient control and treatment alternative consists of the following:

(1) Operation, maintenance and monitoring of ground water pump-out wells which contain and remove contaminated ground water.

(2) Monitoring of the discharge of the collected ground water to the sanitary sewer system in accordance with MWCC requirements.

(3) Monitoring of ground water and surface water and associated receptors to determine the effectiveness of the response actions.

These actions will be implemented in accordance with all applicable environmental laws and regulations.

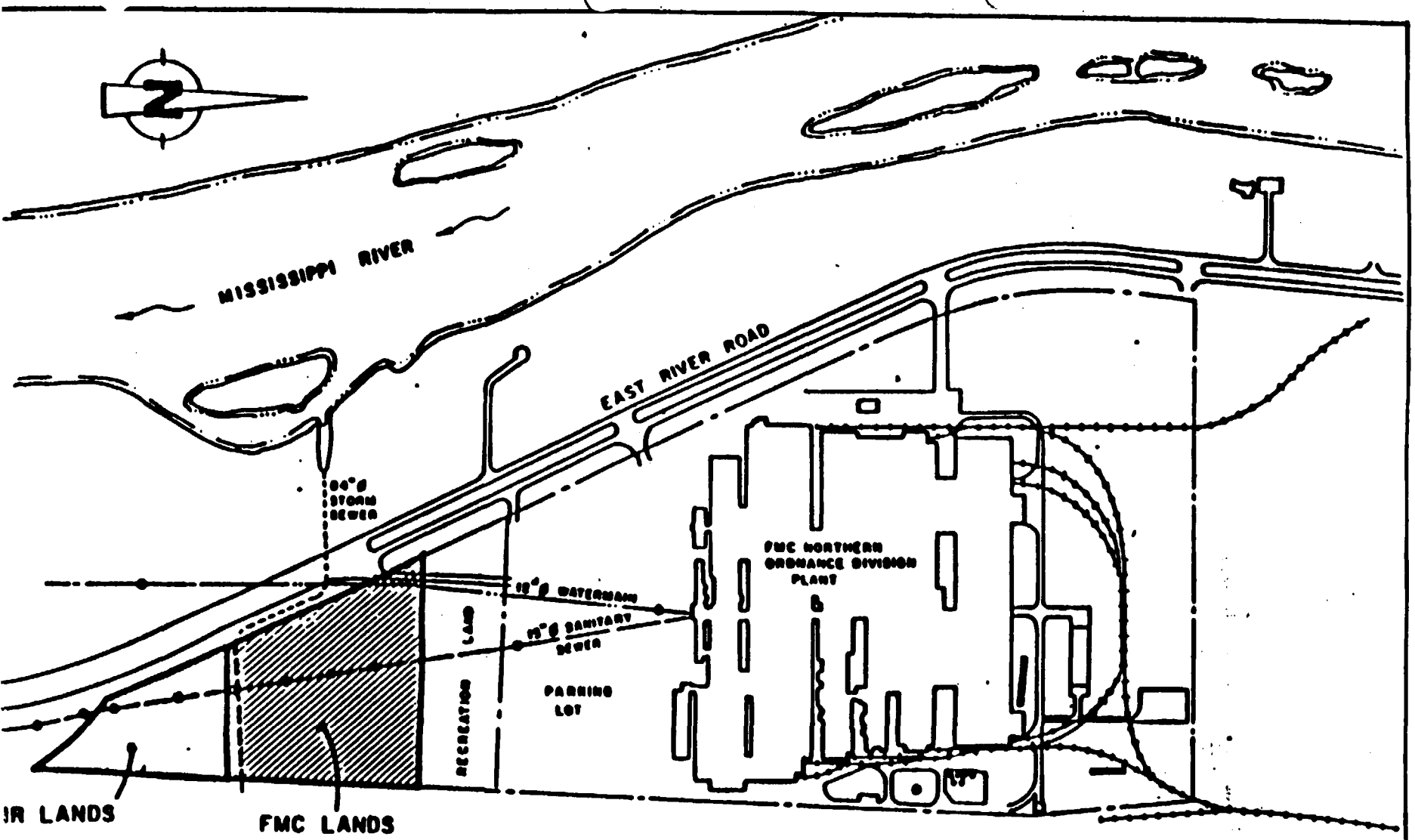
X. Community Relations

In 1983, the MPCA staff held several public meetings regarding the Consent Order between the MPCA, U.S. EPA and FMC which was eventually executed on June 3, 1983 for the FMC Site. Since 1983, the MPCA staff has routinely kept local public officials up to date regarding the status of the FMC Site RI/FS. The MPCA staff held meetings with local government officials on December 9, 1985 and on October 8, 1986, and discussed the RI/FS findings, presented the proposed response actions, and provided an opportunity to ask questions and make comments regarding these actions. In addition, in October, 1986, the proposed State Consent Order and RAP negotiated between the MPCA and FMC was presented to the public for review and comment. The public and local government support the proposed remedy. In addition to these community relations efforts, permits required by the RAP will be issued in accordance with established public notice requirements. The U.S. EPA prepared a Remedial Alternative Recommendation which was subjected to public comment in September, 1987. A Responsiveness Summary has been prepared that addresses comments received. (See Attachment 2 to Record of Decision).

XI. Operable Unit Justification

This ground water operable unit for the FMC and BNR lands is justified because the requirements of the National Contingency Plan have been met (See

40 CFR 300.5 and 40 CFR 300.68(c)]. This operable unit is a discrete part of the entire response action in that it proposes reductions in the concentrations of contaminants in the separate disposal areas south of the NIROP. This reduction will reduce releases from the FMC and BNR lands into the ground water, into the Mississippi River, and into the City of Minneapolis drinking water intake. This operable unit has been shown to be cost-effective through the alternatives analysis in the RI/FS. It is consistent with a permanent remedy because this operable unit deals strictly with the physically separate FMC and BNR lands, is expected to be the permanent remedy for that area, and because the surface soil removal has already occurred down to the ground water table.



ATTACHMENT 1

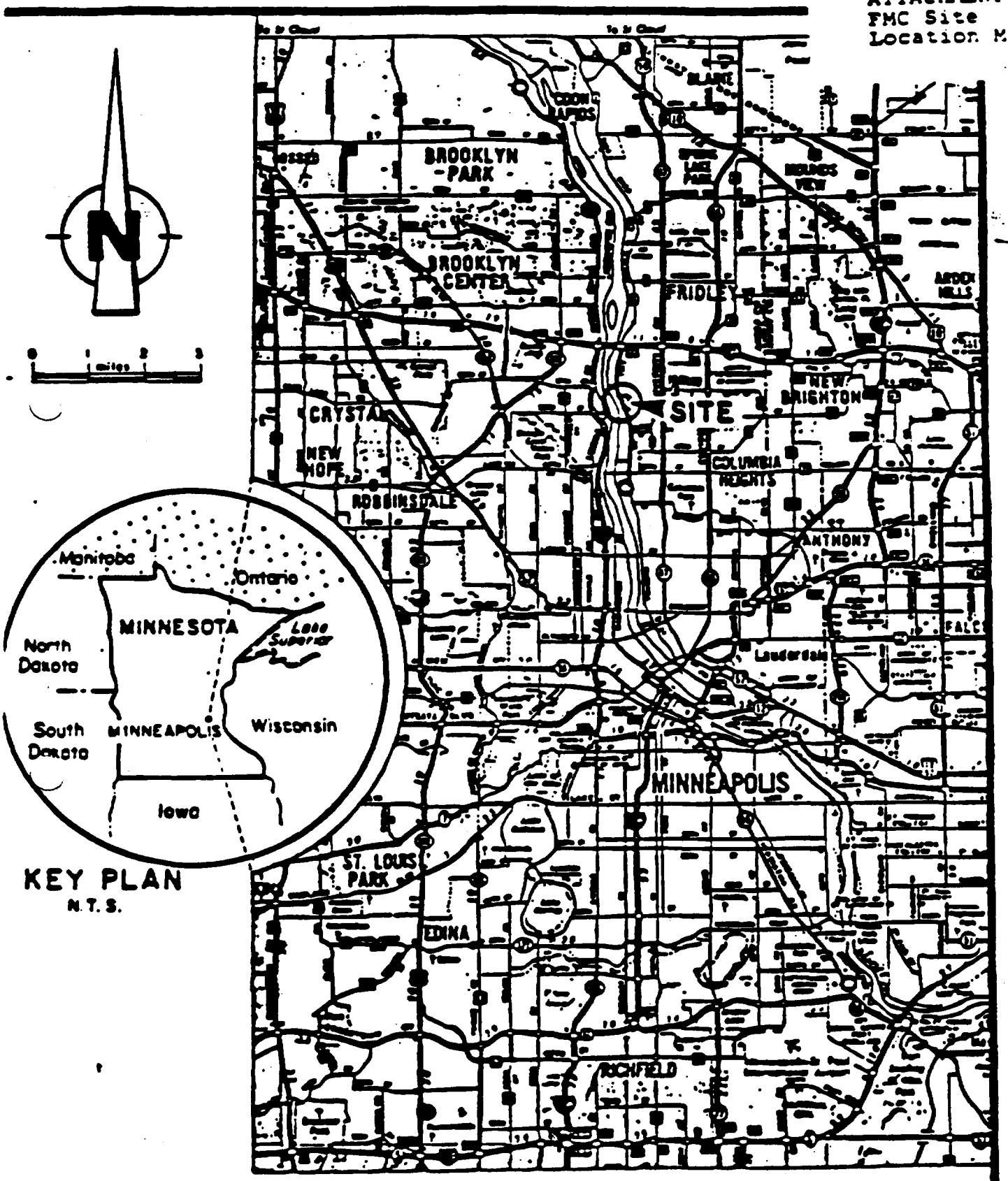
SITE PLAN

FMC Northern Ordnance Plant

A

06/01/88

ATTACHMENT II
FMC Site
Location Map



KEY PLAN
N.T.S.

No. 067916

AAA DISPOSAL SYSTEMS, INC.

P.O. Box 349, Roscoe, Il. 61073

Phone: Rockford 226-9803 Beloit 389-3933

Packer Truck Service ( ) Yards ( ) Gal.

Containerized . . . . . .

Compacted . . . . . .

Loose . . . . . .

Drums . . . . . .

Load . . . . . .

Misc.

Customer Name Wagner Lambert

Address

Roll Off Container Service (✓) Yards ( ) Gal.

Containerized . . . . . .

Compacted . . . . . 42 yd

Liquid Disposal . . . . . .

Misc.

DATE 2/8/82 DRIVER Clayton CUSTOMER SIGNATURE [illegible]

No. 067914

AAA DISPOSAL SYSTEMS, INC.

P.O. Box 349, Roscoe, Il. 61073

Phone: Rockford 226-9803 Beloit 389-3933

Packer Truck Service ( ) Yards ( ) Gal.

Containerized . . . . . .

Compacted . . . . . .

Loose . . . . . .

Drums . . . . . .

Load . . . . . .

Misc.

Customer Name Wagner Lambert

Address

Roll Off Container Service (✓) Yards ( ) Gal.

Containerized . . . . . .

Compacted . . . . . 42 yd

Liquid Disposal . . . . . .

Misc.

DATE 2/8/82 DRIVER Clayton CUSTOMER SIGNATURE [illegible]

No. 067922

AAA DISPOSAL SYSTEMS, INC.

P.O. Box 349, Roscoe, Il. 61073

Phone: Rockford 226-9803 Beloit 389-3933

Packer Truck Service ( ) Yards ( ) Gal.

Containerized . . . . . .

Compacted . . . . . .

Loose . . . . . .

Drums . . . . . .

Load . . . . . .

Misc.

Customer Name Wagner Lambert

Address

Roll Off Container Service (✓) Yards ( ) Gal.

Containerized . . . . . .

Compacted . . . . . 42 yd

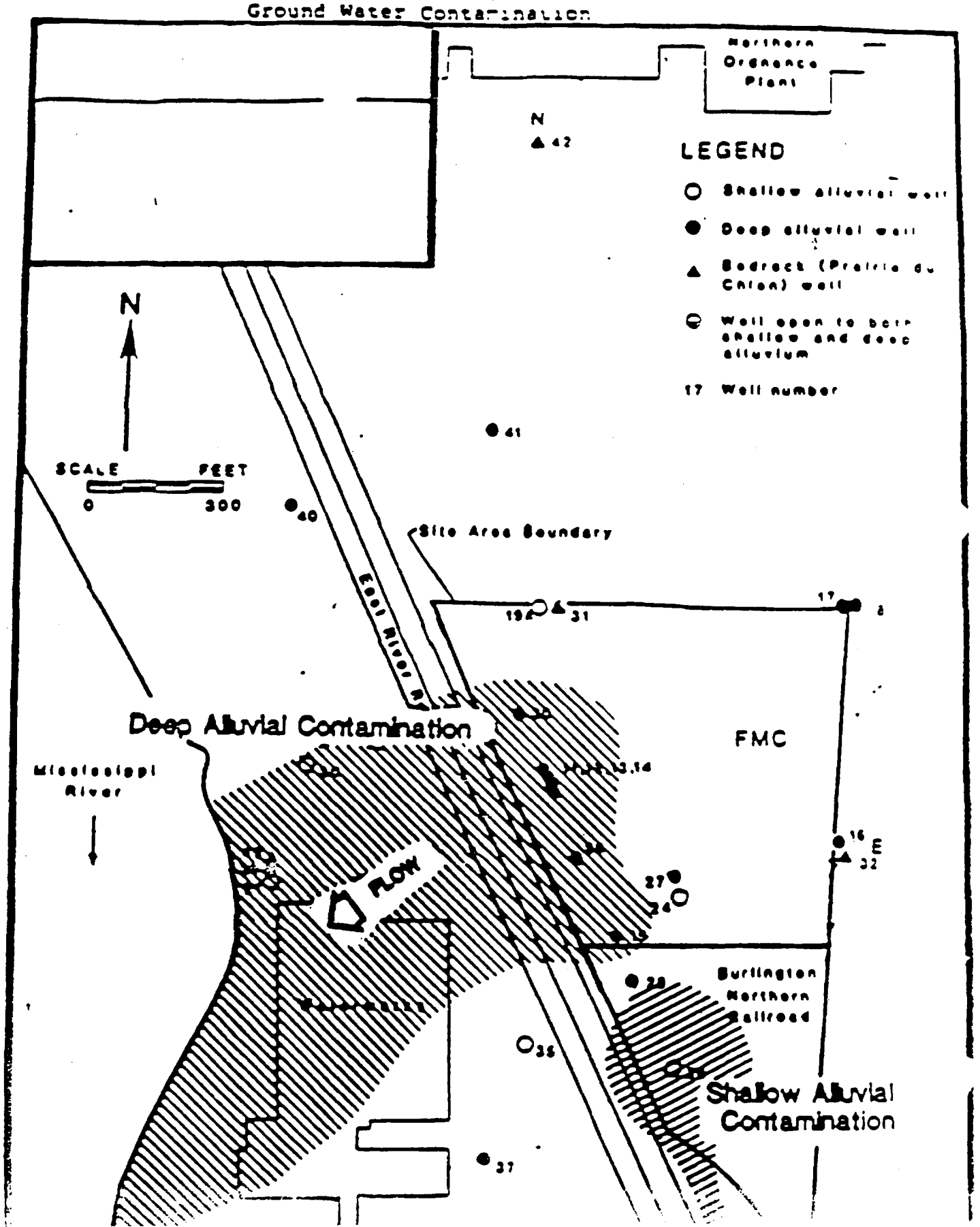
Liquid Disposal . . . . . .

Misc.

DATE [illegible] DRIVER [illegible]

Attachment IV

Ground Water Contamination



Attachment V

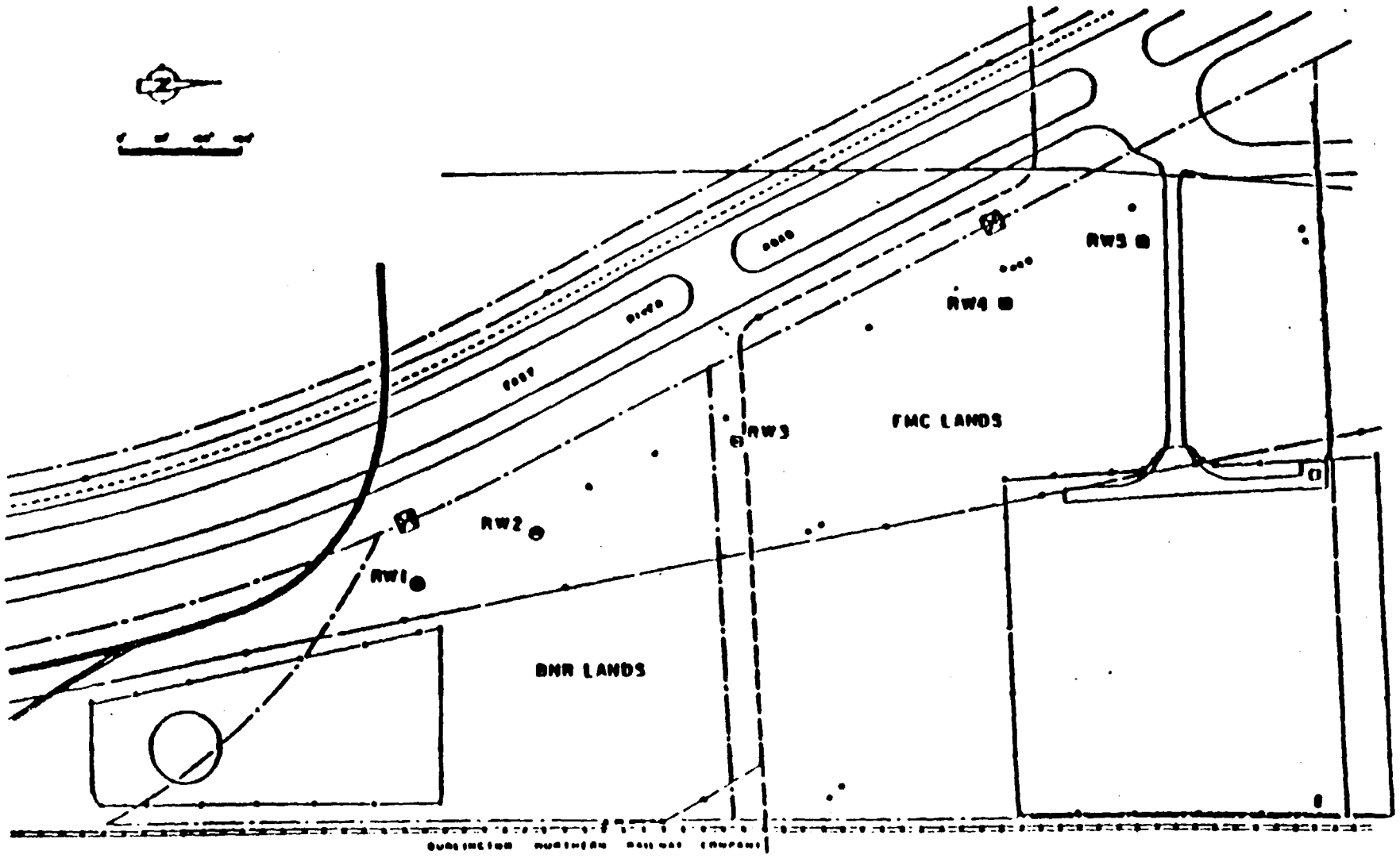
ESTIMATED COST SUMMARY OF REMEDIAL ACTION ALTERNATIVES

FMC CORPORATION
MINNEAPOLIS, MINNESOTA

Remedial Action Alternative	Total Capital Construction Cost	Operation, Maintenance and Monitoring Cost: Capital Cost	Operation, Maintenance and Monitoring Cost: Annual Cost	Operation, Maintenance and Monitoring Cost: Total Present Worth Cost	Total Remedial Alternative Cost
1. Excavation of contaminated soils from DNR lands with disposal in constructed CF on FMC lands	$4,644,000	$15,000	$71,040	$940,000 for 30 year period	$5,640,760
2. a) Physical containment of DNR lands with soil-bentonite containment wall and no cap	1,003,550	10,000	54,340 first 5 years 43,340 remaining 15 years	536,105 for 20 year period	1,557,715
b) Physical containment of DNR lands with soil-bentonite containment wall and clay cap	1,125,645	10,000	57,010 first 5 years 45,010 remaining 15 years	576,075 for 20 year period	1,719,720
3. Hydraulic containment of DNR lands	216,100	10,000	72,900	131,625 for 2 year period	367,005
4. Physical containment of FMC lands with grout curtain wall	5,197,945	40,000	62,144 first 5 years 42,144 remaining 15 years	567,630 for 20 year period	5,013,575
5. Hydraulic containment of FMC lands	491,755	40,000	77,500	611,245 for 11 year period	1,151,000

NOTES:
Present worth value for annual operation, maintenance and monitoring costs calculated at a six percent discount rate.

This Table was included as Table 4 in the proposed FS prepared by FMC. The MPCA staff do not agree with the specific costs attributed to the alternatives. However, this Table does present an acceptable comparison of relative costs for these alternatives.



LEGEND

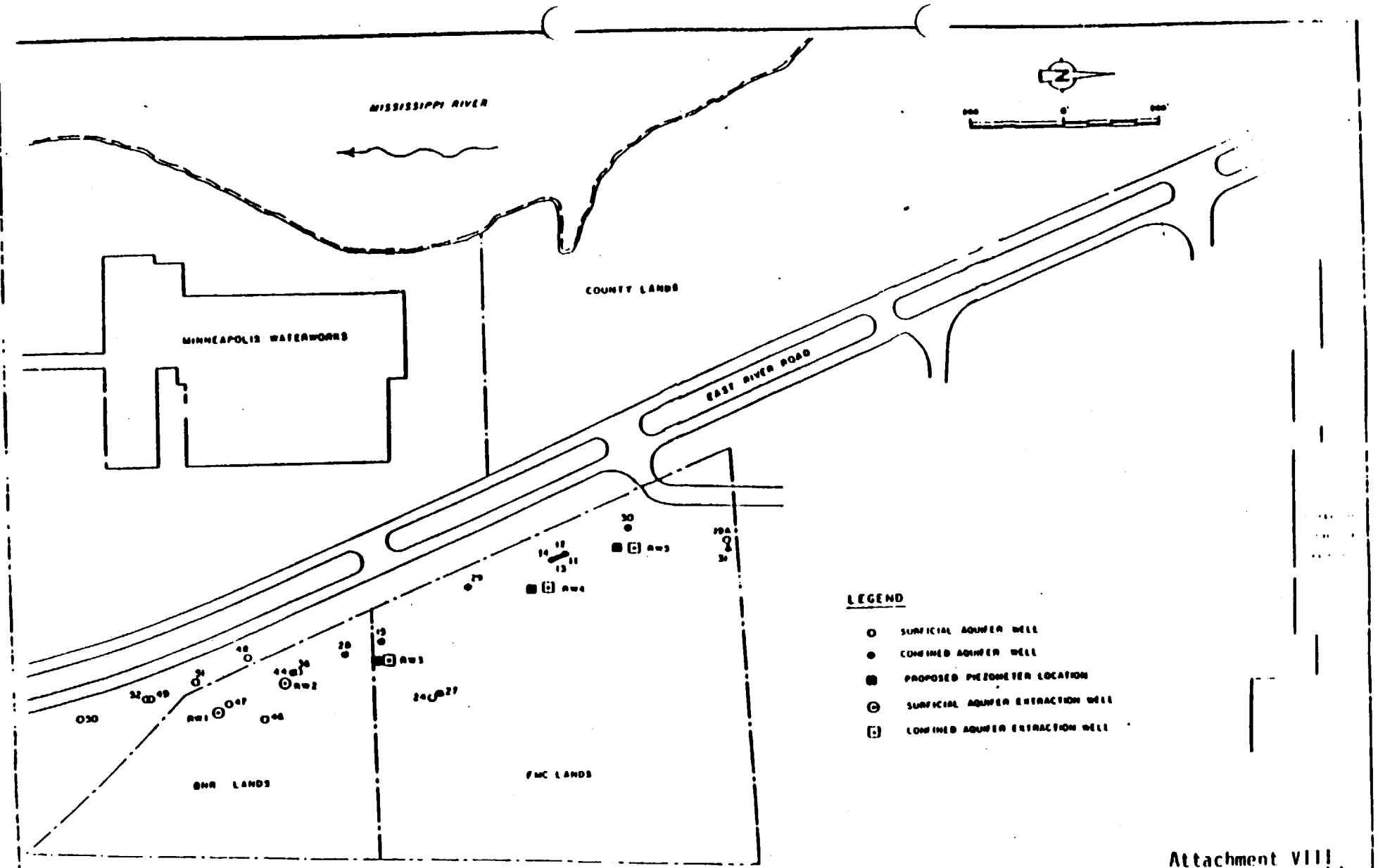
- ■ CONFINED AQUIFER EXTRACTION WELLS
- ⊖ SURFICIAL AQUIFER EXTRACTION WELLS
- • EXISTING GROUNDWATER MONITORING WELLS

ATTACHMENT VII

EXTRACTION WELL LOCATIONS

FMC Northern Ordnance Plant

CRA

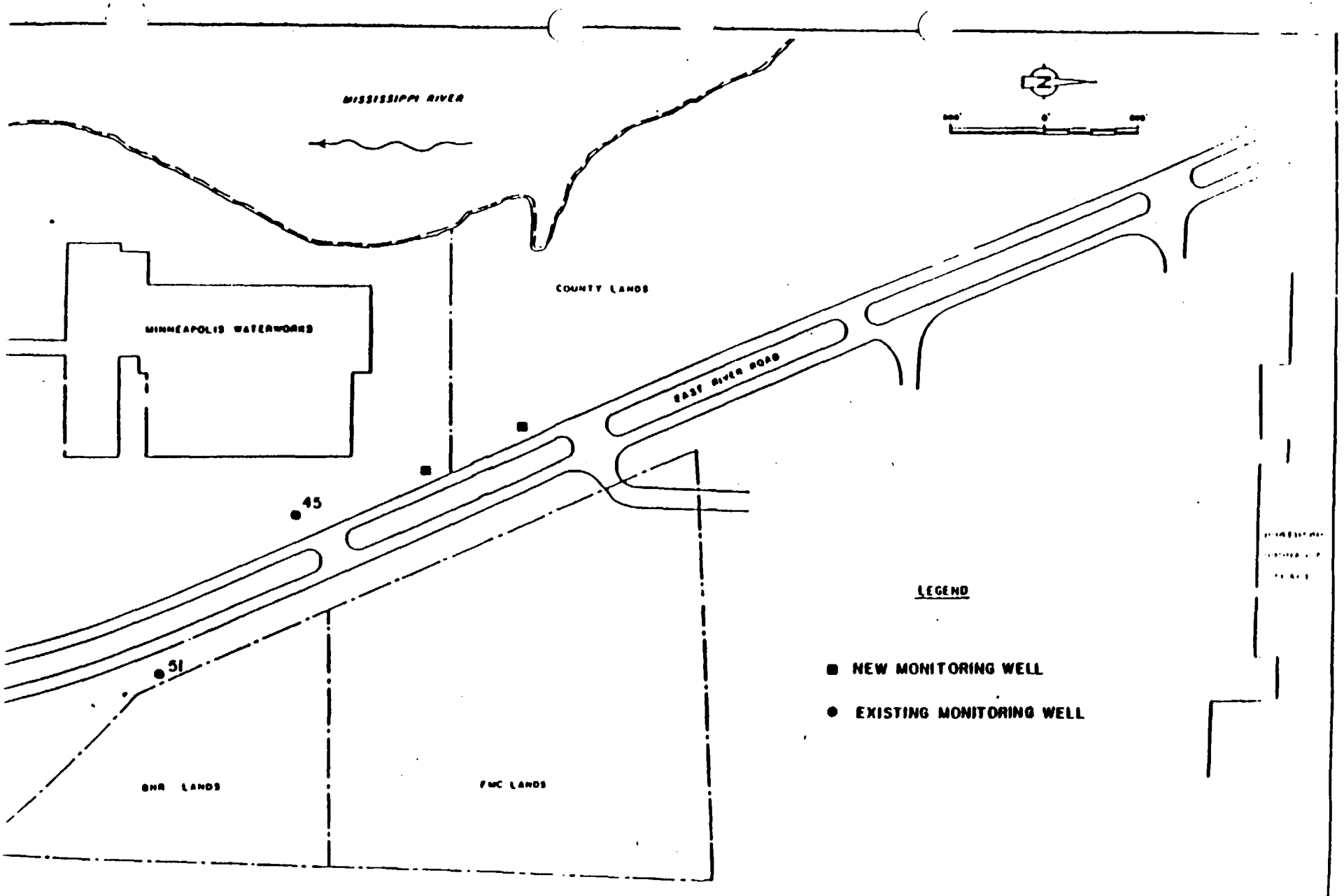


Attachment VIII
figure 1

HYDRAULIC CONTAINMENT
MONITORING LOCATIONS
FMC Northern Ordnance Plant

CRA

1518-20-14/6 6



Attachment IX
Figure 16

LONG-TERM MONITORING WELL LOCATIONS
FMC Northern Ordnance Plant

CRA

20 14/04/86

Responsiveness Summary for the FMC Site, FMC and Burlington Northern Railroad (BNR) Lands Ground Water Operable Unit, in Fridley Minnesota

1. Introduction

The U.S. Environmental Protection Agency (U.S. EPA) obtained information on the types and extent of contamination, evaluated remedial measures, and recommended remedial actions for ground water contamination from the FMC and Burlington Northern Railroad (BNR) lands portion of the FMC Site. As part of this process, U.S. EPA submitted its recommended alternative to public comment for a twenty-one (21) day period. Public participation in Superfund projects is required under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Contingency Plan (NCP). Comments received by the public are considered in the selection of the remedial action for the site. This document summarizes the comments received and states U.S. EPA's responses.

The responsiveness summary has three sections:

a. Overview. This section briefly presents U.S. EPA's recommended solution.

b. Background on Community Involvement. This section briefly presents a history of community relations.

c. Summary of Public Comments Received During the Public Comment Period and U.S. EPA's Responses.

2. Overview

During the public comment period, U.S. EPA presented nine response action alternatives in the documents which formed the feasibility study. U.S. EPA recommended a solution in the FMC Site Summary of Remedial Alternative Recommendation that included a ground water extraction well system to keep contaminants from continuing to migrate off-site and to reduce the contaminant mass available to migrate off-site; an untreated discharge of extracted water to the sanitary sewer system and publicly owned treatment works to dispose of extracted water away from the Minneapolis drinking water intake; use of existing institutional controls and recognition of land-use as assurance that ground water will not be used in the land between the FMC and BNR lands and the Mississippi River until the plume in that area has naturally dissipated; and a ground water monitoring system to monitor the extraction system, ground water contamination, and receptors.

The FMC Corporation was the only commentor. FMC objected to the

U.S. EPA proposed remedy to the extent it differs from the Consent Order between the State and FMC, objected to not being sent a copy of the FMC Site Summary of Remedial Alternative Recommendation, and objected to the time available for their comments.

3. Background on Community Involvement

Community involvement at the FMC Site has been minimal, particularly in the last few years. The site did receive considerable media attention in 1983, because at that time it was ranked No. 1 on the U.S. EPA's National Priorities List.

In 1985 the MPCA held a public comment period on the proposed "pump and treat" groundwater remedy for the FMC site. In October 1986, the MPCA held another public comment period on a final agreement between FMC and the State which embodied the same remedy. According to the MPCA's Public Participation Officer, the resident interest during these periods was low.

The U.S. EPA released the Feasibility Study for the FMC groundwater remedy on August 26, 1987. On August 27, 1987 a press release was issued to persons on the mailing list, and on September 3, 1987 a fact sheet was sent to those parties. The public comment period ended September 15, with only one commentor, the FMC Corporation.

4. Summary of Public Comments Received During The Public Comment Period and U.S. EPA's Responses

Comments raised during the public comment period for the feasibility study for the FMC Site, FMC and BNR lands ground water operable unit, are summarized. Comments made by FMC Corporation are grouped into three categories: 1) general comments on the proposed remedy, 2) comments on timing and procedure, and 3) specific comments on the FMC Site Summary of Remedial Alternative Recommendation. FMC Corporation's September 15, 1987 comment letter, which were the only comments received, is attached.

1. General Comments on the Proposed Remedy

a. Comment. FMC objects to U.S. EPA's proposed remedy to the extent it differs from the Remedial Action Plan agreed upon between the State and FMC.

U.S. EPA Response. U.S. EPA's proposed remedy is generally consistent with the State's remedy, except as to when the ground water extraction system should cease operation, which is addressed specifically in the next comment. Since contamination will remain on-site, U.S. EPA will review the site no less frequently than every 5 years. This is required by Section 121(c) of SARA.

b. Comment. FMC does not believe that achievement of Safe Drinking Water

Act Maximum Contaminant Levels (MCLs) at the facility boundary is necessary or appropriate.

U.S. EPA Response. Although U.S. EPA will rely on the existing institutional controls until the plume dissipates, they are not considered sufficient over the long-term to prevent use of the ground water between the FMC and BNR lands and the Mississippi River. Consequently, over the long-term the ground water could be used for drinking water and the MCLs are appropriate.

c. Comment. Resource Conservation and Recovery Act (RCRA) Alternate Concentration Limits (ACLs) at the site boundary, based on a remote receptor, are appropriate under Section 121(d)(2) (B)(ii) of SARA.

U.S. EPA Response. U.S. EPA did not use ACLs because of concerns regarding the lack of proof that contamination from the FMC Site does not or will not in the future cause a "statistically significant increase" in contaminants in the Mississippi River, considering the measurable levels of trichloroethylene at the City of Minneaplis drinking water intake, and because of concerns about the existing institutional controls to "preclude human exposure" to the contaminated ground water over the long-term in the land between the FMC and BNR lands and the Mississippi River (see comment 1.b. above).

d. Comment. Achievement of MCLs at the site boundary is likely to be technically impracticable and not cost-effective.

U.S. EPA Response. This concern has been discussed and will be part of the U.S.EPA reviews that will occur no less frequently than every five years as required by Section 121(c) of SARA.

2. Comments on Timing and Procedures

a. Comment. U.S. EPA did not send FMC a copy of the site summary.

U.S. EPA Response. FMC is on the mailing list for public participation and was sent a press release on August 26, 1987, and a fact sheet on September 3, 1987, notifying them public comment was being sought and where documents were available. In addition, a public notice was placed in the Minneapolis Star Tribune on starting the public comment period of twenty-one (21) days and indicating where documents were available. FMC was informed that U.S. EPA was recommending a remedy and that comments were being sought.

b. Comment. The comment period was less than 2 weeks.

U.S. EPA Response. The comment period was 21 days.

c. Comment. U.S. EPA refused to extend the public comment period for FMC.

U.S. EPA Response. Although U.S. EPA never explicitly informed FMC that the public comment period would not be extended, the Agency does not believe such an extension is appropriate when FMC was sent a press release notifying them of the public comment period; when the issues had been discussed over an extended period of time; and when the majority of the remedy had already been agreed to by FMC and the State in a consent order.

d. Comment. FMC wishes to be given adequate notice of U.S. EPA's review of the proposed remedy and a full opportunity to supplement their comments.

U.S. EPA Response. Since the results of the reviews will be used to either concur with or alter activities at the site, especially cessation of the ground water pumping, FMC will be informed of results requiring alteration of proposed activities. Further, because the U.S. EPA would likely seek to have FMC make those alterations, discussions between FMC and the U.S. EPA are likely.

e. Comment. U.S. EPA was invited to participate in negotiations between the State and FMC.

U.S. EPA Response. It is U.S. EPA's position that it was only allowed to be peripherally involved in negotiations between the State and FMC, and was never a full party to those negotiations. As a result, some difference in remedy is possible.

3. Specific Comments on the Site Summary of Remedial Alternative Recommendation.

a. Comment.

Page 8 The second sentence in the second full paragraph should state that "Using a worst case set of assumptions, the FS submitted by FMC as modified by the MPCA director indicates that the FMC and BNR lands may contribute to a threatened exceedance at the Minneapolis drinking water intake..." The following sentence should also indicate that the RI/FS data indicating a health risk of up to 1.1 x 10 (-5) is based on a "worst case set of assumptions."

U.S. EPA Response. The continued use of "worst case" is not proven, especially since the health risk noted was based on a measured contaminant level at the drinking water intake. Conservative actions are merited due to the significance of the City of Minneapolis drinking water supply.

b. Comment.

Page 10 The first sentence of Section VI should indicate that it is the Agency's evaluation of the RI/FS which has led to the conclusion that response actions are necessary at and

around the FMC and BNR land. FMC continues to believe that the RI/FS does not support that conclusion. In addition, the final sentence of the first paragraph of Section VI should state that releases from the FMC and BNR lands "potentially" threaten the public health. The work "threaten" implies an unacceptable risk, and no such risk exists now.

U.S. EPA Response. Although there are no existing receptors in the land between the site and Mississippi River, there is a threat to anyone who would use the ground water in that area. It appears that "threat" implies a potential impact. We do not agree that the threat is a potential threat, but do agree the impact is a potential impact.

c. Comment.

Page 10 The calculation of excess cancer risks included at the top of the page should not be based on instantaneous peak concentrations. The calculation of excess cancer risks is based on long-term exposure; thus, the relevant contaminant concentrations should be the average concentrations measured over the long-term.

U.S. EPA Response. Because of the lack of long-term monitoring data of adequate frequency and coverage, and because of fluctuations in the levels measured, it is considered prudent and protective to use maximum concentrations for illustrative purposes.

d. Comment.

Page 11 FMC disagrees with the statement in the first line of page 11 that existing releases contribute to a potential health risk to users of the Minneapolis water supply system. Under present conditions, there is no demonstrated risk to users of the water supply system. Current concentrations of hazardous substances at the water intake are fully within acceptable limits as established by federal regulations.

U.S. EPA Response. The use of "potential" is to indicate that there is concern, based on trichloroethylene levels that have approached the MCL, about the effect of contamination in the future. The fact that present levels are below the MCL is good, but does not eliminate concerns over the presence of trichloroethylene.

e. Comment.

Page 19 The first full paragraph indicates that EPA will reevaluate its recommended remedial action after two years. Since it is quite possible that FMC will continue to operate its groundwater pumpout system for longer than two years, we presume that this paragraph is intended to suggest that EPA

will evaluate its recommendation at the cessation of FMC's pump-out.

U.S. EPA Response. As presently envisioned a review will be conducted after two years because it is the minimum period during which pumping will occur. The results of that review may or may not dictate a review at the cessation of pumping.

f. Comments.

Page 4 The entry for January, 1985 should indicate that FMC believes the feasibility study submitted on January 21, 1985 fulfills the requirements of the June 8, 1983 consent order.

Page 4 The entry for August, 1985 should indicate that the MPCA approved the feasibility study submitted by FMC as later modified.

Page 4 The entry for February, 1986 should indicate that FMC submitted a Remedial Action Plan (RAP) workplan to both the MPCA and to the EPA.

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Page 11 The last paragraph should state that "the FS analysis, as modified by the MPCA director, indicated that only hydraulic containment... would...protect public health..."

Page 12 The first sentence of the first full paragraph should indicate that several extracted groundwater treatment and discharge alternatives were "evaluated by the FS," rather than "proposed by FMC."

Page 14 The penultimate sentence of the second full paragraph should state that "concentrations of other potential contaminants will be substantially lower."

U.S. EPA Response. U.S. EPA does not disagree with any of the major points of the above comments. They provide some additional clarification, but do not question conclusions.

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MICHAEL D. CHRISTENSON
J. MICHAEL SCHWARTZ
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BRIAN W. GRAY
STEVEN A. CHELESNIK
GREGORY C. SCOTT
SHARON N. FULLMER

OF COUNSEL:
FRED L. MORRISON

September 15, 1987

RECEIVED

Ms. Jennifer Hall (5PA-14)
Community Relations Coordinator
United States Environmental Protection
Agency
Region V
230 South Dearborn Street
Chicago, IL 60604

Re: FMC's Comments on FMC Site Summary of Remedial Action Recommendation

Dear Ms. Hall:

This letter is to present the comments of the FMC Corporation on the "FMC Site Summary of Remedial Alternative Recommendation," which was referenced in the Superfund Fact Sheet mailed from your office on or about September 3, 1987.

FMC wishes to register its strong objection to the fact that EPA never sent it a copy of the site summary, which describes the remedy the Agency proposes to recommend for the FMC site. Copies of the Fact Sheet were not received by FMC personnel or by myself until or about September 9. When I noticed a reference in the Fact Sheet to a proposed remedy which differs from the remedy agreed upon between FMC and the Minnesota Pollution Control Agency (MPCA), I phoned Kerry Street of your office on September 10 to inquire whether that remedy was described in any document and whether FMC would have a further opportunity to comment upon a

draft Record of Decision (ROD). Mr. Street informed me of the existence of the site summary and stated that he had not sent a copy to FMC. He further stated that September 15 was the deadline for comments not only on the feasibility study, but also on EPA's recommended remedy, and he suggested that I try to obtain a copy of the site summary from the MPCA.

Because the concerned MPCA staff members were not available, I was unable to obtain a site summary from the MPCA, and again phoned Mr. Street on September 11 to inform him of that fact and to request an extension of time in which to comment. Mr. Street replied that he did not wish to grant an extension of time, because EPA wishes to approve a ROD by September 30. He suggested that I instead obtain a copy of the site summary from the Anoka County Library. I did so, but because of a major malfunction in the Minneapolis phone system on September 11, I was unable to teletype copies of the document to FMC's environmental staff in Philadelphia or to FMC's technical consultant in Ontario. As a result, FMC personnel were not able to review the document or to prepare their comments until September 14. Of necessity, their review could not be a detailed one.

For the last two and one-half years, the EPA has not acted on the feasibility study prepared by FMC. Its recent actions in establishing a comment period of less than two weeks for its proposed remedy, neglecting to send FMC--the regulated party--a copy of that proposed remedy, and refusing to extend the comment period are at best unfair and are likely a violation of due process.

In this regard, we note that page 19 of the site summary indicates that at the cessation of groundwater pumping by FMC, the EPA will review its proposed remedy to reevaluate whether additional remedial action is appropriate. We expect that FMC will be given adequate notice of the results of that reevaluation and a full opportunity at that time to supplement these comments.

FMC also objects to EPA's proposed remedy to the extent that it may differ from the Remedial Action Plan (RAP) agreed upon between FMC and the MPCA. That RAP, which is incorporated within the consent order of October 1986, is designed to fully protect the public health, welfare, and environment, and indeed, goes beyond what is necessary for full protection. As you know, the negotiation of that order, in which EPA was invited to participate, continued for one and one-half years and fully explored all the relevant issues.

Specifically, FMC does not believe that achievement of the MCLs at the facility boundary is necessary or appropriate. Because the groundwater of concern discharges into surface water, because there is no statistically significant increase of contaminants from the groundwater in the surface water, and because there are adequate controls to prevent human exposure between the facility boundary and the surface water, an alternate concentration limit (ACL) for the boundary is appropriate under Section 121(d)(2)(B)(ii) of SARA. Moreover, achievement of MCLs at the boundary is likely to be technically impracticable within the meaning of Sections 121(a) and 121(d)(4)(C) of SARA, and not cost-effective within the meaning of Section 121(a) of SARA.

In the absence of drinking water wells in the area, the MCLs, which are established for drinking water purposes, are neither relevant nor appropriate criteria at the facility boundary. The appropriate criterion should be an ACL based on exposure. The only point of exposure is the Minneapolis drinking water intake. The MCLs are currently being met at that intake, and the RAP agreed upon between FMC and the MPCA will ensure that contamination from the FMC site will not contribute to any future exceedence of MCLs at the intake. Thus, the facility boundary ACL of 270 ppb incorporated within the existing RAP should not be changed.

I am attaching to this letter a list of additional comments on the site summary which FMC developed in the short time available to it. We look forward to an additional opportunity to comment if and when EPA reevaluates its position and/or chooses to act on its recommended remedy.

Very truly yours,

James A. Payne
Attorney for FMC Corporation

JAP/mks
Enclosure
cc: William W. Warren
Judy Y. Longfield
Douglas Hildre
Richard G. Shepherd
David T. Richfield
5310v

ADDITIONAL COMMENTS OF FMC ON SITE SUMMARY

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5311v

SUBJECT TITLE	AUTHOR	DATE	NO. OF PAGES
Letter to Jennifer Hall, EPA Re: FMC's Comment on Summary of remedial Alternative Recommendation		Sept. 15, 1987	5
Summary of Remedial Alternative Recommendation		August, 1987	25
Additional Interim Guidance for FY 1987 Record of Decision	J. Winston Porter, Assistant Administrator, EPA	July, 24, 1987	8
Letter to Taussig, FMC Re: Approval Conditions for discharge of contaminated groundwater to sanitary sewer	Breinhurst Metropolitan Waste Control Commission	July 10, 1987	3
Memorandum Re: Calculation of VOC emissions resulting from FMC remedial action	Street EPA	Sept. 1, 1987	1
Guidance on ARARS	U.S. EPA	July 9, 1987	14
Guidance: Alternate Concentration Limit	U.S. EPA	July, 1987	66
June, 1987 Progress report	FMC Corp.	July 8, 1987	2
May 1987 Progress report	FMC Corp.	June 9, 1987	2
April 1987 Progress report	FMC Corp.	May 11, 1987	2
March 1987 Progress report	FMC Corp.	April 10, 1987	2

SUBJECT TITLE	AUTHOR	DATE	NO. OF PAGES
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January 1987 Progress report	FMC Corp.	Feb. 10, 1987	2
December 1986 Progress report	FMC Corp.	Jan. 26, 1987	2
Response to U.S. EPA Institutional Control Questionnaire	State of Minnesota Office of Attorney General	Dec. 29, 1986	27
November 1986 Progress report	FMC Corp.	Dec. 12, 1986	2
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Agenda Item Sheet for October 28, 1986 MPCA Citizens Board Meeting: Request for Approval of Response Order by Consent, with attachments:	MPCA	Oct. 17, 1986	55
1) Response Order by Consent			
2) Minnesota Enforcement Decision Document	Executive Dir. MPCA	Oct. 16, 1986	22

SUBJECT TITLE	AUTHOR	DATE	NO. OF PAGES
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Proposed Response Action Plan	FMC	August 20, 1986	31
July 1986 Progress report	FMC Corp.	August 15, 1986	3
Letter to Longfield, FMC with attached MPCA's comments regarding FMC's Proposed Response Action Plan (RAP)	MPCA	July 31, 1986	4
May 1986 rogress report	FMC	June 10, 1986	4
Memo to Waste Management Division Directors I-X, Re: Discharge of stewater from CERCLA tes into POTWs.	U.S. EPA Offices of Emergency and Remedial Response, Water Enforcement and Permits and Waste Programs Enforcement	April 15, 1986	
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Compilation of Analytical Data collected during an investigation of the FMC Site by FMC between Dec., [illegible] 81 and June, 1983 including [illegible]l sampling acquifer sampling, surface water (Miss. River) sampling	FMC Corp.	May, 1984	
Summary of Analytical Data collected during investigation of the FMC site by FMC between December, 1980 and June 1983	FMC Corp.	May, 1984	
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Proposed Work Plan for Evaluation of Past Disposal Practices At FMC Site	Eugene A. Hickok & Associates	Feb. 3, 1981	5
Aerial Photographic Analysis of the FMC Site			

Any chain of Custody documents would be in the possession of the PRP's or their Consultants.

Raw Data obtained during the RI is in the possession of the PRP's or their Consultants.

The following reports prepared for FMC by E.A. Hickok & Associates are in the possession of the PRPs or their consultants and MPCA:

Evaluation of Past Disposal Practices, Phase I, Initial Assessment, April 20, 1981;

Evaluation of Past Disposal Practices, Phase II, Hydrogeological Investigation, December 31, 1981.