GWOU ADMINISTRATIVE RECORD
SECTION TITLE:
GW-500-502-1.02

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Mel Carnahan, Governor • Stephen M. Mahfood, Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

AUG 31 1999

Mr. Steve McCracken, Project Manager
United States Department of Energy
Weldon Spring Remedial Action Project
7295 Highway 94 South
St. Charles, MO 63304

Mr. Mike Sanderson
Director of the Superfund Division
U.S. Environmental Protection Agency, Region VII
901 N. 5th Street
Kansas City, KS 66101

RE: Dispute Issues for the Groundwater Operable Unit, Weldon Spring Site Remedial Action Project, Weldon Spring, Missouri

Dear Messrs. McCracken and Sanderson:

The Missouri Department of Natural Resources (MDNR) is officially invoking the Dispute Resolution process concerning the United States Department of Energy's Weldon Spring Site, Groundwater Operable Unit (GWOU). Outlined in this letter and attachments are issues and concerns with which MDNR has dispute and which are being elevated to the Dispute Resolution Committee for resolution. Although we are not a signatory to the Interagency Agreement, we desire to follow existing procedures for issues of this nature. We have tried to resolve these concerns informally through numerous comment periods, as well as through technical discussions with the Department of Energy (DOE), but without responses we consider adequate.

Overall, we agree with the Department of Energy's characterization of the contamination and environmental conditions at the site. We also support, as an initial means of treatment, their preferred alternative to treat a portion of the groundwater contamination through a chemical oxidation process. However, as the last Record of Decision planned for this site, it is essential that these issues be thoroughly resolved prior to finalizing such a decision. Listed below are the issues currently being disputed.

Issue #1
The DOE has failed to adequately develop and assess groundwater treatment alternatives, including the pump and treat alternative in the Feasibility Study (FS) or Supplemental Feasibility Study (SFS).

MDNR's position:
A more complete development of the alternatives to clean up contaminated groundwater at the site must be accomplished before a complete and accurate comparison can be made and a preferred remedy selected. In comments submitted on the SFS, we asked DOE to fully develop the pump and treat alternatives by optimizing the pump and treat network. To date, the pump and treat alternatives

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have not been fully developed in either the FS or the SFS. Thus, a fair comparison of alternatives against the nine Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) evaluation criteria as stated in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) can not be perfomed. Additionally, due to incomplete alternative development, the preferred remedial action can not be selected with confidence, nor can the public compare the alternatives appropriately.

Issue #2
DOE inappropriately proposes to waive the Applicable or Relevant and Appropriate Requirements (ARARs) for water quality contaminants [nitrate and 2,4-Dinitrotoulene (2,4-DNT)] for the entire site based on Technical Impracticability (TI). DOE has not demonstrated TI as required by DOE and EPA policy. In addition, the proposed waiver does not provide a remediation goal if the waiver is granted.

MDNR's position:
Waiver of ARARs for nitrate and 2,4-DNT for the entire site based on TI is inappropriate. MDNR does not consider it technically impracticable to remediate nitrate or 2,4-DNT in certain contaminant zones at this site. Based on information provided by DOE, some contaminant zones can be remediated to meet ARARs in a reasonable specified time. DOE has yet to prepare a written TI evaluation. A written TI evaluation is one of the "major administrative responsibilities" specified in DOE policy regarding technical impracticability decisions. This evaluation must be submitted to the EPA TI review team in accordance with EPA headquarters and Region VII policy.

Issue #3
The DOE preferred alternative in the Proposed Plan is a limited effort to remediate Trichloroethylene (TCE) contamination in the groundwater via a chemical oxidation process. If unsuccessful, DOE claims they will have demonstrated Technical Impracticability for TCE and that Monitored Natural Attenuation is the preferred alternative. DOE proposes a minimum of two rounds of chemical injection to remediate the TCE.

MDNR's position:
MDNR supports the DOE agreement to meet the ARAR of 5 parts per billion (ppb) for TCE contamination across the entire site. Chemical oxidation is considered a cost effective alternative for the treatment of TCE at this site. However, implementation of the chemical oxidation is a concern. Therefore, performance goals for the chemical oxidation process must be defined in the Proposed Plan. As related to Issues #1 and #2, the pump and treat alternative would be a contingency, in case the chemical oxidation process is unable to meet the 5 ppb ARAR for TCE.

Issue #4
The DOE has failed to include the groundwater standard for uranium at 40 CFR 192.02 as an ARAR.

MDNR's position:
The Uranium Mill Tailings Radiation Control Act (UMTRCA) standard 40 CFR 192.02 for uranium in usable groundwater is 30 pCi/l and this standard is considered an ARAR for the groundwater at the chemical plant site. Recognition of the UMTRCA standard for uranium is required.

The DOE and EPA agreed in the *Record of Decision* for the Quarry Residual Operable Unit (p. 40) that "40 CFR 192.02 would likely be an ARAR for any remedial action considered for the useable

groundwater source south of the [Femme Osage] slough," and the DOE states in the *Proposed Plan*, "the groundwater at the chemical plant area is considered potentially useable." Therefore, the 40 CFR 192.02 groundwater standard for uranium is an ARAR for the GWOU.

Issue #5
DOE has referenced institutional controls in the Proposed Plan; however, no explanation as to the types, locations, or means to insure they remain effective for the necessary time frames is provided.

MDNR's position:
The Proposed Plan must include: the purpose for the institutional controls, types of control, associated costs, long-term monitoring of compliance, a demonstration of the effectiveness of implementability, mechanisms of enforcement, and the mechanism for funding long-term oversight and necessary future remedial actions. These components are sometimes known as stewardship issues.

Issue #6
DOE has failed to provide sufficient detail on how the Groundwater Operable Unit remediation and monitoring in the Proposed Plan will interface with monitoring and maintenance of the onsite disposal cell in order to remain protective.

MDNR's position:
DOE has provided no information on the details, comparisons, and assurances for any of the alternatives that will interface with the groundwater monitoring and action leakage rate plan for the disposal cell. DOE's present submittal regarding the action leakage rates for the waste cell is not in accordance with design values that the State has applied at other similar sites; contains inadequate factors of safety; lacks detail on leachate sump design and monitoring; and does not include the post-closure monitoring plan and action response plan.

The Missouri Department of Natural Resources looks forward to resolving these issues of dispute in a timely manner. Please contact me at your earliest convenience to review these issues at (573) 751-0763.

Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

John A. Young
Director

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Enclosure

c: Dan Wall, EPA Region VII
Weldon Spring Citizens Commission
Ron Kucera, MDNR/Office of the Director

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DETAILED COMMENTS
Weldon Spring Site Remedial Action Project (WSSRAP)
Groundwater Operable Unit (GWOU)

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1.0 INTRODUCTION

The Missouri Department of Natural Resources has issues of dispute with the Departments of Energy's Weldon Spring Site Remedial Action Project (WSSRAP). This paper will detail each issue of dispute with the Groundwater Operable Unit (GWOU) and provide a summary of the technical information available for each issue. This paper provides management a decision making tool for the issues at hand.

2.0 BACKGROUND

2.1 Location

The GWOU covers all groundwater associated with the Chemical Plant area and its surroundings, excluding the groundwater mentioned in the Quarry Residuals Operable Unit. The Chemical Plant area is located approximately 2 miles west of Weldon Spring, MO along Highway 94 (**Figure 1**).

2.2 Contaminants

DOE divided the Chemical Plant area into seven zones of contamination for ease of discussion and representation (**Figure 2**). These zones represent clusters of monitoring wells that exhibit elevated levels of contaminants.

Groundwater contaminated with various contaminants at elevated concentrations is common at the Chemical Plant site. Table 1 depicts concentrations of each contaminant per contaminant zone (Ref. 1). As the table shows, Zone #1 contains groundwater contaminated with Trichloroethylene (TCE), uranium, nitrate, and nitroaromatic compounds. Zone #5 contains some nitrate and nitroaromatic compounds.

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Location of the nitrate contamination is at and around the raffinate pits (**Figure 3**). Zone #1 contains over 50% (by mass) of the total nitrate contamination. Concentrations of nitrate are over 100 times the ARAR of 10 parts per million (ppm). Location of the TCE contamination is localized in Zones #1 and #2. Concentrations of TCE are also over 100 times the ARAR of 5 ppb. Elevated concentrations of uranium and nitroaromatic compounds are found in several zones. The nitroaromatic compound 2,4-DNT is found above the ARAR of 0.11 parts per billion (ppb) in Zones #1, #2, #3 and #4.

3.0 ISSUES OF DISPUTE

Currently, there are six issues under dispute with the Department of Energy's WSSRAP. This section summarizes each issue of dispute and technical data available at this time pertaining to each issue.

3.1 Issue #1, Full Development of the Pump and Treat Alternatives

The DOE has failed to adequately develop and assess groundwater treatment alternatives, including the pump and treat alternative in the Feasibility Study (FS) or Supplemental Feasibility Study (SFS). A more complete development of the alternatives to cleanup contaminated groundwater at the site must be accomplished before a complete and accurate comparison can be made and a preferred remedy selected.

DOE originally developed the pump and treat alternatives (#4and #7) in the FS that included the possibility of reinjecting treated groundwater back into the aquifer. This option (reinjection) was not developed further due to the large number of injection wells required and the low hydraulic conductivity thought to exist throughout the site (page 3-12, Ref. 2). Since the release of this FS, DOE has performed a field test to collect hydrogeological data in the area of Contaminant Zone #1, (**Figure 4**). This field test, a Pilot Pump Test was completed in August 1998.

The new data from the Pilot Pump Test was compiled in a completion report (Completion Report for the Pilot Pump Test) which concluded that the transmissivity of Zone #1 was much greater than expected and that sustainable extraction rate exceeded previous expectations. Transmissivity is defined as the rate a fluid is transmitted through a unit width of porous media while under the influence of a unit hydraulic gradient. In the area of MW-3028 the transmissivity of the aquifer was over 700 times more than previously measured prior to the Pilot Pumping Test (p. 51, Ref 3). Table 1 shows the measured transmissivity for the area of concern.

Table 1

Range of Transmissivity in the Area of MW-3028 (gpd/ft)

Before Pilot Pump Test	After Pilot Pump Test
2.9-9.1	6400-7600

In addition, sustained injection rates of 10 gpm or greater in Zone #1 have been observed during previous dye trace studies (page 25, Ref. 3).

The SFS was then developed to augment the original FS and include this new data, and reevaluate the feasibility of the pump and treat and other alternatives. Since conditions were not as previously suspected the possibility of artificially recharging the aquifer to optimize a pump and treat alternative has

now been renewed. DOE has been asked to fully develop the pump and treat alternatives by including artificial recharge as part of the alternative. The pump and treat alternatives have not been fully developed to this date. Since the pump and treat alternatives have not been fully developed, a fair comparison of alternatives against the nine CERCLA evaluation criteria as stated in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) can not be performed. Due to the incompleteness of alternative development, the preferred remedial action can not be selected with confidence nor can the public compare the alternatives appropriately.

DOE argues that at least four "optimized" extraction systems could be designed (Ref. 4). These four optimized systems could be designed to remediate contaminants in a specific time or to minimize cost, cleanup time, or cost and cleanup time. It would be appropriate for DOE to develop the pump and treat alternatives based on minimizing cost and cleanup time to use as a comparison against the other alternatives.

3.2 Issue #2, Waiver of ARARs for nitrate and 2,4-DNT

DOE inappropriately proposes to waive the Applicable or Relevant and Appropriate Requirements (ARARs) for water quality contaminants [nitrate and 2,4-Dinitrotoulene (2,4-DNT)] for the entire site based on Technical Impracticability (TI). DOE has not demonstrated TI as required by DOE and EPA policy. In addition, the proposed waiver does not provide a remediation goal if the waiver is granted.

Waiver of ARARs for nitrate and 2,4-DNT for the entire site based on TI is inappropriate. MDNR does not consider it technically impracticable to remediate nitrate or 2,4-DNT in certain contaminant zones at this site. Based on information provided by DOE, some contaminant zones can be remediated to meet ARARs in a reasonable specified time. DOE has yet to prepare a written TI evaluation. A written TI evaluation is one of the "major administrative responsibilities" specified in DOE policy regarding technical impracticability decisions (Technical Impracticability Decisions for Ground Water at CERCLA Response Action and RCRA Corrective Action Sites, DOE/EH-413/9614, August 1998, citing Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration, Interim Final, OSWER Directive 9234.1-25, U.S. Environmental Protection Agency, September 1993).

The TI evaluation should be submitted to the EPA TI review team in accordance with EPA headquarters and Region VII policy (Consistent Implementation of the FY 1993 Guidance on Technical Impracticability of Ground-Water Restoration at Superfund Sites, U.S. Environmental Protection Agency, OSWER Directive 9200.4-14, January 19, 1995).

DOE feels that it is technically impracticable to achieve reduction of contaminant levels to meet ARARs within a reasonable time frame due to several factors (p. 45-46, Ref. 5). These factors are listed below, along with evidence that suggests otherwise.

I) The hydrogeology present in the shallow groundwater system is highly complex and unfavorable for remediation using extraction methods.

This highly complex groundwater system includes fractures and weathered bedrock features (including paleochannels and dissolution features) that facilitate the extraction of groundwater. In areas where these features do not exist to a great extent, groundwater extraction is limited. These features only accelerate the ability to remove groundwater from the aquifer when compared to zones that do not have these features. The fracturing and dissolution features provide the needed pathways for the groundwater to flow downgradient to an extraction well at a rate that will allow for remediation of contaminants in a reasonable time.

II) Sustainable yield is low (<10 gallons per minute, gpm).

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The sustainable yield for Zone #1 likely exceeds 10 gpm (page 39, Ref. 3). This sustainable yield was limited by dewatering of the aquifer, not by the ability of the aquifer to transmit groundwater. This limiting factor (dewatering) can be neutralized by applying artificial recharge to the aquifer as groundwater is extracted. The Pilot Pumping Test concluded that sustainable yield greater than 10 gpm might be achievable if the aquifer was artificially recharged. Rates of 31 gpm were sustained for over one half a day without artificial recharge of the aquifer (page13, Ref. 3). With the addition of artificial recharge, higher extraction rates could be sustained (page 39, Ref. 3).

III) The area of influence of the extraction well is structurally controlled.

The area of influence is structurally controlled and this control generally corresponds to the boundaries of the contaminant Zone #1. An extraction well placed within a Zone of contamination and within these boundary conditions would influence the contaminant zone itself. The area of aquifer with the greatest concentration of contaminant would be influenced, since the contaminant resides within these controlling structures.

IV) The distribution of contaminant is complex and in general, of low concentration.

Concentrations 10-200 times the ARAR's of nitrate, TCE and 2,4-DNT are associated with contaminant Zone #1 (page 24, Ref. 5). The distribution of contaminants in Zones #1 and #2 seems to be bound by structural constraints and is localized, not complex or of low concentration.

V) Cleanup times estimated by using very optimistic extraction rates are still excessively long.

These calculations are excessively long due to a few factors, including:

A) The minimal number of wells needed to contain the zone of contamination was used to calculate remediation times. This would equate to a conservatively long remediation time. The optimal number of wells to remediate a zone of contamination would provide for remediation of certain zones in a reasonable time period and a period of time that can be planned for (**Figure 5**).

B) Dewatering of the aquifer controls the sustainable pumping rate that was used to calculate remediation times. Dewatering can be eliminated by artificially recharging the aquifer, resulting in higher sustainable yields. An extraction/recharge network can be designed that will not dewater the aquifer and provide for reduction of contaminant levels to ARARs in a reasonable time period.

VI) Pumping tests performed at the site demonstrated that cleanup times would be excessive because of low yields, long recovery times for groundwater levels and high potential for dewatering the adjacent porous media.

A) The Pilot Pumping Test concluded that a sustainable yield greater than 10 gpm might be achievable if the aquifer was artificially recharged (page 39, Ref. 3). Sustainable yields of this caliber will support an extraction type remedial alternative and attain ARARs in a reasonable time or one that can be planned for.

B) Long recovery times and dewatering can be controlled by a properly designed extraction/recharge system.

In addition, since Dardenne Creek is a no discharge drainage, the need to treat groundwater that discharges at springs and seeps into this drainage is evident. Groundwater contaminated with wastes originating from WSSRAP (uranium, nitrate, etc.) surface at seeps and springs such as Burgermeister Spring. This wastewater can not be allowed to drain in the Dardenne Creek drainage system. Treatment

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of water discharging at these locations must be performed to protect this drainage. The PP and preferred alternative should include treatment of these waters.

3.3 Issue #3, TCE Performance Goals and TI

The DOE preferred alternative in the Proposed Plan is a limited effort to remediate Trichloroethylene (TCE) contamination in the groundwater via a chemical oxidation process. If unsuccessful, DOE claims they will have demonstrated Technical Impracticability for TCE, and that Monitored Natural Attenuation is the preferred alternative. DOE proposes a minimum of two rounds of chemical injection to remediate the TCE.

MDNR supports the DOE agreement to meet the ARAR of 5 ppb for TCE contamination across the entire site. Chemical oxidation is considered a cost effective alternative for the treatment of TCE at this site. However, implementation of the chemical oxidation is a concern. Therefore, performance goals for the chemical oxidation process must be defined in the Proposed Plan. As related to Issues #1 and #2, the pump and treat alternative would be a contingency, in case the chemical oxidation process is unable to meet the 5 ppb ARAR for TCE.

3.4 Issue #4, UMTRCA Standard for Uranium

The DOE has failed to include the groundwater standard for uranium at 40 CFR 192.02 as an ARAR. The Uranium Mill Tailings Radiation Control Act (UMTRCA) standard 40 CFR 192.02 for uranium in usable groundwater is 30 pCi/l and this standard is considered an ARAR for the groundwater at the chemical plant site. Recognition of the UMTRCA standard for uranium is required.

The DOE and EPA agreed in the *Record of Decision* for the Quarry Residual Operable Unit (p. 40) that "40 CFR 192.02 would likely be an ARAR for any remedial action considered for the useable groundwater source south of the [Femme Osage] slough," and the DOE states in the *Proposed Plan*, "the groundwater at the chemical plant area is considered potentially useable." Therefore, the 40 CFR 192.02 groundwater standard for uranium is an ARAR for the GWOU.

3.5 Issue #5, Institutional Control Components

Institutional controls are proposed with no explanation of the cost to implement or enforce. The burden for monitoring and enforcing appears to be delegated to authorities other than DOE. There are no support provisions for those authorities to carry out the responsibilities. Similarly, there is no information regarding how DOE will compel the affected property owners to accept the land use restrictions. There is no definition of the mechanisms that will be used to put institutional controls in place.

The Proposed Plan must include these components

- purpose for the institutional controls
- types of control
- associated costs
- long-term monitoring of compliance
- a demonstration of the effectiveness of implementability
- mechanisms of enforcement
- mechanism for funding long-term oversight and necessary future remedial actions

This approach is outlined in section IV of *Institutional Controls: A Reference Manual, WORKGROUP DRAFT* that was prepared by the U.S. EPA Workgroup on Institutional Controls and published March, 1998. This document states that "the standard of care and degree of analysis in the FS should be as high for ICs as for other elements of the remedy." These components are sometimes known as stewardship issues. Please refer to MDNR's comment letter dated June 21, 1999 on the Stewardship Plan, Revision A.

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3.6 Issue #6, Disposal Cell ALR and Monitoring

DOE has failed to provide sufficient detail on how the Groundwater Operable Unit remediation and monitoring in the Proposed Plan will interface with monitoring and maintenance of the onsite disposal cell in order to remain protective.

There is no discussion in the FS, SFS, or PP that provides details, comparisons, and assurances for any of the alternatives that will interface with the groundwater monitoring and action leakage rate plan for the disposal cell. DOE's present submittal regarding the action leakage rates for the waste cell is not in accordance with design values that the State has applied at other similar sites, contains inadequate factors of safety, lacks detail on leachate sump design and monitoring, and does not include the post-closure monitoring plan and action response plan.

4.0 REFERENCES

1. U.S. Department of Energy, 1999, *Supplemental Feasibility Study for Remedial Action for the Groundwater Operable Unit at the Chemical Plant Area of the Weldon Spring Site, Weldon Spring, Missouri*, DOE/OR/21548-783, prepared by Argonne National Laboratory, Argonne, IL, for U.S. Department of Energy, Weldon Spring Site Remedial Action Project, Weldon Spring, MO, June.

2. U.S. Department of Energy and U.S. Department of the Army, 1998,*Feasibility Study for the Groundwater Operable Units at the Chemical Plant Area and the Ordnance Works Area at the Weldon Spring Site, Weldon Spring, Missouri*, DOE/OR/21548-569, prepared by Argonne National Laboratory, Argonne, IL, for U.S. Department of Army, Corps of Engineers, Kansas City District, Kansas City, MO, Dec.

3. MK-Ferguson Company and Jacobs Engineering Group, Inc., 1998, *Completion Report for the Pilot Pumping Test for the Groundwater Operable Unit at the Weldon Spring Site*, DOE/OR/21548-757, prepared for U.S. Department of Energy, Oak Ridge Operations Office, Weldon Spring Site Remedial Action Project, St. Charles, MO, Oct.

4. Responses to MDNR's Comments, on *Draft Supplemental Feasibility Study for the Remedial Action for the Groundwater Operable Unit at the Chemical Plant Area of the Weldon Spring Site, Weldon Spring, Missouri*, March 1998

5. U.S. Department of Energy, 1999, *Proposed Plan for Remedial Action for the Groundwater Operable Unit at the Chemical Plant Area of the Weldon Spring Site, Weldon Spring, Missouri*, DOE/OR/21548-733, prepared by Argonne National Laboratory, Argonne, IL, for U.S. Department of Energy, Weldon Spring Site Remedial Action Project, Weldon Spring, MO, July.

5.0 APPENDIX

5.1 Figures

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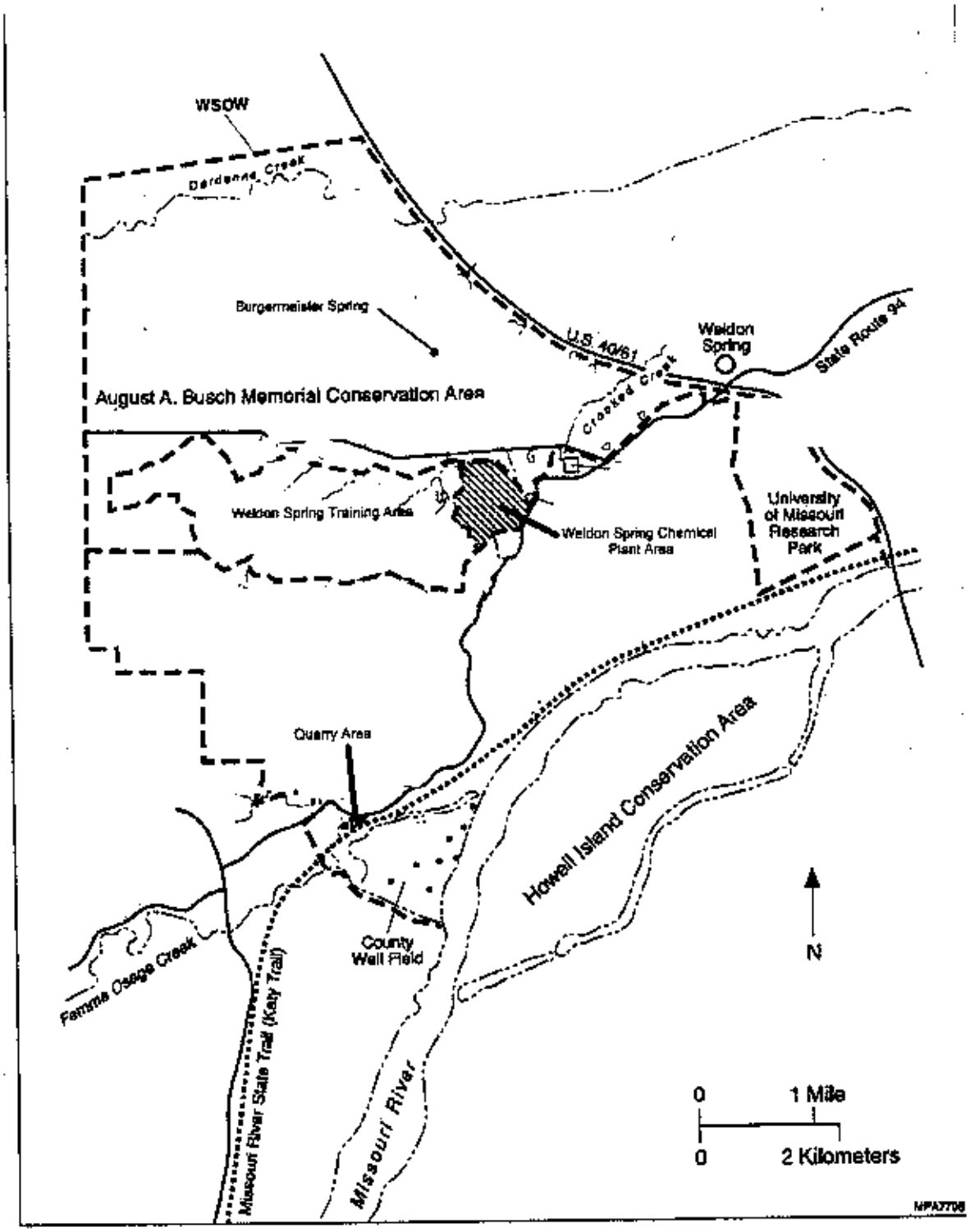

Figure 1: Location of Chemical Plant Area

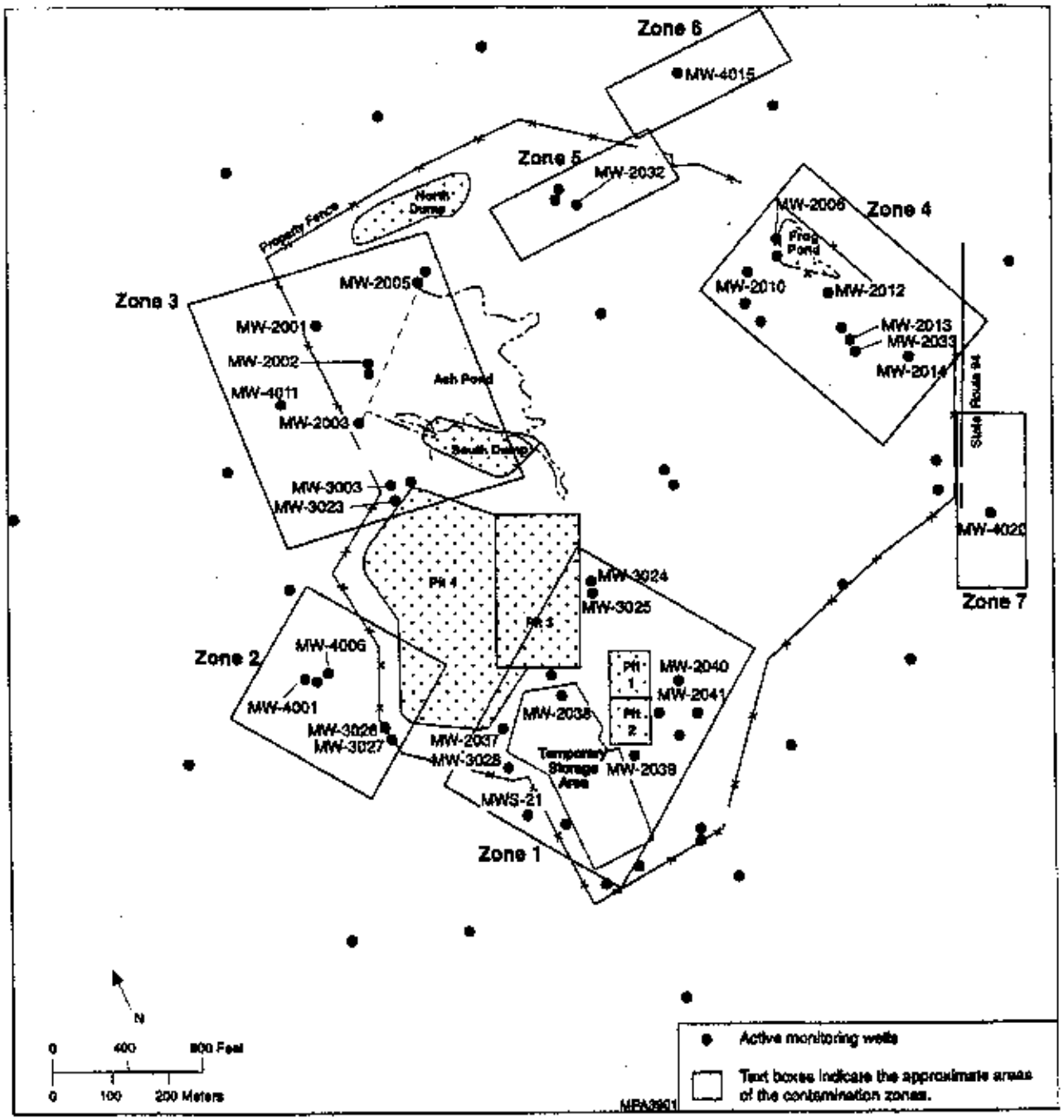

Figure 2: Contaminant Zones at Chemical Plant Area

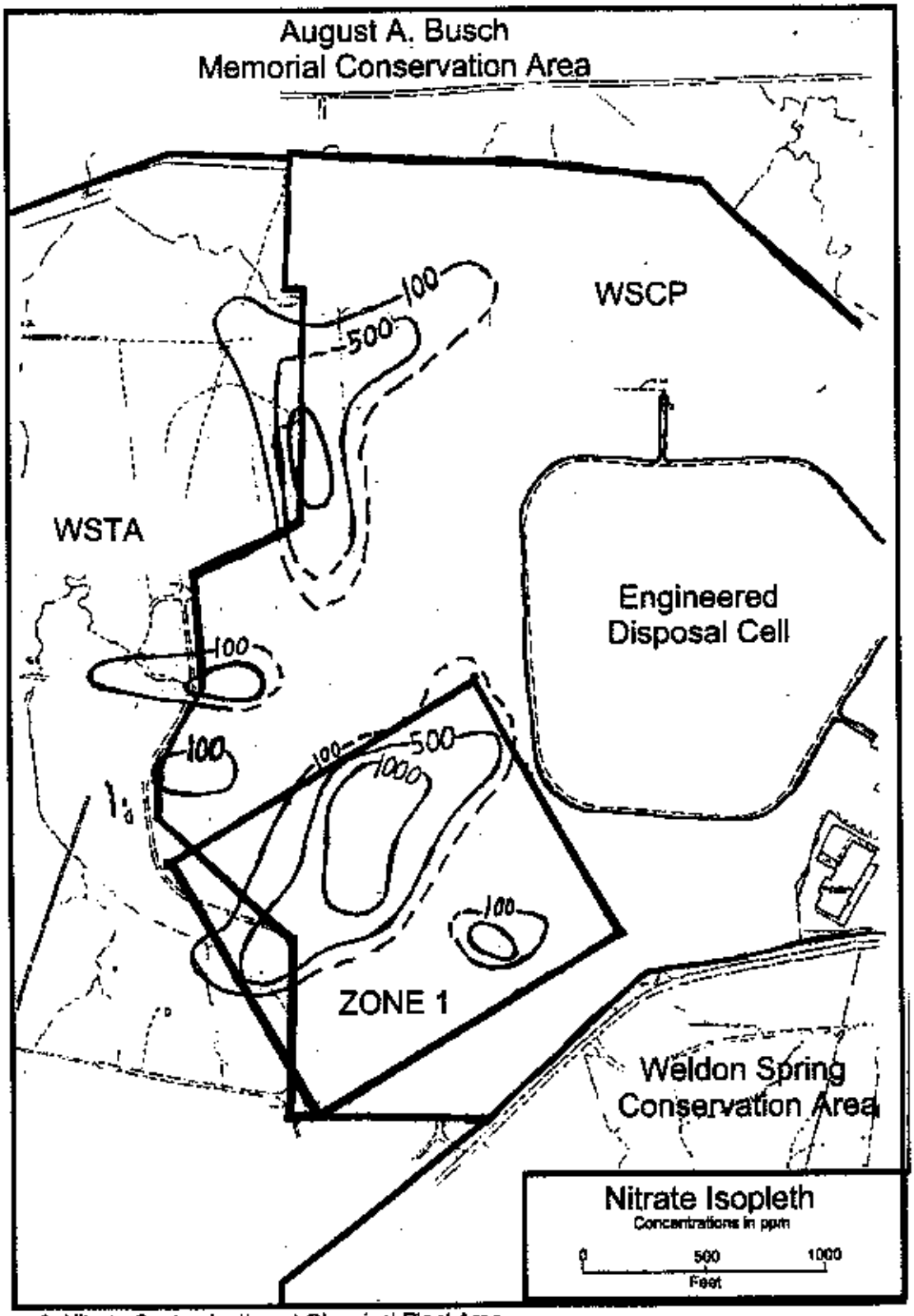

Figure 3: Nitrate Contamination at Chemical Plant Area

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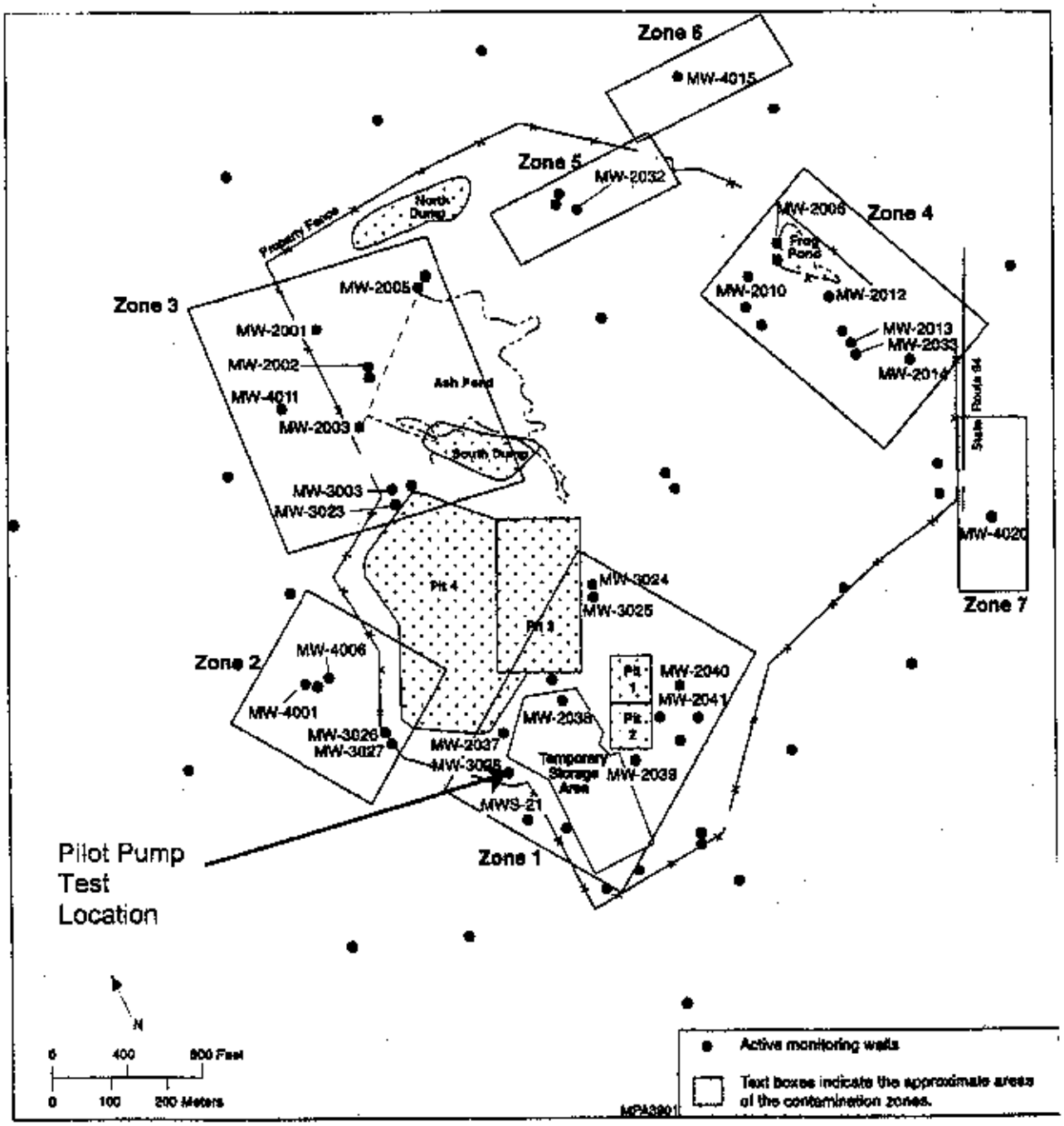

Figure 4: Pilot Pump Test Location

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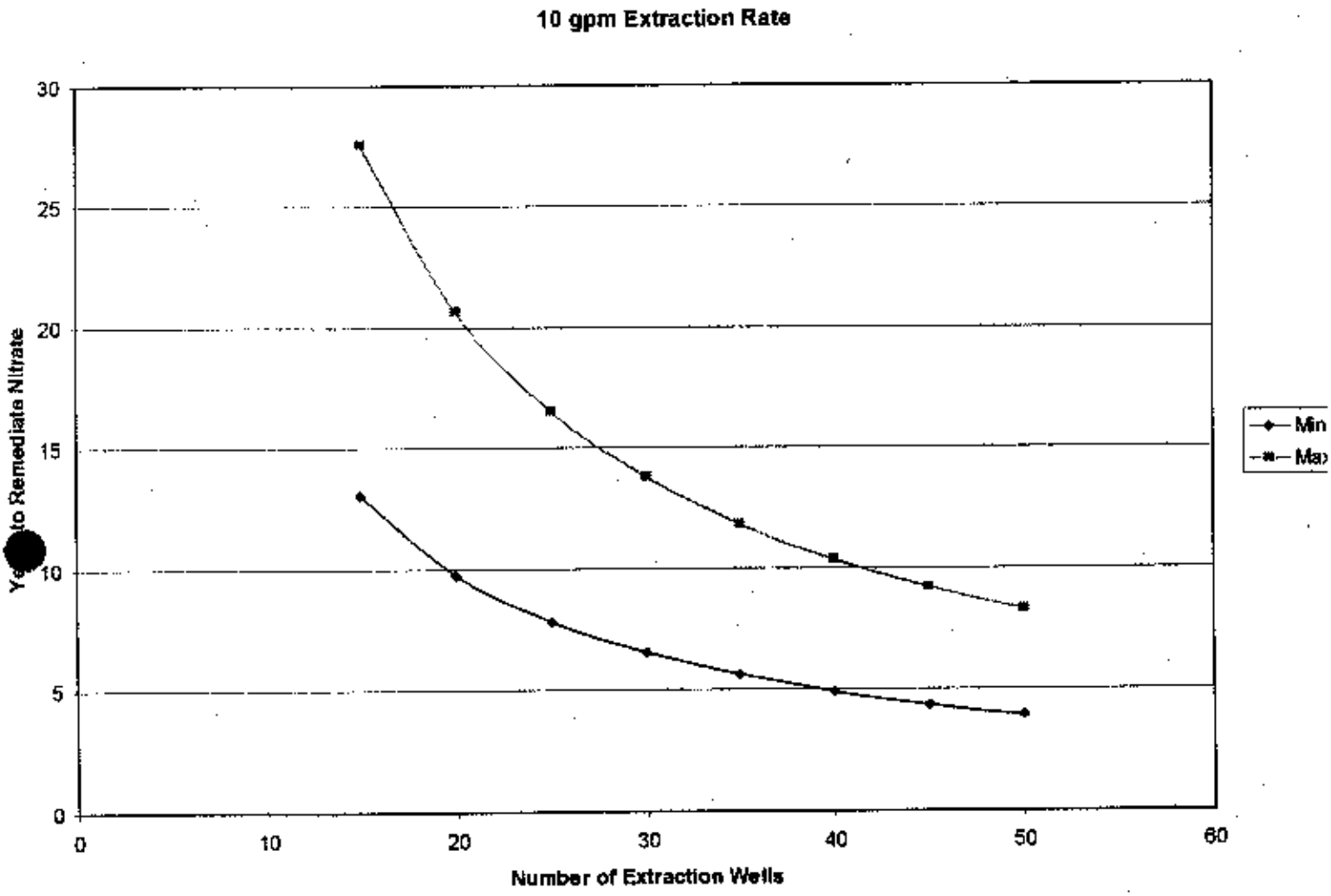

Figure 5: Remediation Times for Contaminant Zone #1 Based on 10 gpm Extraction Rate and a Range of Pore Volume Removal

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5.2 Tables

Table 1 Contaminants for Zones at Chemical Plant Area

Zone	Monitoring Wells with Contaminants Exceeding PRGs	Range of Maximum Contaminant Concentration						
		TCE (µg/L)	Uranium (pCi/L)	Nitrate (mg/L)	2,4-DNT (µg/L)	2,6-DNT (µg/L)	2,4,6-TNT (µg/L)	1,3,5-TNB (µg/L)
1	MW-2037, MW-2038 MW-2039, MW-2039 MW-2040, MW-2041 MW-3024, MW-3025 MWS-21	52–1,400	55	88–1,000	0.73–1.4	0.24–0.27	NA[a]	NA
2	MW-3026, MW-3027 MW-4001, MW-4006	5.5	NA	23–450	0.13	2.3–2.5	NA	21–62
3	MW-2001, MW-2002 MW-2003, MW-2005 MW-3003, MW-3023 MW-4011	NA	15–22	80–420	0.12–0.73	0.19–2.4	NA	NA
4	MW-2006, MW-2010 MW-2012, MW-2013 MW-2014, MW-2033	NA	NA	NA	0.12–6.0	0.50–110	25	2.8–7.2
5	MW-2032	NA	NA	110	NA	1.3	4.4	2.0
6	MW-4015	NA	NA	NA	NA	0.83	NA	7.1
7	MW-4020	NA	20	NA	NA	NA	NA	NA

[a] NA denotes that the particular COC was not detected, or that the reported concentration did not exceed the respective PRG or reference point.