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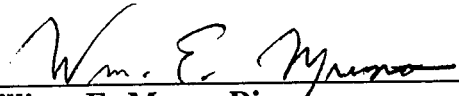
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MPCA, Ground Water
& Solid Waste Div.

**FIVE-YEAR REVIEW REPORT
GENERAL MILLS/HENKEL CORPORATION
MINNEAPOLIS, MINNESOTA**

Prepared By:

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Region V
Chicago, Illinois**



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Waste Management Division**

Date 9/30/94



Five-Year Review Report General Mills/Henkel Corporation

I. Introduction

Purpose

The United States Environmental Protection Agency (U.S. EPA), in consultation with the Minnesota Pollution Control Agency (MPCA) has conducted a five-year review of the Remedial Action implemented at the General Mills/Henkel Site, Minneapolis, Minnesota. The purpose of a five-year review is to ensure that the remedial action implemented at the General Mills/Henkel Site remains protective of public health and the environment.

Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. 9601 *et seq.*, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), requires that periodic reviews be conducted for sites in which hazardous substances, pollutants, or contaminants remain at the site after initiation of remedial actions. The periodic reviews must occur at least once every five years. The five-year review requirement applies only to Record of Decisions selected after SARA and such reviews are referred to as statutory reviews. The U.S. EPA is also committed to conducting certain discretionary reviews called policy reviews which, although not required by the statute or National Contingency Plan, are conducted as a matter of policy. The General Mills/Henkel five-year review was conducted as a matter of policy.

A three tier approach has been established for conducting five-year reviews. The three types of five-year review stress an analysis of the protectiveness of the remedy. Site-specific considerations, including the nature of the response action, the status of on-site response activities, and the proximity to populated areas and sensitive environmental areas, determine the level of review for a given site. A level I review is the most basic type of evaluation of protectiveness and is appropriate for most sites. A level II review contemplates a recalculation of risk, if site-specific circumstances warrant. A level III review involves a new risk assessment and is utilized when site specific circumstances show it to be necessary. The U.S. EPA has determined that a level I review is appropriate for the General Mills/Henkel site.

Site Characteristics

The General Mills/Henkel Corporation Superfund Site is located at 2010 East Hennepin Avenue in Minneapolis, Minnesota. The 10 acre facility was a technical research facility from 1930 to 1977 conducting both food and chemical research. From 1947 through 1962, a soil absorption pit which consisted of a series of three stacked, perforated 55-gallon drums

buried 10-12 feet beneath the soil surface was used to dispose of laboratory solvents. General Mills has estimated that up to 1000 gallons of solvents were discharged into the waste pit annually from 1947 to 1962.

In June 1981, General Mills notified the Minnesota Pollution Control Agency (MPCA) that they intended to investigate the soil absorption pit. Eleven soil borings were drilled at the site and results from three borings showed elevated levels of volatile organic chemicals. The analysis showed the presence of benzene, toluene, xylene, methyl isobutyl ketone, ethylbenzene, methylene chloride, 1,1,1 trichloroethane, 1,1,2,2 tetrachloroethane, 1,1,2 trichloroethane, 1,1,2,2 tetrachloroethylene, chlorobenzene, and trichloroethylene (TCE). In 1983, three additional borings were drilled in the areas that showed significant contamination in 1981 and one boring exhibited elevated levels of VOCs.

Sixteen groundwater monitoring wells were installed in 1982, seven additional wells in 1983 and four in 1984. A wide variety of volatile organic chemicals have been present in the monitoring wells, but TCE has overshadowed all other constituents present. Two aquifers underlying the site are contaminated, the surface or glacial drift and the Platteville formation (Carimona and Magnolia Members). In addition, the St. Peter Sandstone and Prairie Du Chien Group contain elevated levels of TCE. A generalized geologic column is shown in Figure 1.

General Mills analyzed different alternatives in 1983 to address site contamination in a document called "Summary of Alternative Remedial Actions". The following is a list of the different alternatives:

1. No action.
2. Excavation of contaminated soils in the vadose zone.
3. 45-foot diameter excavation of contaminated soils to a depth of 30 feet (vadose and saturated zone).
4. 70-foot diameter excavation of contaminated soils to a depth of 30 feet (vadose and saturated zone).
5. Venting of the vadose zone in conjunction with a groundwater pumpout system.
6. Groundwater pumpout system.
7. Slurry wall and cap.
8. Soil washing in conjunction with a groundwater pumpout system.

The groundwater pumpout system was chosen since the other options would not eliminate the need for, or significantly reduce the operating time for the groundwater pumpout system. The decision to use a groundwater pumpout system was finalized on October 23, 1984 through a Consent Order between General Mills and the MPCA. The U.S. EPA did not participate in the negotiations with General Mills or the MPCA.

Groundwater Pump and Treatment System

In 1985, a total of six groundwater extraction wells were installed by General Mills to remediate the groundwater. Three of the six extraction wells are used to extract contaminated groundwater from locations downgradient from the site and within the glacial drift aquifer, with the remaining three extraction wells placed on the General Mills site. Figures 2 through 5 show the locations of the groundwater extraction and monitoring wells. The downgradient glacial drift pumpout wells are designed to contain and remove groundwater with TCE concentrations exceeding 270 parts per billion (ppb). The downgradient glacial drift groundwater is extracted at approximately 300 gallons per minute and the extracted water discharged to the Minneapolis Storm Sewer for eventual discharge to the Mississippi river through a National Pollution discharge Elimination System (NPDES) permit. The pumpout wells began operation on December 5, 1985.

Three groundwater extraction wells (#108, #109, and #110) were installed on the General Mills site and began operation on November 1, 1985. Two of the onsite extraction wells remove groundwater from the glacial drift aquifer and one onsite well removes groundwater from the Carimona member aquifer. The groundwater from the three onsite extraction wells is pumped to an onsite air stripper for treatment. The air stripper is treating approximately 150 gallons per minute with an efficiency of 99 percent. The treated groundwater is regulated by a State NPDES permit. Required effluent concentrations at the point of discharge into the Minneapolis storm sewer network are to contain less than 50 ppb of TCE based on an annual average and less than 100 ppb of TCE as a daily maximum.

In August, 1992, two additional groundwater extraction wells were installed onsite by General Mills to remediate the Magnolia member aquifer. Pursuant to the Consent Order between General Mills and the MPCA, additional groundwater extraction is required if monitoring wells in the Magnolia member aquifer showed TCE concentrations greater than 27 ppb. The groundwater extracted from the Magnolia member aquifer is discharged into the Minneapolis storm sewer network. The NPDES permit has been amended and reissued to include provisions for the new discharge into the storm sewer network from the Magnolia member aquifer extraction wells. Due to the zone of groundwater influence from the two Magnolia member aquifer pumping wells, the Carimona member (#108) pumping well has been shut down. Influent to the air stripper is now approximately 100 gallons per minute with the two Magnolia member wells pumping at approximately 200 gallons per minute.

To prevent access to the site, fencing surrounding the site has been in place prior to the investigation beginning in 1981. The former research facility now houses light industrial

businesses.

II. Discussion of Remedial Objectives

Glacial Drift Aquifer

The cleanup standard for the glacial drift aquifer is 270 ppb for TCE. The 270 ppb value was agreed upon in the 1984 Consent Order between General Mills and MPCA. Approximately 400 gallons per minute is pumped from the glacial drift aquifer. TCE near 100 ppb is present outside the groundwater capture zone.

Carimona Member of the Plattville Formation

The cleanup standard for the groundwater in the Carimona member is 27 ppb of TCE. The groundwater pump and treatment system has been recently modified by General Mills such that the extraction well on-site for the Carimona member has been replaced with two extraction wells in the deeper Magnolia member. Field observations have shown that contamination in the Carimona member is being contained by the two Magnolia extraction wells.

Magnolia Member of the Plattville Formation

The Consent Order between General Mills and the MPCA stated that if TCE concentrations exceeded 27 ppb in the Magnolia member, the groundwater pump and treatment system would require expansion to include the Magnolia member. In 1992, General Mills expanded the pumping system to include the Magnolia aquifer since TCE levels exceeded the action level of 27 ppb. Presently, the system is effective in containing the contamination and since operation, contaminate levels have decreased in the aquifer. Water is pumped at approximately 200 gallons per minute and is discharged to a storm sewer through a NPDES permit.

St. Peter Sandstone

In the Consent Order between General Mills and the MPCA, groundwater monitoring is included for the St. Peter Sandstone. A cleanup standard for the St. Peter Sandstone is not included in the Consent Order. TCE levels in groundwater are above 27 ppb within the St Peter Sandstone.

Prairie Du Chien/Jordan Aquifer

One well is located on-site which monitors the Prairie Du Chien/Jordan aquifer. The monitoring well has shown elevated levels of TCE greater than 27 ppb. Due to the depth

from ground surface and the confining layers between the St. Peter Sandstone, the contamination may be from other sources.

III. Summary of Site Visit

Site visits and subsequent meetings with General Mill, MPCA and U.S. EPA have been conducted on July 9, 1992 and September 1, 1993. Each site visit consisted of an overview of the air stripper and the groundwater extraction and monitoring wells along with a site status update. Maintenance items on the groundwater pump and treatment system that are resolved throughout the year are described in the General Mills Annual Report.

IV. Applicable or Relevant and Appropriate Requirements Review

Five-Year Review guidance established policy for U.S. EPA to review and analyze the remedial action at a site as it is affected by newly promulgated or modified Federal and State environmental laws. Applicable or Relevant and Appropriate Requirements (ARARs) associated with the construction and long-term maintenance and monitoring of the remedial action at the General Mills/Henkel Site were not addressed in the Consent Order because the October 1984 Consent Order pre-dates establishment and use of ARARs. The remedial action must meet all identified applicable or relevant and appropriate Federal and more stringent State requirements. ARARs for the site remedy are as follows:

1. Safe Drinking Water Act (SDWA), 40 CFR Parts 141-143. Establishes Maximum Contaminant Levels (MCLs) for groundwater remediation.
2. National Pollution Discharge Elimination Permit. Permit Number 0056022 - Dated August, 1992
3. Minnesota Rule 4717.7100 to 4717.7800. Health Risk Limits (HRLs) for groundwater contaminants.
4. Minnesota Rules Ch. 7050 for discharge to a surface water body.
5. Minnesota Rule 7060. Establishes uses and nondegradation goal for groundwater.
6. Minnesota Rule 4725. Water well code. Establishes standards for the construction, maintenance and sealing of wells.
7. Clean Water Act for NPDES discharge requirements.

8. Clean Air Act for air stripper requirements.

To-Be-Considered (TBC) Criteria

1. Minnesota Department of Health (MDH) Recommended Allowable Limits (RALs), Release 3. Establishes contaminant specific performance standards for groundwater remediation.

The remedial action performance standards for groundwater are 270 ppb of TCE in the glacial drift aquifer and 27 ppb for the Carimona member and Magnolia member. Table 1 identifies the MCLs, HRLs, RALs and cleanup goals for the TCE in groundwater for the General Mills site and Table 2 through 6 presents groundwater monitoring data.

The NPDES permit for the treated and untreated groundwater was modified in 1992 and monitoring has shown compliance with the discharge requirements.

V. Recommendations

The cleanup levels for TCE established in the Consent Order (referenced above) shall be met before the Consent Order is to be terminated. Once this occurs actions should be taken by MPCA or U.S. EPA to enforce the more protective groundwater cleanup standard of 5 ppb for TCE, or whatever is the current standard (MCL or HRL or whatever is lowest) at that time.

The St. Peter Sandstone which is not a part of the Consent Order between General Mills and MPCA appears to have contamination at levels greater than 5 ppb of TCE. The effect of the Magnolia pumping wells on the St. Peter should be investigated and if the zone of capture does not affect the St. Peter, then expansion of the pumping system to contain and treat the St. Peter groundwater should be investigated along with any off-site sources. A revision to the NPDES permit may be required if the groundwater capture system is expanded.

U.S. EPA does not believe that the groundwater standard established in the Consent Order is protective of human health and the environment and recommends that MPCA and General Mills amend the Consent Order to establish 5 ppb as the cleanup standard for TCE.

The groundwater is monitored twice a year, with one sampling event for TCE only. Since TCE is by far the most prevalent compound, the monitoring plan is adequate with one exception. Vinyl chloride should be added to the volatile organic chemical parameter list since vinyl chloride is a common degradation product of TCE.

VI. Statement of Protectiveness

The groundwater pump and treatment system remains functional, but requires the above mentioned modifications. When the modifications are implemented, the remedy should provide adequate protection to public health and the environment.

VI. Next Review

It is probable that the cleanup standards will not be reached by the next five-year review in September 1999. This five-year review will be a Level I review, consisting of review of all recent groundwater monitoring data and newly promulgated environmental laws.

900

850

800

750

700

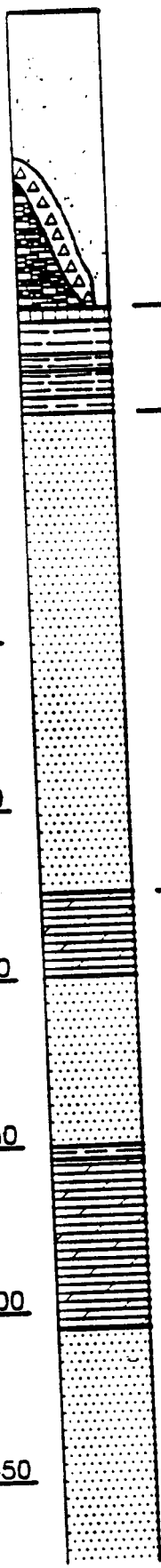
650

600

550

500

450



Alluvium

Sand, gravelly sand and silty sand, sometimes overlain by bogs and moraines which have been drained and filled. Overlying soil is variable in composition often clayey or silty. Deposits are terrace deposits from Glacial River Warren. Thickness ranges from 23 to 57 feet.

Glacial Till

Gray and red tills associated with Des Moines and Superior lobes. Unsorted material with variable texture containing clay sizes and boulders. Sometimes underlain by thin layer of alluvium. Contains sand lenses. Absent in many places, up to 20' thick.

Decorah Shale

Greenish-gray to olive-gray claystone, fissile, fossiliferous, contains several limestone layers. Patchy in this area. Thickness range up to 50'.

Platteville/
Glenwood
Formations

Carmans Member - micrite, fossiliferous often fractured and weathered, 3.5-4.5' thick.
Magnolia Member - fossiliferous micrite, calcitic shale, with rippled bedding, corroded zones, some fractures, 8.5-9' thick.
Hidden Falls - micrite, shaly, fossiliferous, 6-7' thick.
Witkin Member - thin beds of limestone, interbedded shale 12-13' thick.
Pantonica Member - dolomite, hard, 1-1.5' thick.
Glenwood Shale - green shale, sandy at the base, 3-5' thick.

St. Peter Sandstone

Light yellow or white, medium grained, massive appearing sandstone composed of rounded and subrounded grains. Thin beds of green shale are present. Ranges in thickness from 150-170'.

Prairie Du Chien Group

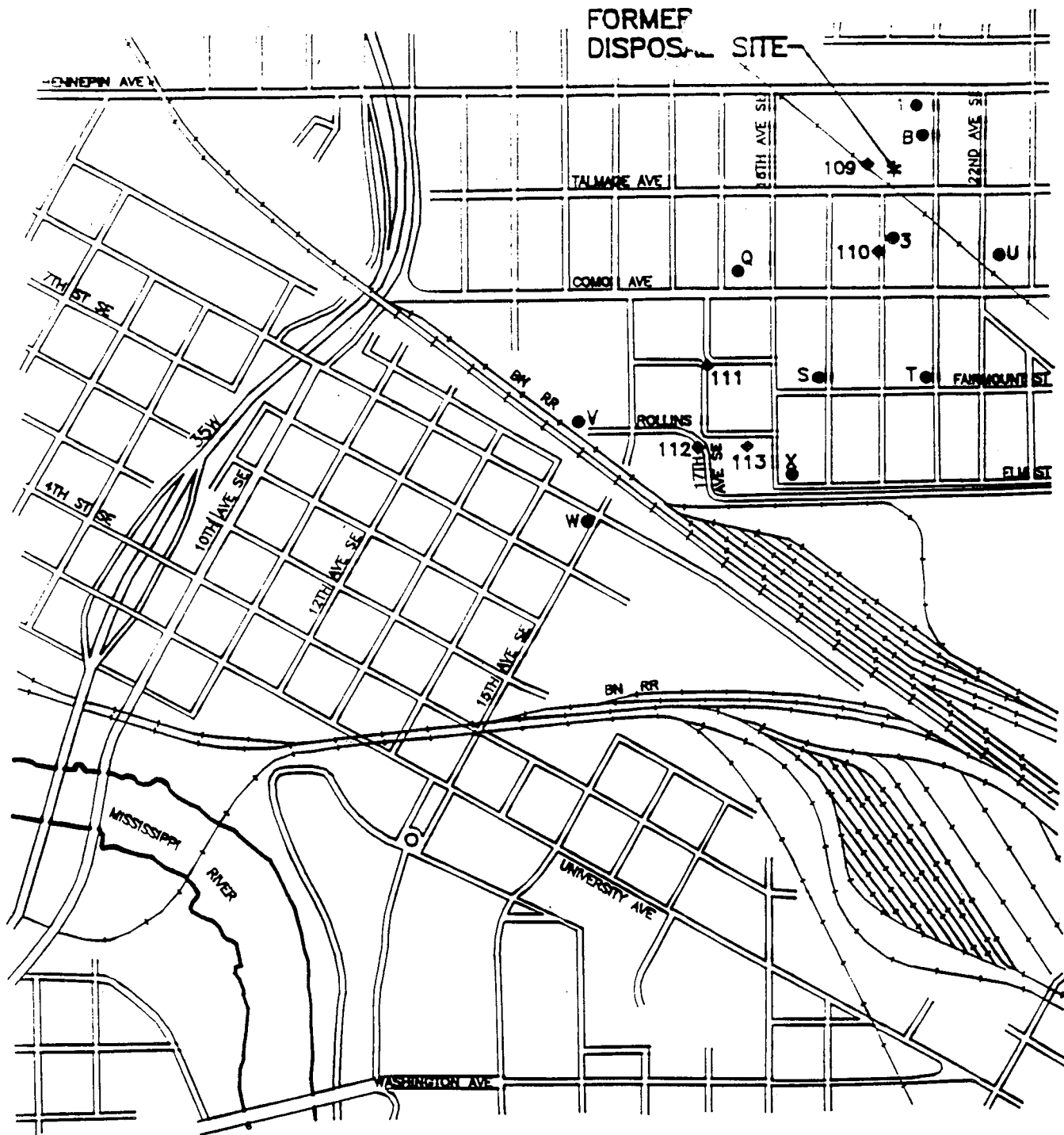
Onawa Dolomite - thin to thick bedded, light brownish gray or buff, fine- to medium-grained dolomite, minor amounts of shale and pure dolomite.
New Richmond Sandstone - fine- to medium-grained quartzose sandstone and quartzitic dolomite, minor amounts of shale and pure dolomite.
Wilcox River Dolomite - thin to thick bedded dolomite, sandy dolomite with some interbedded quartzose sandstone. Thickness of entire formation is 120'-150'.

Jordan Sandstone

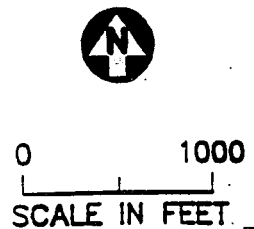
Argillaceous and dolomitic quartz sandstone with pebble-size clasts of dolomitic sandstone and thin beds of dolomite, white or yellow, coarse to medium-grained orthoquartzites to yellow silty, fine grained quartzose sandstone, 85-100' thick. Underlain by the St. Lawrence formation which is 120'-200' thick and contains a variety of silty or sandy dolomitic rocks.

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Figure 1
GENERALIZED GEOLOGIC COLUMN



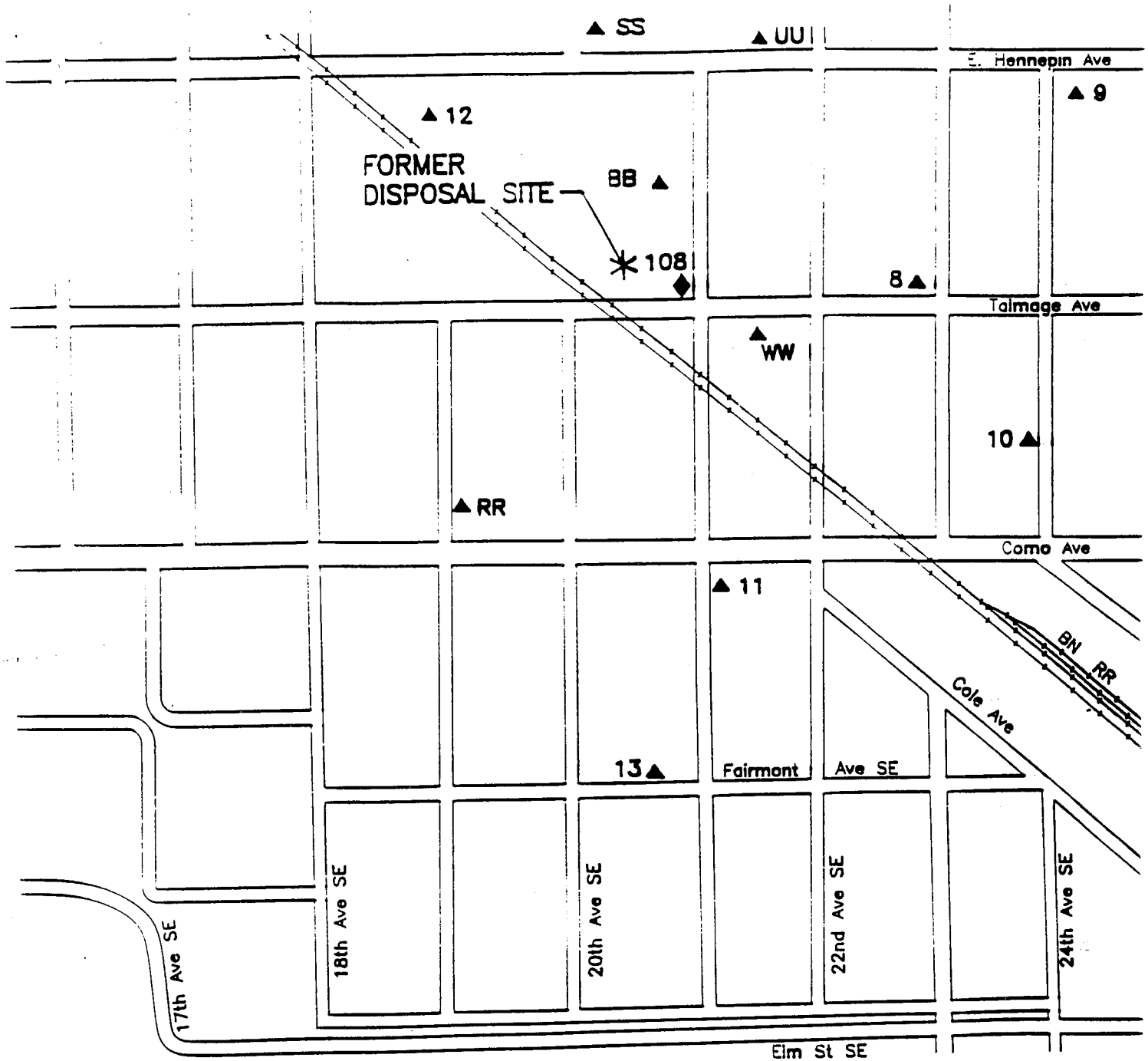
- GLACIAL DRIFT MONITORING WELL
- ◆ GLACIAL DRIFT PUMP-OUT WELL



PLAN 0481-81 1.00 01/07/1982 10-30-02

Figure - 2-
 GLACIAL DRIFT AQUIFER
 1992 MONITORING LOCATIONS





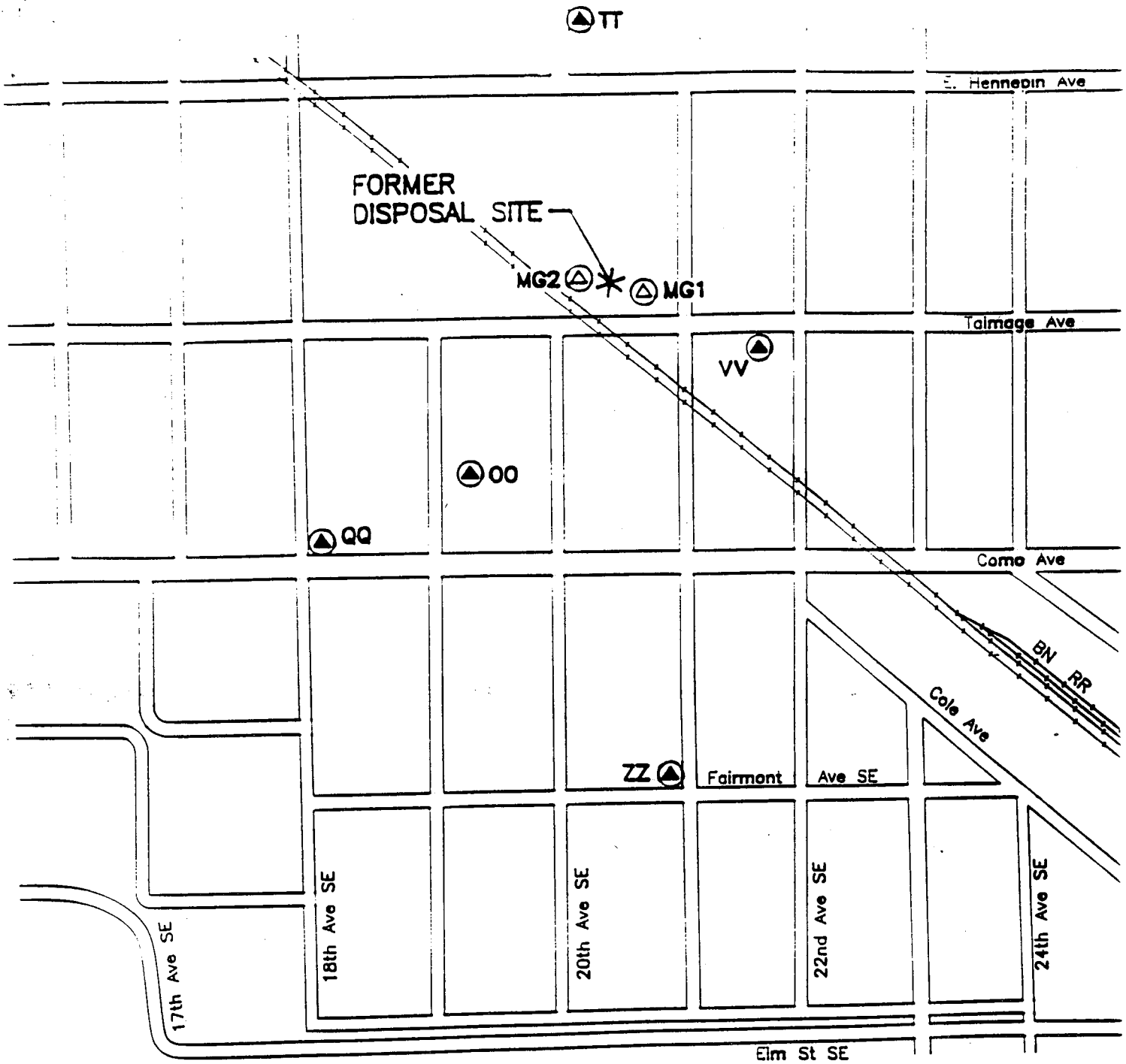
- ▲ CARIMONA MEMBER MONITORING WELL
- ◆ CARIMONA MEMBER PUMP-OUT WELL



0 200 400
SCALE IN FEET

NW 0487-82 1.00 11/14/1993 15:48:47

Figure 3
CARIMONA MEMBER
1992 MONITORING LOCATIONS



- ▲ MAGNOLIA MEMBER MONITORING WELL
- ⊙ MAGNOLIA MEMBER PUMP-OUT WELL

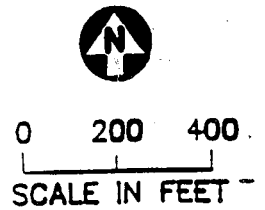
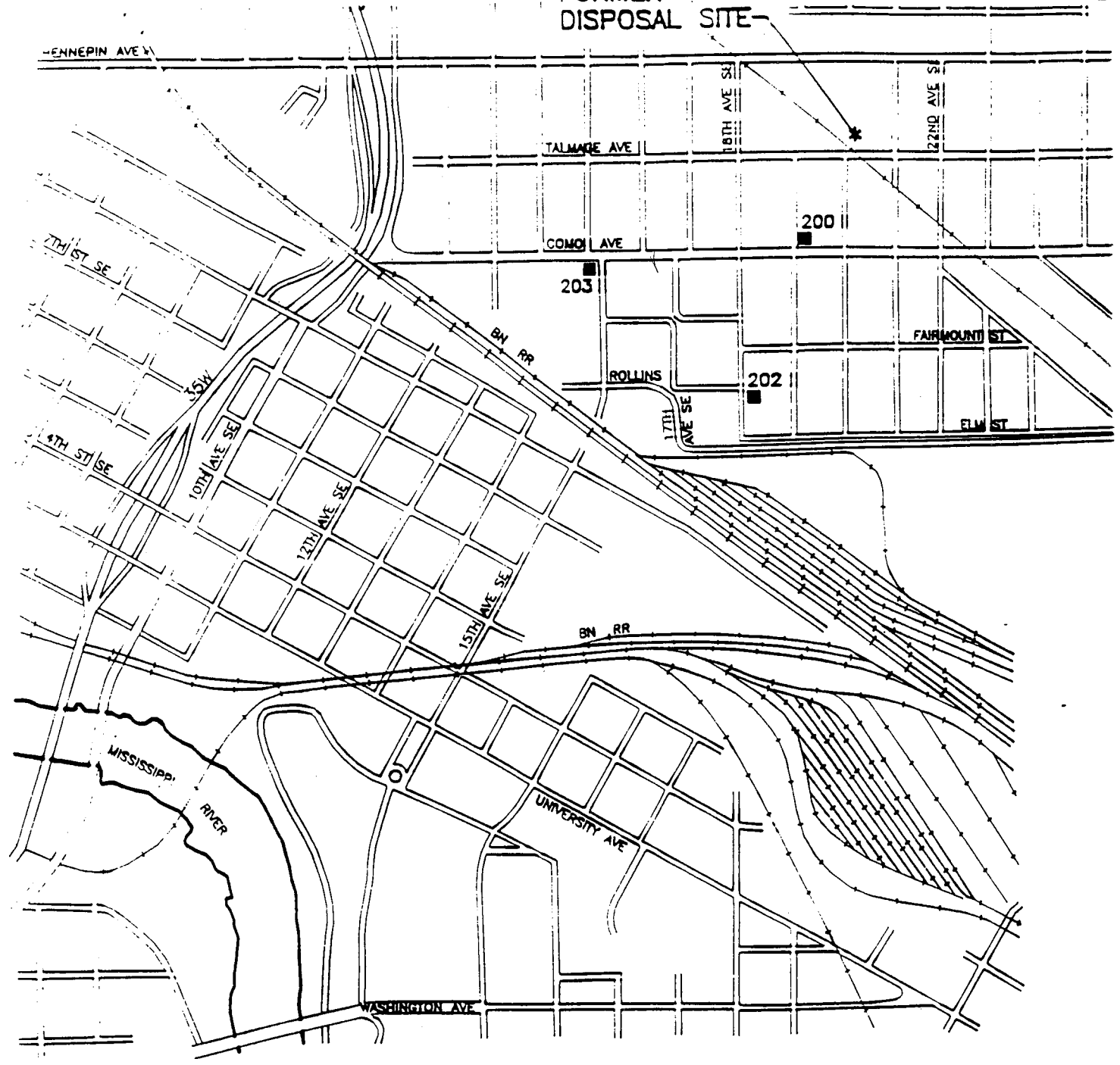


Figure 4
MAGNOLIA MEMBER
1992 MONITORING LOCATIONS

FORMER DISPOSAL SITE



■ ST. PETER SANDSTONE MONITORING WELL



0 1000
SCALE IN FEET

PLAN C481-84 1.00 11/14/1993 15:52:28

Figure 5
ST. PETER SANDSTONE
1992 MONITORING LOCATIONS

TABLE 1
Groundwater Cleanup Standards

<u>Chemical Parameter</u>	<u>MCL</u>	<u>HRL</u>	<u>RAL</u>
Trichloroethylene	5 ug/l	None	30 ug/l

Groundwater Cleanup Goal For TCE

Glacial Drift Aquifer - 270 ug/l

Carimona Member - 27 ug/l

Magnolia Member - 27 ug/l

St. Peter Sandstone - None

Prairie Du Chien/Jordan - None

TABLE 2

1993 WATER QUALITY DATA
GLACIAL DRIFT WELLS

(concentrations in ug/L)

	B		Q		S		T		U		V	
	05/18/93	05/18/93	05/18/93	11/23/93	05/18/93	11/23/93	05/18/93	05/18/93	05/18/93	11/22/93	05/18/93	11/22/93
1,1-Dichloroethane	1.4	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--
1,2-Dichloroethylene, cis	5.1	<0.50	11	--	<0.50	<0.50	<0.50	<0.50	<0.50	4.8	<0.50	--
1,2-Dichloroethylene, trans	<0.50	<0.50	0.5	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--
1,2-Dichloroethane	<0.50	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--
1,1,2,2-Tetrachloroethane	<0.50	<0.50	<0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--
Tetrachloroethylene	5.2	<0.50	2.1	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--
1,1,1-Trichloroethane	1.7	1.0	<0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--
Trichloroethylene	580	<0.50	390	400	<0.50	<0.50	<0.50	0.7	68	68	100	100
Sum Volatile Organics	590	1.0	400	400	ND	ND	ND	0.7	73	73	100	100

	W		X		1		3	
	05/19/93	11/22/93	05/18/93	05/18/93	11/22/93	05/18/93	11/22/93	
1,1-Dichloroethane	<0.50	--	<0.50	<0.50	--	3.8	--	
1,2-Dichloroethylene, cis	0.8	--	<0.50	<0.50	--	33	--	
1,2-Dichloroethylene, trans	<0.50	--	<0.50	<0.50	--	<0.50	--	
1,2-Dichloroethane	<0.50	--	<0.50	<0.50	--	<0.50	--	
1,1,2,2-Tetrachloroethane	<0.50	--	<0.50	<0.50	--	<0.50	--	
Tetrachloroethylene	<0.50	--	<0.50	1.0	--	3.7	--	
1,1,1-Trichloroethane	<0.50	--	<0.50	<0.50	--	1.5	--	
Trichloroethylene	2.9	2.9	<0.50	<0.50	<0.50	470	740	
Sum Volatile Organics	3.7	2.9	ND	1.0	ND	510	740	

-- Not analyzed.
ND Not detected.

3, .005
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TABLE 3

1993 WATER QUALITY DATA
CARIMONA MEMBER WELLS

(concentrations in ug/L)

	BB	RR	SS	UU	VV	8
	05/19/93	05/19/93	05/18/93	05/18/93	05/18/93	05/19/93
1,1-Dichloroethane	5.4	1.3	3.2	<0.50	<0.50	0.6
1,2-Dichloroethylene, cis	95	39	1.2	3.1	27	2.3
1,2-Dichloroethylene, trans	1.1	<0.50	<0.50	<0.50	1.4	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50	<0.50	<0.50	0.8
1,1,2,2-Tetrachloroethane	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethylene	12	<0.50	<0.50	<0.50	<0.50	0.6
1,1,1-Trichloroethane	3.3	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethylene	940	93	2.5	29	130	92
Sum Volatile Organics	1100	130	6.9	32	160	96

	9		10		11	
	05/19/93	11/23/93	05/19/93	11/23/93	05/18/93	11/23/93
1,1-Dichloroethane	0.5	--	<0.50	--	<0.50	--
1,2-Dichloroethylene, cis	<0.50	--	<0.50	--	4.8	--
1,2-Dichloroethylene, trans	<0.50	--	<0.50	--	<0.50	--
1,2-Dichloroethane	0.6	--	<0.50	--	<0.50	--
1,1,2,2-Tetrachloroethane	<0.50	--	<0.50	--	<0.50	--
Tetrachloroethylene	<0.50	--	<0.50	--	<0.50	--
1,1,1-Trichloroethane	<0.50	--	<0.50	--	<0.50	--
Trichloroethylene	1.9	0.78	46	43	120	180
Sum Volatile Organics	3.0	0.78	46	43	120	180

	12		13	108	
	05/19/93	11/23/93	05/18/93	06/08/93	11/23/93
1,1-Dichloroethane	<0.50	--	<0.50	3.2	--
1,2-Dichloroethylene, cis	<0.50	--	1.1	88	--
1,2-Dichloroethylene, trans	<0.50	--	<0.50	2.2	--
1,2-Dichloroethane	<0.50	--	<0.50	<0.50	--
1,1,2,2-Tetrachloroethane	<0.50	--	<0.50	<0.50	--
Tetrachloroethylene	<0.50	--	<0.50	2.9	--
1,1,1-Trichloroethane	<0.50	--	<0.50	0.87	--
Trichloroethylene	<0.50	<0.50	26	640	300
Sum Volatile Organics	ND	ND	27	740	300

-- Not analyzed.
ND Not detected.

TABLE 4

1993 WATER QUALITY DATA
MAGNOLIA MEMBER WELLS

(concentrations in ug/L)

	00		00		00	
	05/19/93	11/23/93	05/19/93	05/18/93	11/22/93	
1,1-Dichloroethane	<0.50	--	<0.50	<0.50	--	
1,2-Dichloroethylene, cis	<0.50	--	3.4	1.2	--	
1,2-Dichloroethylene, trans	<0.50	--	<0.50	<0.50	--	
1,2-Dichloroethane	<0.50	--	<0.50	<0.50	--	
1,1,1,2-Tetrachloroethane	<0.50	--	<0.50	<0.50	--	
Tetrachloroethylene	<0.50	--	<0.50	<0.50	--	
1,1,1-Trichloroethane	<0.50	--	<0.50	<0.50	--	
Trichloroethylene	11	5.7	13	0.7	1.8	
Sum Volatile Organics	11	5.7	16	1.9	1.8	

	VV		ZZ	
	05/18/93	11/22/93	05/19/93	11/23/93
1,1-Dichloroethane	1.1	--	<0.50	--
1,2-Dichloroethylene, cis	39	--	1.7	--
1,2-Dichloroethylene, trans	<0.50	--	<0.50	--
1,2-Dichloroethane	<0.50	--	<0.50	--
1,1,1,2-Tetrachloroethane	<0.50	--	<0.50	--
Tetrachloroethylene	1.4	--	<0.50	--
1,1,1-Trichloroethane	<0.50	--	<0.50	--
Trichloroethylene	190	150	73	70
Sum Volatile Organics	230	150	75	70

-- Not analyzed.3.007
12/21/93



TABLE 6

1993 WATER QUALITY DATA
PRAIRE DU CHIEN/JORDAN WELL

(concentrations in ug/L)

	HENKEL	
	05/19/93	11/23/93
1,1-Dichloroethane	0.52	1.0
1,2-Dichloroethyene, cis	<0.50	<0.50
1,2-Dichloroethyene, trans	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50
1,1,1,2-Tetrachloroethane	<0.50	<0.50
Tetrachloroethyene	<0.50	<0.50
1,1,1-Trichloroethane	<0.50	<0.50
Trichloroethyene	16	36
Sum Volatile Organics	17	37

1.009
12/21/93



TABLE 5

1993 WATER QUALITY DATA
ST. PETER SANDSTONE WELLS

(concentrations in ug/L)

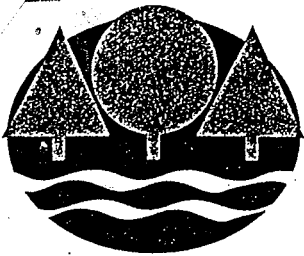
	200		201		202		203	
	05/19/93	11/23/93	05/19/93	05/19/93	05/19/93	05/19/93	05/19/93	05/19/93
1,1-Dichloroethane	<0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethylene, cis	11	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethylene, trans	<0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	<0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	<0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethylene	<0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	<0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethylene	89	19	<0.50	<0.50	<0.50	<0.50	1.4	
Sum Volatile Organics	100	19	ND	ND	ND	ND	1.4	

ND Not detected.

-- Not analyzed.

3.008

12/21/93



*General Mills: Correspondence
" " : 5 year review*

Minnesota Pollution Control Agency

December 29, 1994

Mr. Bill Taylor
Associate Principal Engineer
General Mills, Inc.
Energy & Environment
9000 Plymouth Avenue North
Minneapolis, Minnesota 55427

Dear Mr. Taylor:

Enclosed is a summary of the meeting on the General Mills Five-Year Review Report held at our office on December 13, 1994. Please let me know if your understanding of the discussion differs in any way from the summary. If we do not hear from you, we will assume that the meeting summary accurately reflects the discussion at the meeting.

As previously discussed, Minnesota Pollution Control Agency staff will expect to hear from General Mills by the end of January 1995, regarding a proposed approach to the recommendations in the Five-Year Review.

Please let me know if there are questions or you wish additional information.

Sincerely,

Dagmar Romano
Project Manager
Response Unit I
Site Response Section
Ground Water and Solid Waste Division

DR:ch

Enclosure

cc: Tom Alcamo, U.S. Environmental Protection Agency
Alan Williams, Attorney General's Office



MEMORANDUM

To: General Mills File
Through: Dagmar Romano/Project Manager
From: John K. Seaberg/Hydrogeologist
Subject: Notes from December 13, 1994 Meeting with General Mills regarding Five-Year Review
Date: December 28, 1994

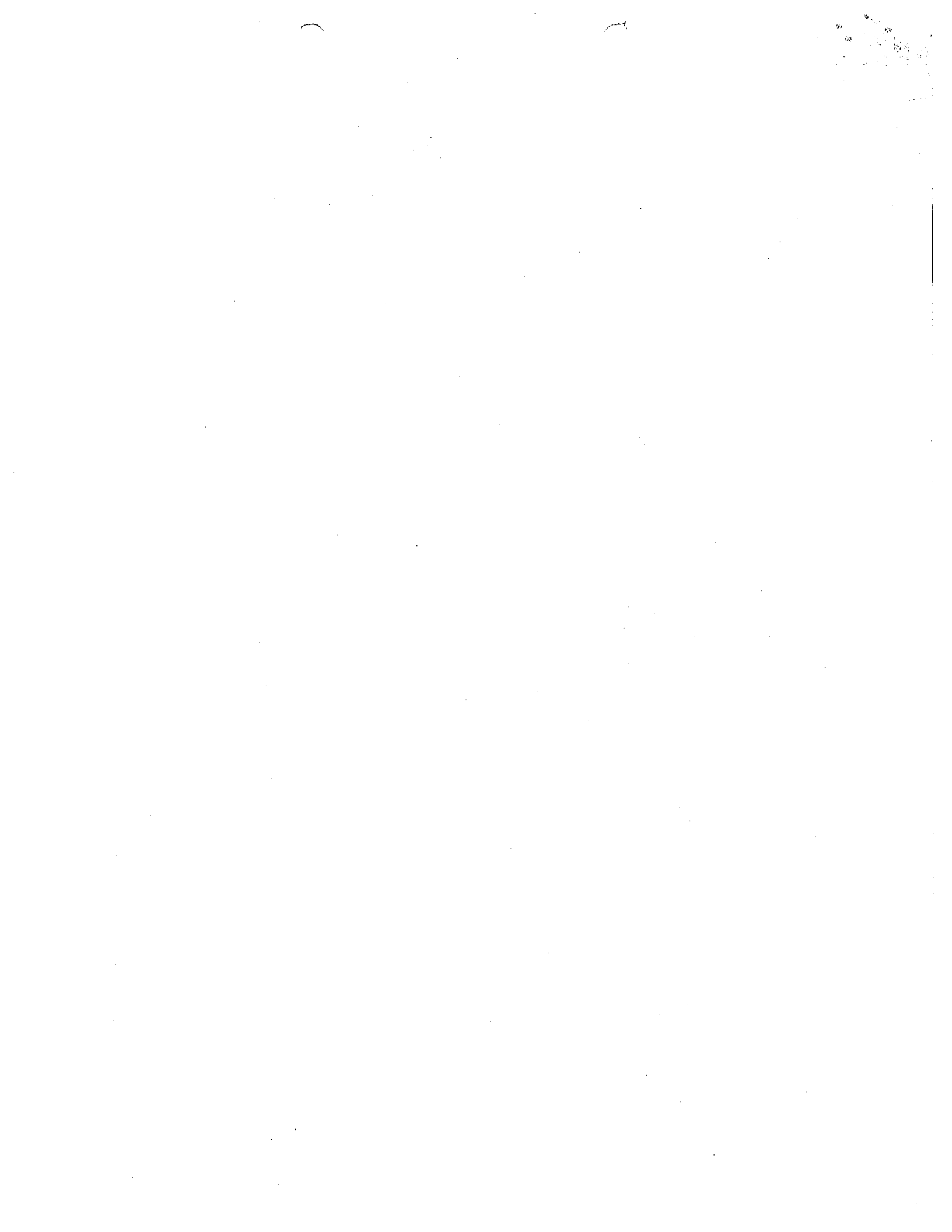
A meeting to discuss the 1994 Five-Year Review of the General Mills site was held at the MPCA on December 13, 1994. The following personnel were present:

MPCA:	Dagmar Romano John Seaberg Gary Eddy
U.S. EPA:	Tom Alcamo
General Mills:	Bill Taylor Larry Deeney
Barr Engineering:	Al Gebhard Peter Sabee Ray Wuolo

Dagmar began the meeting by discussing the issue of voluntary compliance versus a regulatory approach, and the roles of the MPCA and the EPA. Tom and Dagmar stated that EPA conducted the Five-Year Review because MPCA is limited to an annual \$5,000 cap for reimbursable expenses. They emphasized that the recommendations in the Five-Year Review have full concurrence of both MPCA and EPA. The General Mills project is slated to be part of a deferral program in which the MPCA takes the lead and the EPA's role diminishes. Dagmar stated that General Mills has been very cooperative and responsive in the past; it is hoped that they will continue to do so by amending the 1984 Consent Order. The other options that exist involve a regulatory approach. The MPCA, by Board action, could issue a Request For Response Action (RFRA), or the EPA could unilaterally issue a 106 Order (in which the EPA, rather than the MPCA, would be the lead regulatory agency).

Bill responded by saying that General Mills has complied and cooperated with the MPCA, and now it's faced with MPCA wanting more done. He wanted to know what happened. Dagmar replied by stating that the clean-up standards have changed since the Consent Order was executed, and further explained that the issue is not a new one. This issue has been discussed for at least as long as she has been assigned to the project, since 1992.

Al provided background on how the trichloroethene cleanup levels of 27 $\mu\text{g}/\text{L}$ and 270 $\mu\text{g}/\text{L}$ were determined for the Platteville Limestone and the overlying glacial aquifers, respectively. The 27 $\mu\text{g}/\text{L}$ level established for the Platteville Formation was a 10^{-5} risk-based number, similar to the 30 $\mu\text{g}/\text{L}$ Health Risk Limit (HRL) and former Recommended Allowable Limit (RAL). That number was multiplied by a factor of 10, yielding a 10^{-4} risk-based number, for the overlying glacial drift. The rationale for this was that the glacial drift aquifer was not known to be used for water production, and increasing the number by a factor of 10 introduced a dilution/attenuation factor, since the contaminant would be diluted as it moved into the underlying strata. Al stated that even the 270 $\mu\text{g}/\text{L}$ level falls within EPA's acceptable risk range of 10^{-4} to 10^{-5} . Tom countered that EPA typically uses 10^{-6} as an acceptable risk factor.



Dagmar stated that adherence to the recommendations in the Five-Year Review would simply make remedial actions at the General Mills site consistent with how any other site in Superfund is handled. Gary added that one of the objectives of a five-year review is to bring sites up to date with current laws, rules, and policy.

Al noted that following the recommendations could have two implications: 1) an expansion of the pump-out system to encompass the portions of the plume with concentrations exceeding the revised 5 $\mu\text{g/L}$ clean-up level, and 2) pumping for a longer period of time to attain the lower levels. Their greatest concern lies in the second point. He suggested that perhaps another possibility would be to concentrate resources on remediating the source of the groundwater contamination. Dagmar responded by saying that the MPCA had previously discussed the issue and is in full agreement with that approach. The MPCA may be willing to cut slack in an expansion of the pump-out system for a period of time if General Mills took an aggressive approach to characterize and remediate the source of groundwater contamination.

John discussed that current technology in investigation and remediation has advanced considerably since the Consent Order was executed. Investigative techniques that hold promise for the site include seismic reflection and Geoprobe. Additionally, a remedial system based on *in-situ* vapor extraction has potential for removing chlorinated solvents from the substrate, perhaps in combination with other technologies. Overall, technologies to remediate the contamination source are now available that were not available during the early stages of the project.

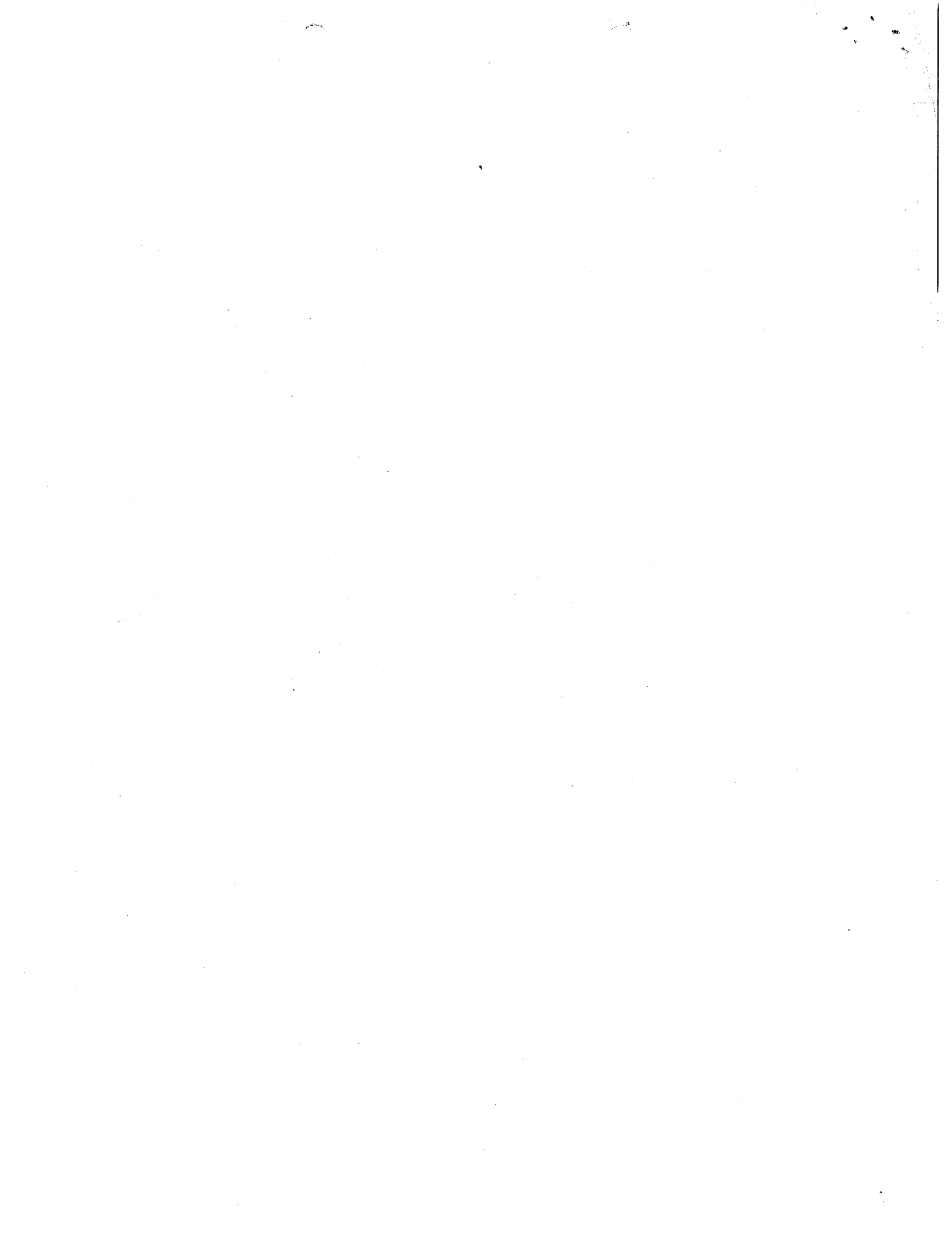
Bill wanted to know what they would stand to gain if they make an effort to clean up the source but are unsuccessful. Larry also voiced concerns about the costs associated with what may only be marginal improvements in the water quality. John stated that even if, despite their best efforts, the site proves recalcitrant to remedial efforts, they would have better characterization, which would be necessary if they chose to evaluate the possibility of a technical impracticability waiver.

Dagmar asked if General Mills would be willing to amend the Consent Order. Al stated that they were still trying to better understand the regulators' position. Gary mentioned that amending the Consent Order could occur through Commissioner's delegation, but a RFRA would require Board approval, and a 106 Order would be issued by the EPA. The MPCA prefers to proceed using a Consent Order amendment. Larry was concerned that, if the new clean-up standards are prescribed in the Consent Order, General Mills would be committing to inflexibility and to vastly increased expenditures. Al wondered whether they could proceed with studies, etc. without amending the Consent Order, since they are apprehensive about amending the Consent Order without knowing how much it will cost them. Dagmar said that the issue of delaying the amendment may not be relevant since they will be held to the new cleanup goals either through an amended Consent Order or the other mechanisms that were discussed. Additionally, she said that General Mills might receive unfavorable public perception by fighting standards that other sites are held to.

The effect of the Magnolia pump-out system on the St. Peter aquifer was discussed. Al said that they would like to continue monitoring before taking any action. John said that additional monitoring is not likely to be useful in evaluating whether the Magnolia pump-out system effectively contains contaminated groundwater. However, this would be acceptable to the MPCA for the time being while the source is being evaluated. He cautioned that this does not preclude future action for the St. Peter aquifer.

Al said that they would agree to monitor for vinyl chloride. It is one of the indicators of degradation that might already be occurring. However, details concerning frequency and duration of sampling have yet to be worked out.

The issue of potential off-site sources was discussed. Although the site is located in an area that historically has been heavily industrialized, no off-site contributors to the groundwater contamination are known to exist. The Glidden site was mentioned as one possibility. MPCA agreed to look into activities for that site (Is there a RFRA? What are current conditions and the status of the site?).



Dagmar needed to excuse herself from the meeting at this point.

The \$5,000 cap on reimbursable expenses was discussed. Gary mentioned this as another reason to amend the Consent Order. Caps are no longer used in consent orders to allow for full recovery of expenses. Early on, the caps were not a problem, but we've been exceeding the cap in more recent years. Gary said that, if the Consent Order was not amended, cost-recovery could occur through a RFRA and, if necessary, by issuing a determination of inadequate response and receiving litigation authority from the Board. If a RFRA was issued, it would duplicate portions of the existing Consent Order and build on that, rather than simply functioning as an addendum to the Consent Order.

Bill suggested one possibility would be for MPCA to submit bills for its entire project expenses without having to amend the consent order. If General Mills failed to pay, the MPCA could then take enforcement action. Gary stated that this would not fulfill the objective of enforcing the recommendations of the Five-Year Review. Bill suggested submitting the entire bill anyway, perhaps allowing some extra time before deciding which direction the project will be taking.

Al restated what he understood Dagmar to say--if General Mills looks at source issues, the MPCA will cut some slack for expanding the groundwater pump-out system at the site for a certain length of time. This was confirmed by MPCA staff.

Further discussion involved the nature of an amended consent order. The best approach would be to state objectives and to keep it general to allow for flexibility. Al inquired further about the possibility of making a good-faith effort to characterize and remediate the source without amending the Consent Order. He suggested a year perhaps, requesting the MPCA to consider the possibility. They would like to figure out the costs before renegotiating the Consent Order--it would be difficult for General Mills to give that up. The MPCA staff may be willing to give General Mills some time but more like six months.

General Mills will try to get back to the MPCA by the end of January 1995 with a position on how they would like to proceed with this. Al mentioned that they need to deal with internal issues in order to determine how they will move with this, and that that takes time. Al asked if the MPCA would be willing to share risk with General Mills if they attempt to clean up the source of groundwater contamination. For example, if the effort is not successful, can the pump-out system be shut down? Risk-sharing might help General Mills management move in this direction. MPCA's response would depend on what General Mills proposed.

Bill asked if we couldn't achieve the same goals through a letter agreement instead of amending the Consent Order. Gary replied that no agreement would be enforceable unless the Consent Order is amended.

The meeting ended with General Mills agreeing to get back to the MPCA by the end of January 1995 with an approach to responding to the recommendations made in the Five-Year Review.



**General Mills/Henkel Corporation Site Meeting
Five-Year Review Report
Proposed Agenda**

December 13, 1994

1:30 p.m.

**Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, Minnesota 55155**

- 1) Voluntary vs. regulatory options for implementing five-year review recommendations.
- 2) Incorporation of revised cleanup standards into Consent Order.
- 3) Effect of Magnolia Pumpout system on St. Peter Aquifer.
- 4) Addition of vinyl chloride to monitoring plan.
- 5) Revision of Consent Order cap on recoverable expenses.

