

RECORD OF DECISION AMENDMENT
For
Operable Unit 3 of the
New Brighton/Arden Hills Superfund Site
Arden Hills, Minnesota

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1.0 INTRODUCTION

1.1 PROPOSED CHANGE IN THE REMEDY

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §9601, et seq. and Executive Order 12580, the United States Army (Army) is the lead agency for response actions at the Superfund Site. All remedial actions are subject to the provisions of the Federal Facilities Agreement (1987) among the Army, U.S. Environmental Protection Agency (USEPA), and the Minnesota Pollution Control Agency (MPCA). In September 1992, a Record of Decision (1992 ROD) was prepared (signed by the USEPA, the MPCA, and the Army) that outlined the selected remedy for groundwater at Operable Unit 3 (OU3).

OU3, also referred to as the South Plume, is one of two off-Site deep groundwater plumes at the New Brighton/Arden Hills (NB/AH) Superfund Site, also known as the Twin Cities Army Ammunition Plant (TCAAP), located in Arden Hills, Minnesota. The other off-Site deep groundwater plume is Operable Unit 1 (OU1), also referred to as the North Plume. Separate source areas on TCAAP distinguish the two plumes. The Superfund site includes TCAAP (an inactive small arms ammunition plant) as well as portions of seven surrounding residential communities. The NB/AH site was placed on the National Priorities List (NPL) for cleanup in September 1983.

The 1992 ROD for OU3 at the NB/AH Superfund site selected a remedy that included the following: extraction of groundwater at the leading edge of the South Plume, treatment of extracted groundwater, municipal use of treated groundwater, and groundwater monitoring. The extraction well placed at the leading edge of the South Plume has had volatile organic compound (VOC) concentrations below the OU3 cleanup standards since 1997 and below detection limits since July 1999. Furthermore, groundwater monitoring during that same time period has shown that the South Plume has receded significantly since the 1992 ROD was implemented (See Section 2.1). The observed recession of the South Plume, and statistical analysis for the groundwater monitoring data, are consistent with the action of natural attenuation and provide a basis for choosing monitored natural attenuation as a component of the remedy, as discussed in USEPA's directive, Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (OSWER, April 1999).

Through evaluation of the OU3 groundwater monitoring results, including a statistical evaluation (discussed herein), the USEPA, MPCA, and Army have determined that a modification to the selected remedy is appropriate. The proposed change is as follows: a) the removal of the requirement for groundwater extraction at the leading edge of the

South Plume; b) the removal of the requirement to treat the extracted groundwater; and c) the removal of the requirement for municipal use of the treated groundwater. A drilling advisory that regulates the installation of private wells within the South Plume as a Special Well Construction Area will continue to be implemented.

1.2 PROCEDURE FOR CHANGING THE REMEDY

Under Section 117 of CERCLA and Section 300.435(c)(2)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), if a new, proposed remedial action differs in any significant respect from a final remedial action plan, the lead agency is required to publish an explanation of the significant differences and the reasons such changes were made. The decision to change the remedy for OU3 constitutes such a significant difference. It is a fundamental change in the remedy, necessitating the issuance of a new proposed plan and an amended ROD.

The proposed plan was made available to the public during a public comment period October 13 through November 14, 2005, and was discussed at a public meeting on October 27, 2005. A summary of the responses to comments received during the public comment period (Responsiveness Summary) can be found in Appendix A.

This ROD amendment and all supporting documents will become part of the NB/AH Administrative Record file in accordance with Section 300.825(a)(2) of the NCP. The Administrative Record is available during business hours and is located at:

Twin Cities Army Ammunition Plant
4700 Highway 10, Suite A
Arden Hills, MN 55112

2.0 BACKGROUND

2.1 SITE HISTORY

The NB/AH site consists of a 25-square mile area located in Ramsey County, Minnesota. This includes the 4-square mile area of the original TCAAP facility and portions of seven nearby communities: New Brighton, Arden Hills, St. Anthony, Shoreview, Mounds View, Columbia Heights, and Minneapolis. The NB/AH site has been divided into three operable units. OU3 consists of contaminated groundwater that migrated from Site I on the TCAAP facility. Figure 1 shows the location of OU3.

TCAAP was constructed in 1941 to produce small-caliber ammunition for the United States military. Production activities included manufacturing small arms ammunition and related materials, proof-testing small arms ammunition and related items as required, and handling and storing strategic and critical materials for other government agencies. Ammunition production and related activities have occurred periodically, commensurate with operations in wars, conflicts, and other national emergencies. Information from past studies indicates that between 1941 and 1981, waste materials such as VOCs, heavy metals, corrosive materials, and explosives were used and disposed of at a number of locations within TCAAP. The use and disposal of these materials at TCAAP resulted in soil and groundwater contamination at the facility.

Site I (part of the TCAAP restoration program) consists of Building 502 and its associated structures, facilities, and surrounding property on the southern boundary of TCAAP. Honeywell began operations at Building 502 in December 1958, and has continuously occupied the building since that time. Alliant Techsystems Inc. (Alliant) was divested by Honeywell as a separate company in September 1990 and effectively vacated TCAAP by September 2004.

Soluble and quench oils were used in Building 502 in the 1940s and 1950s. Oils were distributed throughout the building by a piping system routed in floor trenches. In the 1960s, part of the floor trench was converted to a trichloroethene (TCE) distribution system, which included a 28,000-gallon storage tank.

The most prevalent contaminant identified in the groundwater at OU3 is TCE, so evaluation of the South Plume has focused on TCE as an indicator parameter. Some breakdown products of TCE have also been detected. The source of TCE in the OU3 groundwater has been attributed to leakage from the distribution system that served Building 502. The TCE migrated through the soil at Site I to the deep groundwater.

Groundwater flow then carried the contaminants off TCAAP. Soil at Site I may be a continuing source of TCE contamination to the on-TCAAP deep groundwater.

Groundwater extraction began at Site I on TCAAP in June 1986, with the startup of source control well O3U301 (also known as SC1). The first phase of large-scale groundwater extraction at TCAAP (the Boundary Groundwater Recovery System or BGRS) started operating in October 1987. Full-scale startup of the TCAAP Groundwater Recovery System (TGRS) in Operable Unit 2 began in 1989.

The TGRS was an expansion of the BGRS and incorporated additional boundary extraction wells and additional source control wells at Sites D and G, the source of the Operable Unit 1 plume (North Plume). The expansion of the BGRS into the TGRS had little overall effect on the South Plume because that activity primarily involved wells in the North Plume.

The South Plume remedial system is known as the Plume Groundwater Recovery System (PGRS) and consists of a single extraction well (called New Brighton Municipal Well #13 or NBM#13), a granular activated carbon treatment system, and a connection into the municipal water system for the City of New Brighton. The City of New Brighton operated the PGRS under an agreement with Alliant. The PGRS began operating in April 1994 at a nominal rate of 1,000 gallons per minute (gpm).

In 1997, the PGRS influent concentrations dropped below cleanup standards for all VOCs, and in July 1999, influent concentrations dropped below detection limits. In September 1999, the Army and Alliant were granted permission from the MPCA and the USEPA to reduce the pumping rate by approximately 50 percent to help determine if the reductions in influent concentration reflected an actual decrease in the plume concentration or were the result of over pumping and dilution of the plume. A quarterly monitoring program was also approved to observe any changes in plume configuration following the reduction in pumping rate. The City of New Brighton reduced the average pumping rate to approximately 400 gpm in December 1999. Quarterly monitoring after the pumping rate reduction continued to show non-detectable levels of VOCs in the PGRS influent. In addition, monitoring wells in the vicinity of NBM#13 remained below detection limits.

In 2000, a review of the database for the entire South Plume revealed that the pattern of VOC concentration reduction, observed at the PGRS, was consistent throughout the South Plume and appeared to be contemporaneous with the startup of groundwater extraction and treatment at the TGRS in Operable Unit 2. This led to a decision to evaluate the entire history of the South Plume to more fully understand the reductions

in concentrations observed at the PGRS. The results of this evaluation were presented in the report "Plume History Evaluation, Operable Unit 3" (CRA, October 2000).

The Plume History Evaluation (Report) identified long-term trends in the field data in support of a recommendation to discontinue groundwater extraction at the PGRS. Correlation of the plume concentration reductions with the source control provided by the TGRS suggested that the South Plume had been receding due to the combination of natural attenuation mechanisms and the elimination of VOC mass loading to the off-TCAAP plume due to TGRS operation. In effect, the groundwater data indicated that the plume was "wasting" in an upgradient direction such that the plume no longer extended as far as the PGRS. The report concluded that shutting down the PGRS would have no effect on concentrations in the plume and that the plume would continue to shrink back towards TCAAP. Continued quarterly monitoring was recommended to verify that plume reduction continued after the PGRS was shut off.

The USEPA and MPCA accepted the recommendation to shut down the PGRS as an interim operational change and it was placed in standby mode in August 2001. While the PGRS was placed in standby mode for remediation purposes, NBM#13 has been used occasionally by the City of New Brighton to supplement its water supply since that time, primarily during summer months. Quarterly sampling of the monitoring wells in the vicinity of NBM#13 was continued to verify that concentrations remained below cleanup standards. The Army, USEPA, and MPCA agreed to review the monitoring data in 2004 to determine if the PGRS could be permanently shut down for remediation purposes.

In 2004, Conestoga-Rovers & Associates prepared the "Groundwater Statistical Evaluation, Operable Unit 3, TCAAP, Technical Memorandum" (OU3 Tech Memo), which evaluated contaminant trends in the South Plume. The OU3 Tech Memo, discussed in more detail in Section 3.0, found that wells at the edge of the South Plume had decreasing TCE trends, supporting the conclusion that the South Plume is receding. Only three OU3 wells had TCE concentrations exceeding the MCL of 5 µg/L during the last comprehensive monitoring round in June 2003. All three are significantly upgradient of NBM#13. The three wells are 03M848 (450 µg/L), 04U861 (48 µg/L), and 04U673 (15 µg/L).

2.2 SITE GEOLOGY/HYDROGEOLOGY

The TCAAP area regional geology, beginning at ground surface, consists of four stratigraphic layers that have been assigned the nomenclature of Unit 1 through Unit 4

for reference purposes. The four geologic units are presented in Figure 2 and are as follows:

- Unit 1 - Surficial deposits, consisting primarily of alluvial sediments that range from 0 to 50 feet in thickness.
- Unit 2 - Twin Cities Till, containing a complex mixture of gray and reddish-brown clay with gravel and sand. Unit 2 ranges from 0 to 125 feet in thickness.
- Unit 3 - Hillside and Arsenal Sand, with minor lenses of silt, gravel, and sandy clay. Unit 3 ranges from 100 to 447 feet in thickness at TCAAP and decreases to where it no longer exists in the New Brighton area south of Interstate 694.
- Unit 4 - Bedrock. This unit consists of Prairie du Chien dolomite and Jordan Sandstone which, together, are up to 200 feet thick where present. The Jordan Sandstone is underlain by the St. Lawrence Formation, a dolomitic shale.

Groundwater in the TCAAP area has been classified into similar units corresponding to the geologic units described above, with the exception of the Unit 2 till, which is an aquitard and is not considered a water-bearing unit at the Site. Following are summaries of the three water-bearing units in the TCAAP area:

- Unit 1 - Unit 1 generally contains perched groundwater when underlain by Unit 2. This groundwater predominantly migrates to nearby streams or lakes and discharges to surface water.
- Unit 3 - Unit 3 consists of the Hillside Sand aquifer that is approximately 100 feet thick at the southwest boundary at TCAAP. Groundwater in Unit 3 migrates southwest and west from TCAAP. The thickness of the Unit 3 aquifer decreases to the southwest of TCAAP to the point where it does not exist south of I-694 in New Brighton. Unit 3 is hydraulically connected to the underlying Unit 4.
- Unit 4 - Unit 4 consists of the Prairie du Chien dolomite and Jordan Sandstone, which are up to 200 feet thick. Groundwater within the Unit 4 flows southwest from TCAAP. Unit 4 is hydraulically connected to the Unit 3 formation. Unit 4 overlies the St. Lawrence Formation, which is a regional confining bed and constitutes the base of the active flow regime for TCAAP studies.

Several estimates have been made regarding the hydraulic conductivities and other calculated aquifer properties for the various groundwater units at TCAAP. The most comprehensive evaluation of the Units 3 and 4 aquifer hydraulic characteristics is summarized in the "Aquifer Characterization Study, Off TCAAP Study, Phase III: Supplement," dated November 1989 by CRA. This study evaluated the following six aquifer tests that had been conducted at TCAAP:

- Pumping test of TCAAP boundary Unit 4 extraction well (B9);
- Slug tests of boundary Jordan Sandstone monitoring wells at TCAAP;
- Unit 3 pumping test by the MPCA at the UOP Johnson research well field (CPW10);
- Unit 4 pumping test at the former Northwest Refinery production well (NWRU4);
- Unit 4 pumping test at former TCAAP production well (PJ#508); and
- Performance of the on-Site TCAAP groundwater remediation system (TGRS) groundwater extraction system.

The most detailed hydraulic characteristics were obtained from the B9 pumping test on the TCAAP boundary conducted in August 1988. The data obtained from the B9 test indicated the following aquifer properties:

<u>Unit</u>	<u>Transmissivity</u> <u>(ft²/day)</u>	<u>Thickness (ft)</u>	<u>Hydraulic</u> <u>Conductivity</u> <u>(ft/day)</u>
Hillside Sand (Unit 3)	21,424	156	137
Prairie du Chien (Unit 4)	3,160	37	85
Jordan Sandstone (Unit 4)	4,140	90	46
Bulk Transmissivity	28,724	283	-

The Aquifer Characterization Study found that these properties vary somewhat across the study area. More importantly however, the unit regional groundwater flux within the Unit 3 and Unit 4 remained relatively constant. The NWRU4 test indicated a combined Unit 3 and Unit 4 transmissivity of 48,680 ft²/day. The regional unit groundwater flux in the NWRU4 vicinity was determined to be 49 ft²/day. By comparison, the unit regional groundwater flux in the B9 area is 57 ft²/day. Figure 3 shows the locations of these previous pumping tests.

Upon installation of NBM#13 and five monitoring wells in 1993, a 72-hour constant discharge aquifer pumping test was performed. The results and interpretation of the

test were provided in the TCAAP OU3 Pumping Test Report by CRA, dated January 1995.

The results indicated that the transmissivity of the Prairie du Chien aquifer in the vicinity of the PGRS system averages 72,827 ft²/day and the Unit 4 groundwater flux through this area is 51 ft²/day.

Groundwater quality of NBM#13 at the time of the pumping test indicated that NBM#13 was located at the leading edge of the South Plume. Monitoring wells 04U865 and 04U866, which flank NBM#13, exhibited TCE concentrations slightly above the MCL at that time. Monitoring well 04U864, which is downgradient of NBM#13, had TCE concentrations below the MCL. The South Plume never migrated beyond NBM#13, and has been receding since groundwater extraction at NBM#13 began. Figure 4 compares the current TCE plume outline to the 1994 TCE plume outline.

2.3 1992 ROD-SELECTED REMEDY

The NB/AH site was listed on the NPL in September 1983 based on the results of samples collected from wells in the TCAAP area. The analytical results from these samples indicated that municipal wells, drinking water wells, and wells at TCAAP were contaminated with VOCs. In July 1992, a Feasibility Study was completed for OU3 that identified the groundwater contamination associated with OU3 and provided remedial alternatives for addressing that contamination. In September 1992, the ROD for OU3 was issued that documented the selected remedies and cleanup standards for this operable unit.

In the 1992 ROD, the selected remedy for OU3 was:

- extraction of groundwater at the leading edge of the South Plume;
- treatment of extracted groundwater for the removal of VOCs by a pressurized granular activated carbon (GAC) system;
- discharge of treated groundwater to the potable water supply of the City of New Brighton; and
- monitoring of the groundwater to verify the effectiveness of the remedy.

Also, while not identified specifically as an element of the OU3 remedy, the 1992 ROD discussed implementation of a well drilling advisory, which was implemented for both

OU1 and OU3 by the Minnesota Department of Health (MDH) as the Special Well Construction Area.

3.0 **BASIS FOR THE FUNDAMENTAL CHANGE TO THE SELECTED REMEDY**

In 2000, the Army identified a pattern of reduction in VOC concentrations in the South Plume since the startup of the TGRS in 1989. A study of the long-term trends in the VOC concentrations (Plume History Evaluation, CRA, October 2000) was the basis for shutting down the PGRS on an interim basis in August 2001. In 2004, VOC concentration trends in the South Plume groundwater were again evaluated to demonstrate that shutting down the PGRS had no effect on the South Plume and that the PGRS shutdown should be permanent. This study is presented in the "Groundwater Statistical Evaluation" Technical Memorandum by Conestoga-Rovers & Associates (May 2005).

The groundwater data trends were evaluated using the Mann-Kendall statistical test. Trichloroethene (TCE) data was used as the key indicator parameter in the South Plume. From the population of all wells within the OU3 area, every well that was near or within the 1 microgram per liter ($\mu\text{g/L}$) plume boundary, as drawn in the FY2003 "Annual Performance Report," and had been sampled on a consistent basis, was statistically evaluated (e.g., 03L860 has not been sampled since 1997, so was not evaluated). Eight wells near the plume edge and three wells near the center of the South Plume were selected. The locations of the selected wells are shown on Figure 5. Data from the six most recent years that samples were collected were used to conduct the Mann-Kendall test.

The Mann-Kendall statistics give the direction of the trend, (either positive, negative, or zero) and a confidence level for the trend. The trend direction (Kendall S) is determined by the number of times a TCE concentration is higher or lower than the preceding data. The confidence represents the probability that the trend is not the result of random variation in the data. The Mann-Kendall test is not quantitative. It gives the trend direction and a confidence in that direction, but not the magnitude of the trend.

After the trend direction and confidence is determined, the MAROS decision matrix (from the Air Force Center for Environmental Excellence, Monitoring and Remediation Optimization Software) is used to draw a conclusion regarding the trend. When the confidence in the trend is high (i.e. > 95 percent), MAROS concludes the trend is definite. When the confidence is between 90 percent and 95 percent, MAROS concludes the trend is probable. When the confidence in the trend is low (i.e., < 90 percent), MAROS concludes that there is either no trend or the data are stable.

The statistical evaluation showed that seven of eight plume edge wells had a decreasing TCE trend. Based on the Mann-Kendall analyses, three wells had definitely decreasing TCE trends and four wells had probable decreasing trends. The eighth well, 409548, resulted in a stable TCE trend. This well is technically an OU1 well, but is near the boundary between OU1 and OU3 and is near the downgradient side of the South Plume as shown on Figure 5. Well 409548 has been consistently below the MCL of 5 µg/L for TCE since 1995 (1.4 µg/L in 2003). The statistical evaluation results are summarized on Table 1.

The overall consistent statistical trend of decreasing TCE concentrations in monitoring wells at the plume edge supports the conclusion that the South Plume is receding, even while the PGRS has been shut down. The fact that monitoring wells with decreasing TCE trends are found along the entire edge of the South Plume indicates that the plume is receding along its side as well as on the downgradient edge (wells 03L673, 03L848, 04U673, 04U832, 04U845, 04U848, and 04U863).

The three wells at the center of the South Plume that were statistically evaluated do not provide any conclusive evidence about changes in the plume. Two wells, 04U859 and 04U861, are near the boundary between OU1 and OU3. Well 04U859 had a stable trend and 04U861 had an increasing trend. Well 03M848, which is the center of the South Plume with a TCE concentration of 450 µg/L in 2003, had a stable trend. Stable trends at the center of the plume can be expected as the plume recedes. Decreases at the edge of the plume may take awhile to affect the center of a plume. Also, contaminant mass may shift at the center of a plume, resulting in increases and decreases at specific wells over time that statistically become stable trends.

To support the statistical evaluation, wells outside of the plume boundary were also studied for the consistency of low TCE concentrations. Ten wells were identified that have been sampled consistently and were outside of the 1 µg/L plume boundary. These ten wells have had TCE concentrations below the MCL of 5 µg/L since 1997. Only one result, at 04U866 in 1997, has even been above the detection limit of 1 µg/L). Five of these wells surround NBM#13, the PGRS extraction well, and have been sampled quarterly since 1996. Table 2 presents TCE results since 1996 for these ten wells.

In fact, only three OU3 monitoring wells had TCE concentrations that exceeded the MCL of 5 µg/L during the last comprehensive monitoring round in June 2003. Two of these wells, 03M848 (450µg/L) and 04U861 (48 µg/L), are at the center of the South Plume. The third, 04U673 (15 µg/L), is at the farthest upgradient end of the South Plume.

In addition, data for all of the OU3 contaminants of concern (COC) support the TCE data evaluation. None of the other COCs have exceeded the OU3 cleanup standards at any OU3 groundwater monitoring well since 1999. The other COCs include: cis-1,2-dichloroethene, 1,1-dichloroethane, 1,1-dichloroethene, 1,1,1-trichloroethane, and 1,1,2-trichloroethane. Table 3 presents detectable concentrations of all COCs since 1996.

Based on the statistical evaluation and other supporting data discussed in the preceding three paragraphs, groundwater extraction and treatment by the PGRS system are no longer required to contain the South Plume. The Mann-Kendall statistical evaluations of monitoring wells throughout the length of the South Plume edge show a consistent decreasing TCE trend, supporting the observation that the South Plume has been receding for several years. The decrease in the plume size and concentration has continued while pumping at PGRS extraction well NBM#13 decreased and then was stopped all together in August 2001. The receding plume is due to the consistent operation of the TGRS and possibly other factors relating to natural attenuation processes. The PGRS system should be permanently shut down as a remediation system and the ROD amended to reflect this change.

4.0 DESCRIPTION OF NEW REMEDY AND CHANGES IN EXPECTED OUTCOME

The remedy selected in the 1992 ROD included groundwater extraction and treatment at the leading edge of the plume with municipal use of the treated water. Since the startup of the TGRS (over 15 years ago), the South Plume has been receding, and has receded beyond the influence of NBM#13. Statistical evaluation of groundwater data has shown that the South Plume has been receding since at least 1996, including the period since the PGRS pumping rate was reduced (1999 - 2001) and then discontinued (2001 - 2005). Furthermore, recent groundwater monitoring results show that the area with TCE above the MCL of 5 µg/L has been reduced to three monitoring wells significantly upgradient of the extraction system.

Thus, the new proposed remedy differs significantly from the 1992 ROD in that the elements for groundwater extraction, treatment, and municipal use are no longer useful. While these elements provided value initially, the nature of the Site has changed such that they are no longer useful. The one remaining element of the 1992 ROD is groundwater monitoring, which has been modified to acknowledge natural attenuation processes in the aquifer. Also, monitored natural attenuation and implementation of the Special Well Construction Area have been added as elements of the OU3 remedy. Table 4 presents a side-by-side comparison of the original and proposed remedies.

The change in the remedy should have no effect on the remedial action objectives. There are four remedial action objectives for the OU3 groundwater that are designed to protect human health and the environment from exposure to contaminants:

- Restore the contaminated aquifer for future use by reducing contaminant levels to those that will adequately protect human health and the environment.
- Control contaminant migration to prevent further spread of the VOC plume.
- Prevent the near-term and future exposure of human receptors to contaminated groundwater above MCLs, both on and off Site.
- Monitor groundwater in a manner to verify effectiveness of remedial measures.

During the four years the PGRS has been shut down, the South Plume has been receding, further restoring the portion of the aquifer that had previously been contaminated. The evidence suggests that the plume will continue to recede in the future, providing additional protection to human health and the environment. Continued operation of the TGRS at the TCAAP boundary essentially eliminates additional loading of contaminants to the OU3 groundwater. (The OU2 ROD requires

TGRS operation as long as contaminants remain above OU2 cleanup standards in on-TCAAP deep groundwater.) Contaminants remaining in the South Plume groundwater will continue to decrease in concentration through natural attenuation mechanisms as demonstrated by historical groundwater chemistry data.

Once NBM#13 is abandoned, there will be no municipal water supply wells within OU3. The MDH's Special Well Construction Area ensures that construction of a new well, or modification of the depth of an existing well, may not take place until after the MDH has reviewed and approved plans for the proposed construction. Finally, ongoing groundwater monitoring, evaluated annually in the TCAAP Annual Performance Report, will continue to provide data on the status of the plume.

Therefore, removing the groundwater extraction, treatment, and municipal use components of the remedy appears to be appropriate at this time. Groundwater monitoring will give adequate warning for appropriate action in the unlikely event the South Plume does begin to advance in the future. If groundwater monitoring indicates that the South Plume may be advancing, the magnitude and location of increased contaminant concentrations, along with potential risks to human health and the environment, will be studied to determine appropriate contingency actions ranging from additional sampling to evaluating possible remedial actions. If contingency actions are warranted, the Army will develop and implement a contingency plan approved by the USEPA and MPCA. Groundwater monitoring will also continue for an appropriate period of time, as approved by the regulators, after the cleanup standards are met.

5.0 COMPARATIVE ANALYSIS

The amended remedy, as presented in this ROD amendment, is nearly the same as the No Action alternative (Alternative 1) presented and discussed in the 1992 ROD. One exception is that the analysis presented in the 1992 ROD states that the South Plume would continue to migrate downgradient, impacting additional clean portions of the aquifer. Based on the data summarized in this document, and presented in more detail in the Groundwater Statistical Evaluation Technical Memorandum and the Plume History Evaluation report, the South Plume is actually receding in the upgradient direction. Therefore, the technical advantages cited for the 1992 ROD alternatives (Alternatives 2-4) that considered groundwater extraction and treatment as key elements are no longer valid. It has been demonstrated that the South Plume is being remediated with the assistance of the TGRS, and natural attenuation factors. The USEPA has evaluated natural attenuation factors in the deep groundwater at TCAAP; however, natural attenuation was not implemented as part of the formal remedy for OU3 until now.

Based on the information obtained from the studies completed since the ROD was signed, a brief comparison of the amended alternative and the original alternative is presented here. The two alternatives are compared against each other for each of the nine evaluation criteria.

1.) **Overall Protection of Human Health and the Environment**

The amended remedy is protective of human health and the environment due to contaminant concentrations below detection levels (and cleanup standards) in the area of previous groundwater extraction, continued groundwater monitoring, the lack of a completed exposure pathway because of the Special Well Construction Area, and the continued operation of the TGRS. While the affected groundwater is no longer actively removed, it has been shown that the South Plume is shrinking, and the remaining contamination will not harm human health or further damage environmental media. The original remedy has outlived its usefulness and is no longer any more protective than the amended remedy.

2.) **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)**

Both the original and amended remedies will meet ARARs. Contaminants of concern would remain above cleanup standards in the northern portion of the South Plume within the foreseeable future under the amended remedy and the original remedy. Under the amended remedy, the South Plume is shrinking;

therefore, progress will continue towards meeting cleanup standards. It will take time to meet ARARs for either remedy, with no advantage for either.

3.) Long-Term Effectiveness and Permanence

Because the South Plume is receding without the aid of groundwater extraction at the leading edge of the plume, long-term effectiveness is provided by the amended alternative. Continued groundwater extraction at what was the leading edge of the plume in 1994 would not be any more effective in the long term. Based on the groundwater history and statistical trends, the shrinkage of the plume since the PGRS was shut down appears to be permanent.

4.) Reduction of Toxicity, Mobility, or Volume Through Treatment

The original remedy reduced the mobility and volume of contaminants by extracting and treating contaminated groundwater from the aquifer through 2001. However, as discussed in this document, groundwater extraction is no longer effective because the South Plume has shrunk upgradient beyond the influence of NBM#13. Based on the results of the statistical evaluation, the plume is expected to continue to recede in size and concentration without groundwater extraction in OU3; therefore, the amended alternative should also provide reduction in the mobility and volume of contaminants; however, there will no longer be treatment through GAC. The reduction of contaminants in the South Plume is likely due to natural attenuation mechanisms and the elimination of additional VOC mass loading to the off-TCAAP plume through TGRS operation.

5.) Short-Term Effectiveness

Short-term effectiveness accounts for risk associated with remedy implementation. The risks associated with groundwater monitoring are the same for both remedies. Operation of the PGRS under the original remedy involves safety issues for plant operators that are not presented in the amended remedy. Therefore, the amended remedy has a greater short-term effectiveness than the original remedy.

6.) Implementability

The amended remedy, in essence, has already been implemented. A groundwater monitoring program is in place. Because the plume has receded upgradient beyond the reach of NBM#13, operation of NBM#13 to remove contaminants is no longer feasible for the original remedy.

7.) Cost

The amended remedy will have a lower cost than the original remedy. The ongoing operation and maintenance costs for the PGRS are removed from the remedy. The only remaining cost is ongoing groundwater monitoring, which is similar for both remedies. There is a cost for dismantling the PGRS, but as that cost would be the same for both alternatives, it cancels itself out.

8.) State Acceptance

This ROD amendment has been reviewed by the MPCA, and the State accepts the amended ROD.

9.) Community Acceptance

The TCAAP Restoration Advisory Board (RAB) was informed of this ROD amendment at the September 27, 2004 advisory board meeting. A technical representative of the RAB has participated in discussions about the proposed ROD amendment and has reviewed and provided comments for the relevant documents to Army. Based upon public comments received during the public comment period and the public meeting, the community accepts the amendments to the ROD.

**5.1 RESULTS OF COMPARISON
USING THE NINE CRITERIA**

Both the current and proposed remedies alternatives meet the threshold criterion of providing protection of human health and the environment. Also both remedies require 30 or more years to meet the ARARs.

The amended remedy is preferred by the five balancing criteria. The amended remedy has a superior short-term effectiveness, is easier to implement, and has a lower cost. Given the ongoing shrinkage of the South Plume while the PGRS has been turned off the last four years, both alternatives have equivalent long-term effectiveness and permanence, and reduction in toxicity, mobility, or volume.

5.2 THE AMENDED REMEDY

Therefore, the components of the amended OU3 remedy are:

- monitored natural attenuation;
- monitoring of the groundwater for VOCs to verify the effectiveness of the selected remedy and the natural attenuation of the South Plume; and
- continued implementation of the drilling advisory that regulates the installation of new private wells within OU3 through a Special Well Construction Area.

The results of the groundwater monitoring will be reported on and statistically evaluated annually in the TCAAP Annual Performance Report. Based on these evaluations, the scope of the annual groundwater monitoring activities will be evaluated

yearly to ensure plume coverage. If statistical evaluations show an increasing trend at the edge of the South Plume, contingency actions will be considered to monitor or control the changes to the plume. If contingency actions are warranted, the Army will develop and implement a contingency plan approved by the USEPA and MPCA.

To date, operation of the TGRS has been instrumental in reducing contaminant levels in OU3 by eliminating additional loading of VOCs to the South Plume. The OU2 ROD requires operation of the TGRS until contaminants in the deep groundwater are below the OU2 ROD cleanup standards within the TCAAP boundary; therefore, the TGRS is expected to continue to contribute to OU3 remediation for the foreseeable future.

6.0 STATUTORY DETERMINATIONS

This section discusses how the amended remedy meets the five statutory requirements established by Section 121 of CERCLA.

6.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The amended remedy is protective of human health and the environment due to the absence of contamination in the area of previous groundwater extraction, continued groundwater monitoring and the lack of a completed exposure pathway because of the Special Well Construction Area. The South Plume is shrinking, with the assistance of the TGRS and natural attenuation, providing ongoing additional protection of the environment.

6.2 COMPLIANCE WITH ARARs

Contaminants of concern would remain above cleanup standards in the northern portion of the South Plume within the foreseeable future under the amended remedy and the original remedy. However, it has been shown that under the amended remedy, the South Plume is shrinking; therefore, progress is expected to continue towards meeting cleanup standards. Also, continued operation of the TGRS (required by the OU2 ROD) essentially eliminates additional loading of contaminants to the South Plume.

6.3 COST EFFECTIVENESS

The only cost to implementing the amended remedy is ongoing groundwater monitoring and reporting.

6.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCES RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

Because the South Plume has receded beyond the reach of the extraction system, continued groundwater extraction is no longer appropriate. Capture and treatment of

the source area on TCAAP by the TGRS, preventing further contamination of the South Plume provides a measure of permanence.

**6.5 PREFERENCE FOR TREATMENT
AS A PRINCIPAL ELEMENT**

From 1994 through 2001, the PGRS provided treatment of contaminated groundwater and distribution of the treated groundwater for municipal use. The plume has now receded to the point that groundwater extraction is no longer beneficial; therefore, treatment will no longer be part of the amended remedy.



Richard C. Karl, Director
Superfund Division
U.S. Environmental Protection Agency
Region V

8/11/06

Date

Tim Scherkenbach
Director, Remediation Division
Minnesota Pollution Control Agency

Date



Michael Fix
Commander's Representative
Twin Cities Army Ammunition Plant

10 July 2006

Date

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Superfund Division
U.S. Environmental Protection Agency
Region V

Date



~~Sheryl Corrigan~~ Tim Scherkenbach
~~Commissioner~~ Director, Remediation Division
Minnesota Pollution Control Agency

7/19/06
Date

Michael Fix
Commander's Representative
Twin Cities Army Ammunition Plant

Date

FIGURES

GEOLOGIC UNIT

SOUTHWEST

NORTHEAST

SITE

- Unit 1 **RECENT ALLUVIUM**
 fill recent alluvium and peat
NEW BRIGHTON FORMATION
 fine sands overlying
 lacustrine silts
 - local water table aquifer
 0-50 feet thick
-
- Unit 2 **TWIN CITIES FORMATION**
 reddish brown to gray
 silty clay, clayey sand
 till
 - regional aquitard
 0-150 feet thick
-
- Unit 3 **HILLSIDE SAND**
 reddish brown medium to
 coarse sand with occasional
 gravels, silty sands and red
 sandy tills
 regional aquifer
 0-500 feet thick
-
- Unit 4 **PRAIRIE du CHIEN GROUP**
 Dolomite, sandy dolomite:
 light brown to white
 thin to thickly bedded; variably
 fractured
 - regional aquifer
 0-250 feet thick
JORDAN SANDSTONE
 Sandstone, white to
 yellowish fine to
 coarse-grained; loosely
 to well cemented
 - regional aquifer
 0-100 feet thick

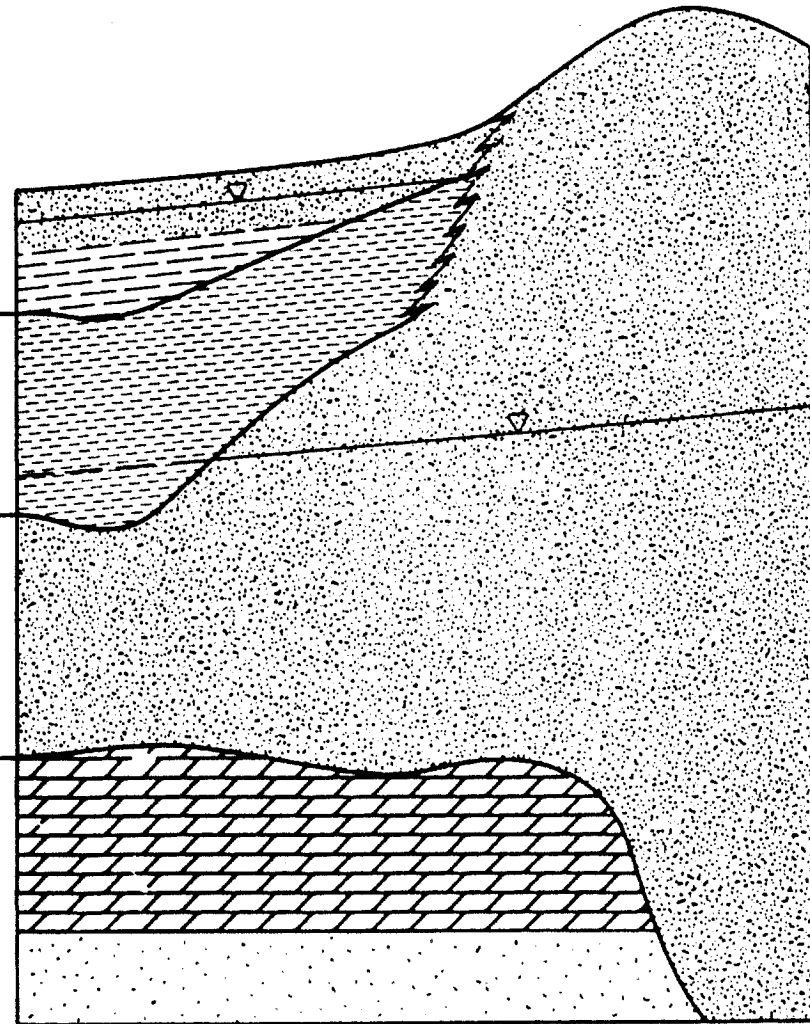


figure 2

**SCHEMATIC REGIONAL GEOLOGIC CROSS SECTION
 OPERABLE UNIT 3
 Twin Cities Army Ammunition Plant**



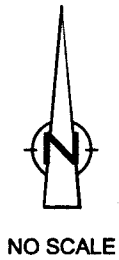
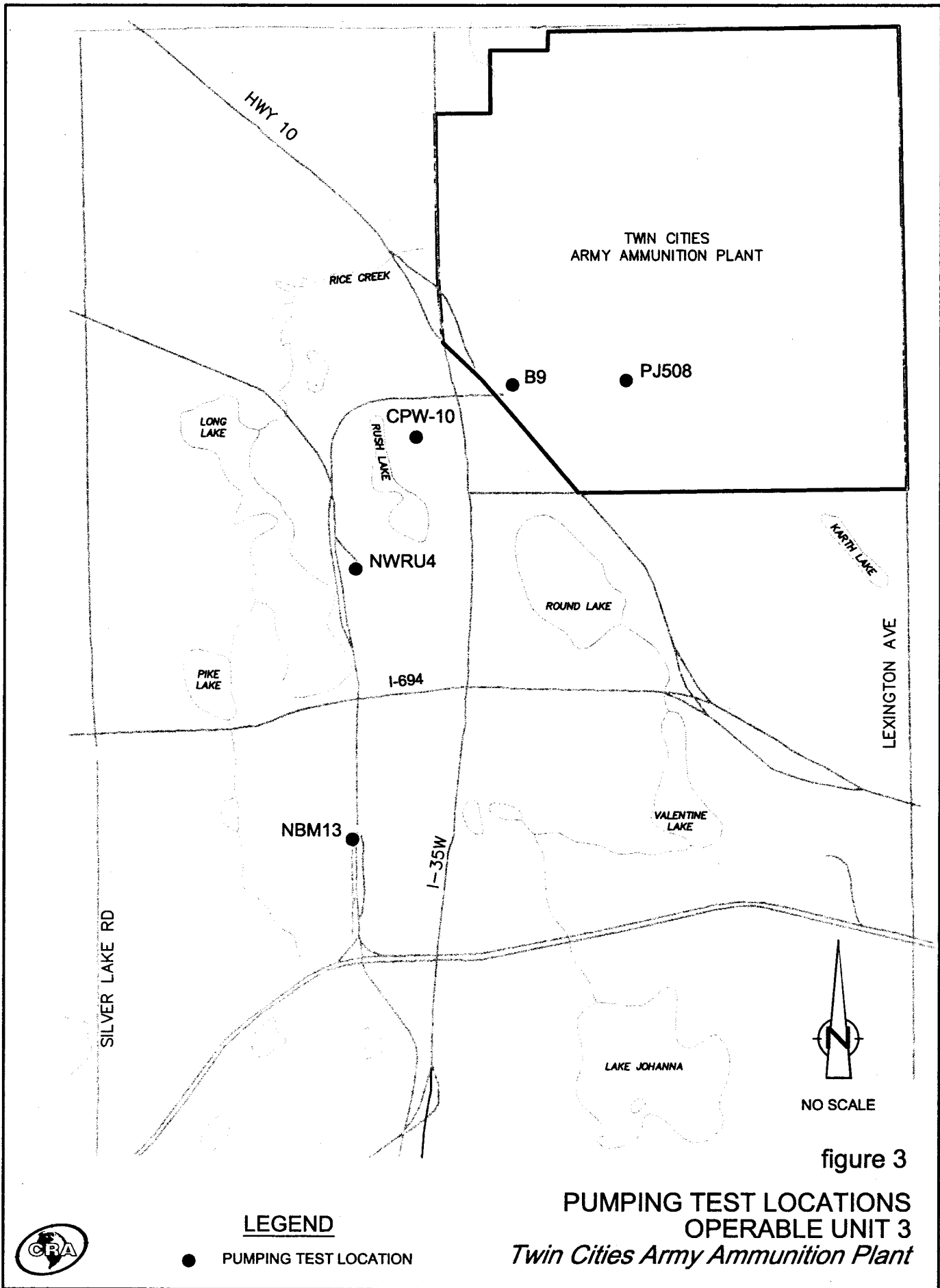


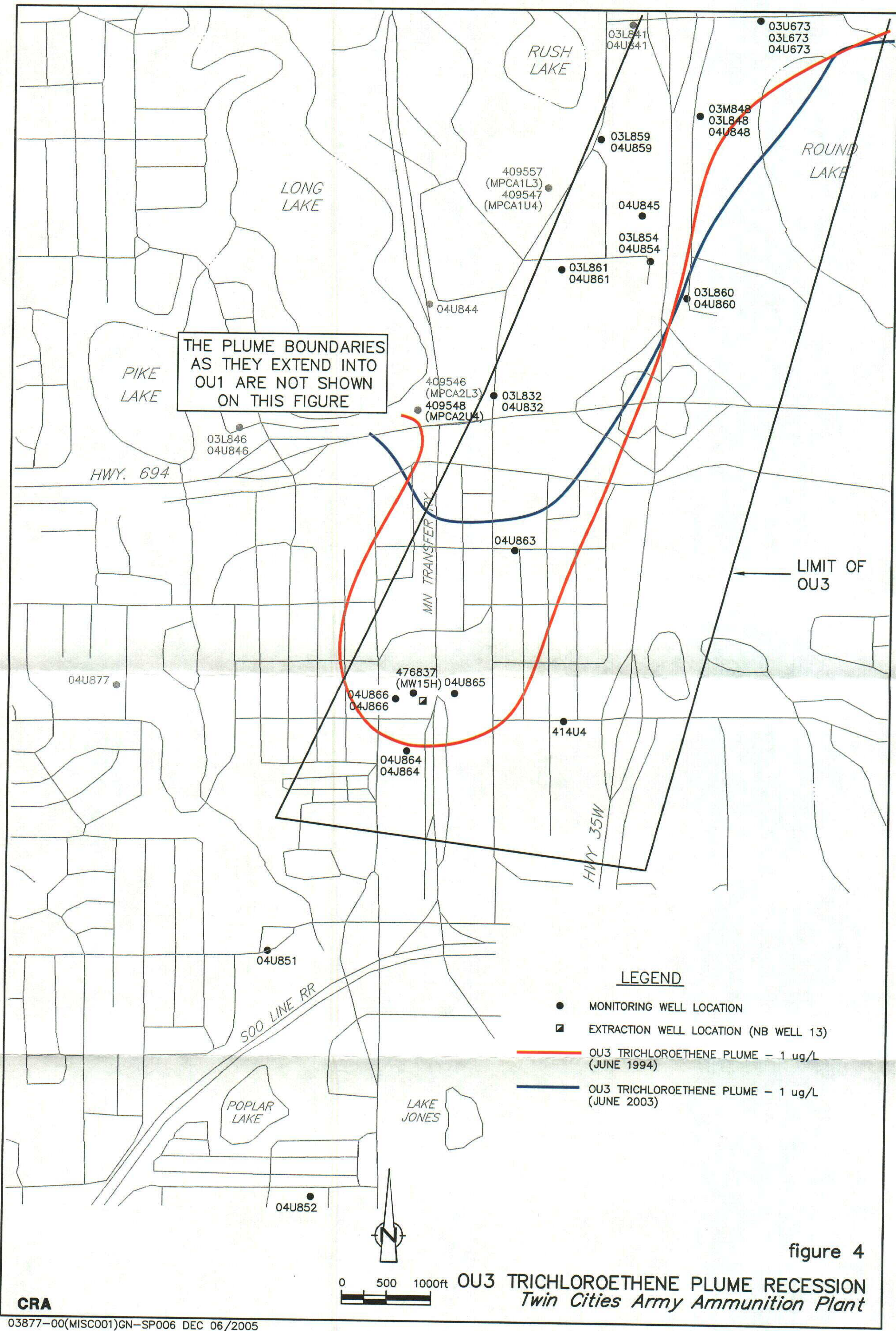
figure 3

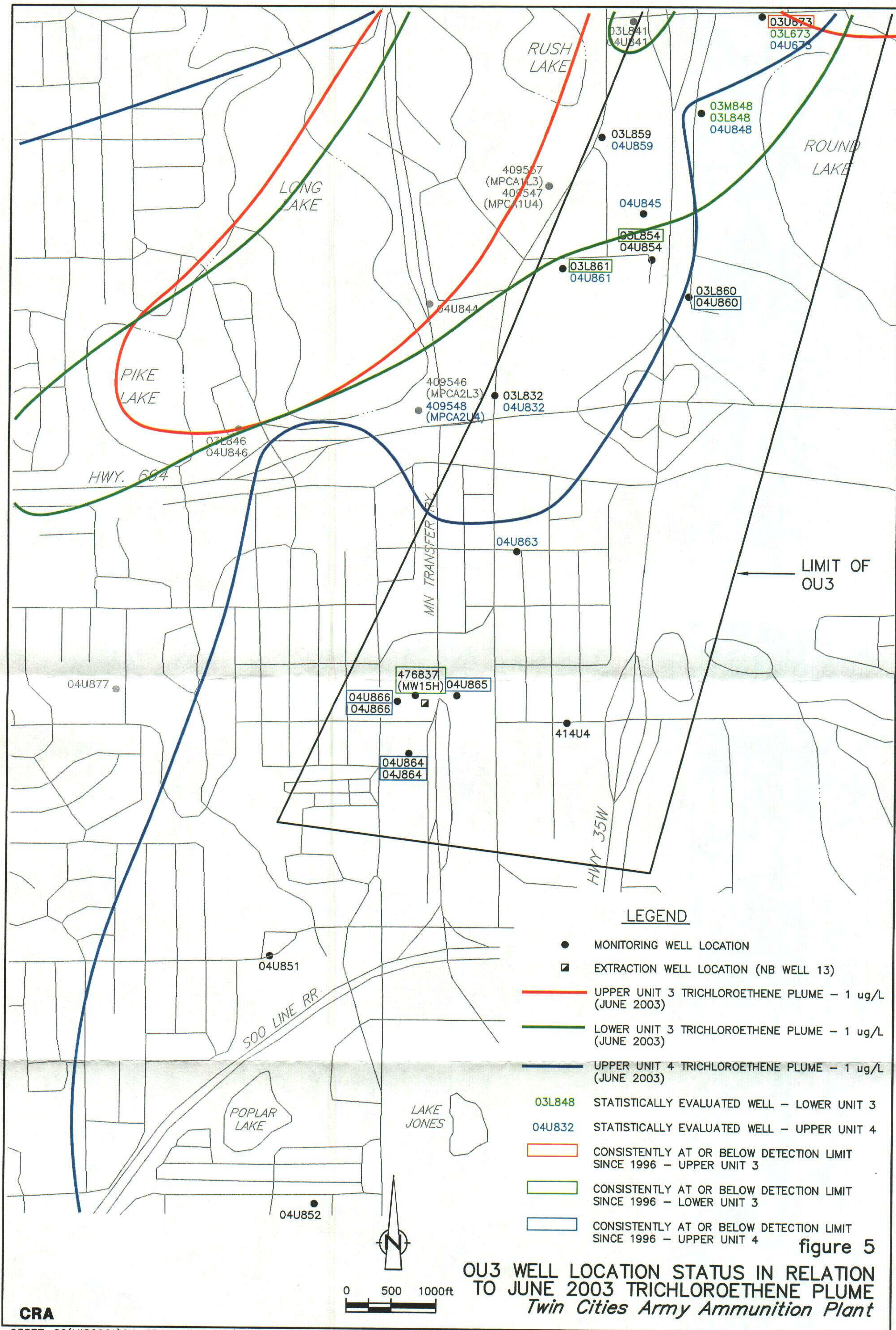
**PUMPING TEST LOCATIONS
OPERABLE UNIT 3
*Twin Cities Army Ammunition Plant***

LEGEND

- PUMPING TEST LOCATION







TABLES

TABLE 1

**MANN-KENDALL SUMMARY - OU3 WELLS
TWIN CITIES ARMY AMMUNITION PLANT (TCAAP)
ARDEN HILLS, MINNESOTA**

<i>Well</i>	<i>Kendall S</i>	<i>Number of Data Points</i>	<i>Raw Trend</i>	<i>Confidence</i>	<i>Coefficient of Variance</i>	<i>Raw Trend Decision</i>	<i>MAROS Conclusion</i>	<i>June 2003 TCE Conc.</i>
Edge of Plume Wells								
03L673	-9	6	Decreasing	93.20%	0.9513	Probable	Decreasing	6.3
03L848	-11	6	Decreasing	97.20%	0.4435	Definite	Decreasing	3.8
409548	-7	6	Decreasing	86.40%	0.2917	Stable or No Trend	Stable	1.4
04U673	-9	6	Decreasing	93.00%	0.7539	Probable	Decreasing	15
04U832	-11	6	Decreasing	97.20%	0.6741	Definite	Decreasing	4.1
04U845	-9	6	Decreasing	93.00%	0.7077	Probable	Decreasing	4
04U848	-11	6	Decreasing	97.20%	0.7307	Definite	Decreasing	0.46 JP
04U863	-9	6	Decreasing	93.20%	0.8178	Probable	Decreasing	<1.0
Center of Plume Wells								
03M848	-7	6	Decreasing	86.40%	0.5478	Stable or No Trend	Stable	450
04U859	-7	6	Decreasing	86.40%	0.7443	Stable or No Trend	Stable	4.4
04U861	13	6	Increasing	99.17%	0.7210	Definite	Increasing	48

TABLE 2

TRICHLOROETHENE RESULTS($\mu\text{g/L}$)
OU3 CONSISTENTLY LOW CONCENTRATION WELLS
TWIN CITIES ARMY AMMUNITION PLANT (TCAAP)
ARDEN HILLS, MINNESOTA

<i>Dates</i>	<i>03U673</i>	<i>03L854</i>	<i>03L861</i>	<i>476837</i>	<i>04U860</i>	<i>04U864</i>	<i>04J864</i>	<i>04U865</i>	<i>04U866</i>	<i>04J866</i>
June 1996	<1.0	<0.56	<0.56	<0.75	<0.56	<0.56	<0.56	1.77	1.18	<0.56
Sept 1996				0.86		<0.56	<0.56	4.09	9.85	<0.56
Dec 1996				1.54		<0.56	<0.56	5.60	14.30	<0.56
June 1997	<1.0	<0.56	<0.56	<0.75	<0.56	<0.56	<0.56	0.81	3.19	<0.56
Dec 1997						<0.56	<0.56			
June 1998	<1.0	<0.56/<0.56	<0.56	<0.75	<0.56	<0.56	<0.56	0.82		<0.56
June 1999	<1.0	<1.00	<1.00/<1.00		<1.00	<1.00	JP 0.55	JP 0.94		<1.00
Dec 1999						<1.00/<1.00	<1.00	JP 0.76	JP 0.82	<1.00
March 2000						<1.00	<1.00	JP 0.50	JP 0.81	<1.00/<1.00
June 2000						<1.00/<1.00	<1.00	JP 0.43	JP 0.70	<1.00
Sept 2000						<1.00	<1.00	JP 0.50	JP 0.66/0.59	<1.00
Dec 2000						<1.0	<1.0	JP 0.25	JP 0.44	<1.00
March 2001						<1.0	<1.0	JP 0.34	JP 0.67	<1.0/<1.0
June 2001	<1.0	<1.00	<1.0	<1.0	<1.00	<1.0	<1.0/<1.0	<1.0	J 0.43	<1.0
Sept 2001						<1.0	<1.0/<1.0	<1.0	JP 0.35	<1.0
Dec 2001						<1.0	<1.0	JP 0.071	JP 0.35/0.39	<1.0
March 2002						<1.0	<1.0	<1.0	JP 0.50	<1.0/<1.0
June 2002						<1.0	<1.0	<1.0	JP 0.36	<1.0
Sept 2002						<1.0	<1.0	<1.0	JP 0.17	<1.0/<1.0
Dec 2002						<1.0/<1.0	<1.0	<1.0	JP 0.40/0.47	<1.0
March 2003						<1.0	<1.0	<1.0	JP 0.23	<1.0/<1.0
June 2003	JP 0.59	<1.0	<1.0	JP 0.39	<1.0	<1.0	<1.0	<1.0/<1.0	<1.0	<1.0
Sept 2003						<1.0	<1.0	<1.0	J 0.22	<1.0/<1.0
Dec 2003						JP 0.37	<1.0	<1.0	<1.0	<1.0/<1.0
March 2004						<1.0	<1.0	<1.0	<1.0/<1.0	<1.0

Notes:

J - Value estimated.

P - Results less than reporting level but greater than instrument detection limit.

**OU3 CONTAMINANTS OF CONCERN ($\mu\text{g/L}$) 1996 - 2003
TWIN CITIES ARMY AMMUNITION PLANT (TCAAP)
ARDEN HILLS, MINNESOTA**

		<i>1,1,1-Trichloroethane</i>	<i>1,1,2-Trichloroethane</i>	<i>1,1-Dichloroethene</i>	<i>1,1-Dichloroethane</i>	<i>1,2-Dichloroethenes (cis & trans)</i>	<i>cis-1,2-Dichloroethene</i>	<i>Trichloroethene</i>
<i>OU3 Cleanup Standards</i>		200	3	6	70	70	70	5
<i>Well</i>	<i>Date</i>							
03L673	6/12/96	1.14	<0.78	2.3	2.31	31.60		650
03L673	6/12/97	<0.76	<0.78	<1.70	<0.73	11.80		240
03L673	6/25/98	<0.76	<0.78	<1.70	<0.73	12.60		270
03L673	6/4/99	<1.00	<1.00	0.88 JP	0.86 JP		9.4	280
03L673	6/12/01	<1.0 V	<1.0 V	<1.0 V	0.19 JV		1.3 V	24 V
03L673	6/10/03	<1	<1	<1	<1		<1	6.3
03L832	6/3/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03L832	6/4/97	<5.00	<5.00	<5.00	<5.00		<5.00	<5.00
03L832	6/22/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03L848	6/3/96	<0.76	<0.78	<1.70	<0.73	<0.76		11.3
03L848 (Dup.)	6/5/97	<0.76	<0.78	<1.70	<0.73	<0.76		8.57
03L848	6/5/97	<0.76	<0.78	<1.70	<0.73	<0.76		9.34
03L848	6/29/98	<0.76	<0.78	<1.70	<0.73	<0.76		10.7
03L848	6/4/99	<1.00	<1.00	<1.00	<1.00		0.42 JP	7.3
03L848	6/12/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		0.31 JV	3.5 V
03L848	6/11/03	<1	<1	<1	<1		<1	3.8
03L854	6/20/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03L854	6/27/97	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03L854 (Dup.)	6/26/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03L854	6/26/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03L854	6/7/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
03L854	6/14/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	<1.0 V
03L854	6/9/03	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
03L859	6/3/96	<0.76	<0.78	<1.70	<0.73	<0.76		5.96
03L859	6/4/97	<0.76	<0.78	<1.70	<0.73	<0.76		2.86
03L860	6/4/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03L860	6/5/97	<5.00	<5.00	<5.00	<5.00		<5.00	<5.00
03L861	6/4/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03L861	6/4/97	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03L861	6/29/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03L861 (Dup.)	6/7/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
03L861	6/7/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
03L861	6/11/01	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
03L861 (Dup.)	6/10/03	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0

**OU3 CONTAMINANTS OF CONCERN ($\mu\text{g/L}$) 1996 - 2003
TWIN CITIES ARMY AMMUNITION PLANT (TCAAP)
ARDEN HILLS, MINNESOTA**

<i>OU3 Cleanup Standards</i>		<i>1,1,1-Trichloroethane</i>	<i>1,1,2-Trichloroethane</i>	<i>1,1-Dichloroethene</i>	<i>1,1-Dichloroethane</i>	<i>1,2-Dichloroethenes (cis & trans)</i>	<i>cis-1,2-Dichloroethene</i>	<i>Trichloroethene</i>
		200	3	6	70	70	70	5
<i>Well</i>	<i>Date</i>							
03L861	6/10/03	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
03M848	6/21/96	5.62	1.26	8.62	9.53	76.80		1400
03M848	6/26/97	3.87	<0.78	6.18	8.88	49.50		510
03M848	6/29/98	1.18	<0.78	6.13	7.18	58.70		660
03M848 (Dup.)	6/4/99	<10.00	<10.00	3.70 JP	4.1 JP		30	650
03M848	6/4/99	<10.00	<10.00	3.70 JP	3.80 JP		29	700
03M848	6/12/01	<10	<10	2.5 J	2.0 J		20	370
03M848	6/9/03	<1	<1	2.4	<1		23	450
03U673	6/12/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03U673	6/12/97	<0.76	<0.78	<1.70	<0.73	<0.76		0.78
03U673	6/25/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03U673	6/4/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
03U673	6/12/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	<1.0 V
03U673	6/10/03	<1	<1	<1	<1		<1	0.59 JP
03U832	6/21/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03U832	6/27/97	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
03U832	6/22/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04J864	6/3/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04J864	9/16/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04J864	12/5/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04J864	6/3/97	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04J864	12/9/97	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04J864	6/25/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04J864	6/4/99	<1.00	<1.00	<1.00	<1.00		<1.00	0.55 JP
04J864	12/20/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04J864	3/9/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04J864	6/9/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04J864	9/6/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04J864	12/19/00	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J864 (Dup.)	6/11/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	<1.0 V
04J864	6/11/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	<1.0 V
04J864 (Dup.)	9/4/01	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J864	9/4/01	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J864	12/5/01	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0

OU3 CONTAMINANTS OF CONCERN ($\mu\text{g/L}$) 1996 - 2003
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ARDEN HILLS, MINNESOTA

OU3 Cleanup Standards		1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethene	1,1-Dichloroethane	1,2-Dichloroethenes (cis & trans)	cis-1,2-Dichloroethene	Trichloroethene
		200	3	6	70	70	70	5
Well	Date							
04J864	3/02	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J864	6/02	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J864	9/02	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J864	12/4/02	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J864	3/3/03	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J864	6/3/03	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J864	9/10/03	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J866	6/3/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04J866	9/16/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04J866	12/4/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04J866	6/2/97	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04J866	6/26/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04J866	6/7/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04J866	12/21/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04J866 (Dup.)	3/9/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04J866	3/9/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04J866	6/9/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04J866	9/6/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04J866	12/18/00	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J866	6/11/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	<1.0 V
04J866	9/4/01	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J866	12/5/01	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J866 (Dup.)	3/02	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J866	3/02	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J866 (Dup.)	6/02	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J866	6/02	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J866 (Dup.)	9/02	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J866	9/02	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04J866	12/3/02	<1	<1	<1	<1		<1	<1
04J866 (Dup.)	3/3/03	0.28 JP	<1	<1	<1		<1	<1
04J866	3/3/03	<1	<1	<1	<1		<1	<1
04J866	6/3/03	<1	<1	<1	<1		<1	<1
04J866	9/10/03	<1	<1	<1	<1		<1	<1
04U414 (414U4) (Dup.)	6/3/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56

TABLE 3

OU3 CONTAMINANTS OF CONCERN ($\mu\text{g/L}$) 1996 - 2003
TWIN CITIES ARMY AMMUNITION PLANT (TCAAP)
ARDEN HILLS, MINNESOTA

OU3 Cleanup Standards		1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethene	1,1-Dichloroethane	1,2-Dichloroethenes (cis & trans)	cis-1,2-Dichloroethene	Trichloroethene
		200	3	6	70	70	70	5
Well	Date							
04U414 (414U4)	6/3/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U414 (414U4)	9/16/96	<0.76	<0.78	<1.70	<0.73	<0.76		0.686
04U414 (414U4)	12/5/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U414 (414U4)	6/3/97	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U414 (414U4)	6/25/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U414 (414U4)	6/7/99	<1.00	<1.00	<1.00	<1.00		<1.00	0.26 JP
04U414 (414U4)	12/21/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04U414 (414U4)	3/10/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04U414 (414U4)	6/12/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04U414 (414U4)	9/5/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04U414 (414U4)	12/19/00	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04U414 (414U4)	6/11/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	<1.0 V
04U673	6/12/96	<0.76	<0.78	<1.70	<0.73	7.81		125
04U673	6/12/97	<0.76	<0.78	<1.70	<0.73	2.15		60.4
04U673	6/25/98	<0.76	<0.78	<1.70	<0.73	2.95		81.9
04U673	6/4/99	<1.00	<1.00	0.28 JP	<1.00		2.6	74
04U673	6/12/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		0.33 JV	2.9 V
04U673	6/10/03	<1	<1	<1	<1		1.1	15
04U832	6/3/96	4.2	<0.78	2.22	2.07	<0.76		41
04U832	6/4/97	8.49	<0.78	3.26	2.81	1.61		35.2
04U832	6/25/98	5.38	<0.78	2.7	2.13	2.59		36.4
04U832	6/7/99	4.4	<1.00	2.2	2.1		2.4	29
04U832	6/14/01	<1.0 V	<1.0 V	0.24 JV	0.41 JV		0.32 JV	3.5 V
04U832	6/11/03	<1	<1	<1	0.71 JP	<1	0.36 JP	4.1
04U845	6/4/96	<0.76	<0.78	<1.70	<0.73	2.89		51.2
04U845	6/5/97	<0.76	<0.78	<1.70	<0.73	1.29		30.8
04U845	6/25/98	<0.76	<0.78	<1.70	<0.73	1.41		32.9
04U845	6/7/99	<1.00	<1.00	<1.00	<1.00		1.7	35
04U845	6/13/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		0.94 JV	4.3 V
04U845	6/9/03	<1	<1	<1	<1		2.3	4
04U848	6/3/96	<0.76	<0.78	<1.70	<0.73	<0.76		6.15
04U848	6/5/97	<0.76	<0.78	<1.70	<0.73	<0.76		3.3
04U848	6/29/98	<0.76	<0.78	<1.70	<0.73	<0.76		4.19
04U848	6/4/99	<1.00	<1.00	<1.00	<1.00		<1.00	3.6

OU3 CONTAMINANTS OF CONCERN ($\mu\text{g/L}$) 1996 - 2003
TWIN CITIES ARMY AMMUNITION PLANT (TCAAP)
ARDEN HILLS, MINNESOTA

OU3 Cleanup Standards		1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethene	1,1-Dichloroethane	1,2-Dichloroethenes (cis & trans)	cis-1,2-Dichloroethene	Trichloroethene
		200	3	6	70	70	70	5
Well	Date							
04U848	6/12/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	0.49 JV
04U848	6/11/03	<1	<1	<1	<1		<1	0.46 JP
04U851	6/4/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U851	6/4/97	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U851	6/26/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U851	6/8/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04U851 (Dup.)	6/12/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	<1.0 V
04U851	6/12/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	<1.0 V
04U851 (Dup.)	6/11/03	<1	<1	<1	<1		<1	<1
04U851	6/11/03	<1	<1	<1	<1		<1	<1
04U852	6/25/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U852 (Dup.)	6/24/97	<1.00	<1.00	<1.00	<1.00		<1.00	0.48 JP
04U852	6/24/97	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00 J
04U852	6/26/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U852	6/8/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04U852	6/12/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	<1.0 V
04U852	6/11/03	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04U854	6/4/96	<0.76	<0.78	<1.70	<0.73	2.96		26.7
04U854 (Dup.)	6/5/97	<0.76	<0.78	<1.70	<0.73	<0.76		17.6
04U854	6/5/97	<0.76	<0.78	<1.70	<0.73	<0.76		16.5
04U859	6/3/96	22.3	<0.78	7.72	6.31	4.11		50.8
04U859	6/4/97	9.57	<0.78	2.47	2.81	3.33		31.9
04U859 (Dup.)	6/25/98	16.2	<0.78	6.29	3.96	3.17		42
04U859	6/25/98	19	<0.78	7.55	4.54	3.17		46.8
04U859	6/7/99	27	0.30 JP	10	6.6		2.4	75
04U859	6/13/01	0.53 JV	<1.0 V	1.5 V	2.1 V		1.1 V	8.4 V
04U859	6/11/03	<1	<1	0.45 JP	1.2		<1	4.4
04U860	6/4/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U860	6/5/97	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U860	6/29/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U860	6/7/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04U860	6/13/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	<1.0 V
04U860	6/9/03	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04U861	6/4/96	1.25	<0.78	<1.70	0.903	2.08		6.99

**OU3 CONTAMINANTS OF CONCERN ($\mu\text{g/L}$) 1996 - 2003
TWIN CITIES ARMY AMMUNITION PLANT (TCAAP)
ARDEN HILLS, MINNESOTA**

<i>OU3 Cleanup Standards</i>		<i>1,1,1-Trichloroethane</i>	<i>1,1,2-Trichloroethane</i>	<i>1,1-Dichloroethene</i>	<i>1,1-Dichloroethane</i>	<i>1,2-Dichloroethenes (cis & trans)</i>	<i>cis-1,2-Dichloroethene</i>	<i>Trichloroethene</i>
		200	3	6	70	70	70	5
<i>Well</i>	<i>Date</i>							
04U861	6/4/97	2.26	<0.78	<1.70	1.12	5.05		7.91
04U861	6/29/98	2.35	<0.78	<1.70	2.43	12.40		17.1
04U861	6/7/99	2	<1.00	2.4	3.1		14	28
04U861	6/11/01	0.34 JV	<1.0 V	0.85 JV	1.3 V		6.6 V	19 V
04U861	6/10/03	<1.0	<1.0	0.77 JP	<1.0		13	48
04U863	6/4/96	<0.76	<0.78	<1.70	<0.73	<0.76		4.59
04U863	9/16/96	<0.76	<0.78	<1.70	<0.73	<0.76		1.84
04U863	12/4/96	<0.76	<0.78	<1.70	<0.73	<0.76		4.73
04U863	6/3/97	<0.76	<0.78	<1.70	<0.73	<0.76		1.54
04U863	6/25/98	<0.76	<0.78	<1.70	<0.73	<0.76		1.15
04U863	6/7/99	<1.00	<1.00	<1.00	<1.00		<1.00	1.3
04U863	12/21/99	<1.00	<1.00	<1.00	<1.00		<1.00	0.69 JP
04U863	3/10/00	<1.00	<1.00	<1.00	<1.00		<1.00	0.51 JP
04U863	6/12/00	<1.00	<1.00	<1.00	<1.00		<1.00	0.67 JP
04U863	9/6/00	<1.00	<1.00	<1.00	<1.00		<1.00	0.60 JP
04U863 (Dup.)	12/18/00	<1.0	<1.0	<1.0	<1.0		<1.0	0.48 JP
04U863	12/18/00	<1.0	<1.0	<1.0	<1.0		<1.0	0.47 JP
04U863	6/14/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	0.22 JV
04U863	3/02	<1	<1	<1	<1		<1	0.11 JP
04U863	6/02	<1	<1	<1	<1		<1	<1
04U863	9/02	<1	<1	<1	<1		<1	<1
04U863	12/3/02	<1	<1	<1	<1		<1	0.12 JP
04U863	3/3/03	<1	<1	<1	<1		<1	<1
04U863	6/3/03	<1	<1	<1	<1		<1	<1
04U863	9/10/03	<1	<1	<1	<1		<1	<1
04U864	6/3/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U864	9/17/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U864	12/5/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U864	6/3/97	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U864	12/9/97	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U864	6/25/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
04U864	6/4/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04U864 (Dup.)	12/20/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04U864	12/20/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00

TABLE 3

**OU3 CONTAMINANTS OF CONCERN ($\mu\text{g/L}$) 1996 - 2003
TWIN CITIES ARMY AMMUNITION PLANT (TCAAP)
ARDEN HILLS, MINNESOTA**

<i>OU3 Cleanup Standards</i>		<i>1,1,1-Trichloroethane</i>	<i>1,1,2-Trichloroethane</i>	<i>1,1-Dichloroethene</i>	<i>1,1-Dichloroethane</i>	<i>1,2-Dichloroethenes (cis & trans)</i>	<i>cis-1,2-Dichloroethene</i>	<i>Trichloroethene</i>
		200	3	6	70	70	70	5
<i>Well</i>	<i>Date</i>							
04U864	3/9/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04U864 (Dup.)	6/9/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04U864	6/9/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04U864	9/6/00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
04U864	12/19/00	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04U864	6/11/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	<1.0 V
04U864	9/4/01	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04U864	12/5/01	<1	<1	<1	<1		<1	<1
04U864	3/02	<1	<1	<1	<1		<1	<1
04U864	6/02	<1	<1	<1	<1		<1	<1
04U864	9/02	<1	<1	<1	<1		<1	<1
04U864 (Dup.)	12/4/02	<1	<1	<1	<1		<1	<1
04U864	12/4/02	<1	<1	<1	<1		<1	<1
04U864	3/3/03	<1	<1	<1	<1		<1	<1
04U864	6/3/03	<1	<1	<1	<1		<1	<1
04U864	9/10/03	<1	<1	<1	<1		<1	<1
04U865	6/3/96	<0.76	<0.78	<1.70	<0.73	<0.76		1.77
04U865	9/17/96	<0.76	<0.78	<1.70	<0.73	<0.76		4.09
04U865	12/4/96	<0.76	<0.78	<1.70	<0.73	<0.76		5.6
04U865	6/3/97	<0.76	<0.78	<1.70	<0.73	<0.76		0.813
04U865	6/25/98	<0.76	<0.78	<1.70	<0.73	<0.76		0.816
04U865	6/8/99	<1.00	<1.00	<1.00	<1.00		<1.00	0.94 JP
04U865	12/21/99	<1.00	<1.00	<1.00	<1.00		<1.00	0.76 JP
04U865	3/10/00	<1.00	<1.00	<1.00	<1.00		<1.00	0.50 JP
04U865	6/12/00	<1.00	<1.00	<1.00	<1.00		<1.00	0.43 JP
04U865	9/6/00	<1.00	<1.00	<1.00	<1.00		<1.00	0.50 JP
04U865	12/19/00	<1.0	<1.0	<1.0	<1.0		<1.0	0.25 JP
04U865	6/12/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	<1.0 V
04U865	9/4/01	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
04U865	12/01	<1	<1	<1	<1		<1	0.071 JP
04U865	3/02	<1	<1	<1	<1		<1	<1
04U865	6/02	<1	<1	<1	<1		<1	<1
04U865	9/02	<1	<1	<1	<1		<1	<1
04U865	12/3/02	<1	<1	<1	<1		<1	<1

OU3 CONTAMINANTS OF CONCERN (µg/L) 1996 - 2003
TWIN CITIES ARMY AMMUNITION PLANT (TCAAP)
ARDEN HILLS, MINNESOTA

OU3 Cleanup Standards		1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethene	1,1-Dichloroethane	1,2-Dichloroethenes (cis & trans)	cis-1,2-Dichloroethene	Trichloroethene
		200	3	6	70	70	70	5
Well	Date							
04U865	3/3/03	<1	<1	<1	<1		<1	<1
04U865 (Dup.)	6/3/03	<1	<1	<1	<1		<1	<1
04U865	6/3/03	<1	<1	<1	<1		<1	<1
04U865	9/10/03	<1	<1	<1	<1		<1	<1
04U866	6/3/96	<0.76	<0.78	<1.70	<0.73	<0.76		1.18
04U866	9/16/96	<0.76	<0.78	<1.70	<0.73	<0.76		9.85
04U866	12/4/96	<0.76	<0.78	<1.70	0.831	0.86		14.3
04U866	6/2/97	<0.76	<0.78	<1.70	<0.73	<0.76		3.19
04U866	12/21/99	<1.00	<1.00	<1.00	<1.00		<1.00	0.82 JP
04U866	3/9/00	<1.00	<1.00	<1.00	<1.00		<1.00	0.81 JP
04U866	6/9/00	<1.00	<1.00	<1.00	<1.00		<1.00	0.70 JP
04U866 (Dup.)	9/6/00	<1.00	<1.00	<1.00	<1.00		<1.00	0.59 JP
04U866	9/6/00	<1.00	<1.00	<1.00	<1.00		<1.00	0.66 JP
04U866	12/18/00	<1.0	<1.0	<1.0	<1.0		<1.0	0.44 JP
04U866	6/11/01	<1.0 V	<1.0 V	<1.0 V	<1.0 V		<1.0 V	0.43 JV
04U866	9/4/01	<1.0	<1.0	<1.0	<1.0		<1.0	0.35 JP
04U866 (Dup.)	12/01	<1	<1	<1	<1		<1	0.39 JP
04U866	12/01	<1	<1	<1	<1		<1	0.35 JP
04U866	3/02	<1	<1	<1	<1		<1	0.50 JP
04U866	6/02	<1	<1	<1	<1		<1	0.36 JP
04U866	9/02	<1	<1	<1	<1		<1	0.17 JP
04U866 (Dup.)	12/3/02	<1	<1	<1	<1		<1	0.47 JP
04U866	12/3/02	<1	<1	<1	<1		<1	0.40 JP
04U866	3/3/03	<1	<1	<1	<1		<1	0.23 JP
04U866	6/3/03	<1	<1	<1	<1		<1	<1
04U866	9/10/03	<1	<1	<1	<1		<1	0.22 J
409548	6/4/96	<0.76	<0.78	<1.70	2.15	<0.76		2.84
409548	6/4/97	<5.00	<5.00	0.87 JP	1.70 JP		<5.00	2.70 JP
409548	6/22/98	<0.76	<0.78	<1.70	1.19	<0.76		2.91
409548 (Dup.)	6/14/99	<1.00	<1.00	0.64 JP	1.1		<1.00	2.9
409548	6/14/99	<1.00	<1.00	0.61 JP	1.1		<1.00	2.8
409548	6/19/01	<1.0	<1.0	0.31 J	0.59 J		<1.0	1.6
409548	6/11/03	<1.0	<1.0	<1.0	<1.0		<1.0	1.4
476837 (MW15H)	6/4/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56

TABLE 3

OU3 CONTAMINANTS OF CONCERN ($\mu\text{g/L}$) 1996 - 2003
TWIN CITIES ARMY AMMUNITION PLANT (TCAAP)
ARDEN HILLS, MINNESOTA

OU3 Cleanup Standards		1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethene	1,1-Dichloroethane	1,2-Dichloroethenes (cis & trans)	cis-1,2-Dichloroethene	Trichloroethene
Well	Date	200	3	6	70	70	70	5
476837 (MW15H)	9/17/96	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
476837 (MW15H)	12/4/96	<0.76	<0.78	<1.70	<0.73	0.95		<0.56
476837 (MW15H)	6/4/97	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
476837 (MW15H)	6/26/98	<0.76	<0.78	<1.70	<0.73	<0.76		<0.56
476837 (MW15H)	6/8/99	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00
476837 (MW15H)	6/29/01	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
476837 (MW15H)	6/11/03	<1.0	<1.0	<1.0	<1.0		<1.0	0.39 JP

Note:
 Dup. - Duplicate analysis.
 J - Value estimated.
 P - Results less than reporting level but greater than instrument detection limit.
 V - Sample arrived at laboratory with cooler temp. between 6° and 9° C.
 Shaded values exceed the OU3 Cleanup Standards. Trichloroethene values are not shaded. Data taken from Appendix D of the TCAAP FY2003 Annual Performance Report.

TABLE 4

COMPARISON OF ALTERNATIVES - OU3
TWIN CITIES ARMY AMMUNITION PLANT (TCAAP)
ARDEN HILLS, MINNESOTA

Original Alternative

- Extraction of groundwater at the leading edge of the South Plume;
- Treatment of extracted groundwater for the removal of VOCs by a pressurized granular activated carbon (GAC) system;
- Discharge of treated groundwater to the potable water supply of the City of New Brighton; and
- Monitoring of the groundwater to verify the effectiveness of the remedy.

Proposed Alternative

- Monitored natural attenuation;
- Monitoring of the groundwater for VOCs to verify the effectiveness of the remedy and the natural attenuation of the South Plume; and
- Continued implementation of the drilling advisory that regulates the installation of new private wells within OU3 through a Special Well Construction Area.

APPENDIX A
RESPONSIVENESS SUMMARY

**RESPONSIVENESS SUMMARY
OPERABLE UNIT 3 OF THE NEW BRIGHTON/ARDEN HILLS SUPERFUND SITE
RECORD OF DECISION AMENDMENT**

The public comment period for the Operable Unit 3 (OU3) Proposed Plan began on October 13, and ended on November 14, 2005. A public notice summarizing the Proposed Plan and announcing the public comment period was printed in the Minneapolis Star Tribune on October 13, 2005. Public notice was also printed in local newspapers covering the areas of Arden Hills, Shoreview, New Brighton, Mounds View, and Fridley. The U.S. Army (Army) also distributed a newsletter announcing availability of the Proposed Plan and the public comment period.

A public meeting was held on October 27, 2005 at the New Brighton Family Service Center. Representatives of the Army, U.S. Environmental Protection Agency (USEPA), and Minnesota Pollution Control Agency (MPCA) were present to answer questions. At the meeting, the City of New Brighton submitted written comments. The City supported the decision detailed in the Proposed Plan to terminate remediation activities in OU3. No other comments or questions were presented either in writing or orally at the public meeting. A transcript of the public meeting has been included in the Administrative Record for the site.

Later during the public comment period, written comments were received from LeEtta Flicker of New Brighton, Minnesota. Ms. Flicker was in attendance at the public meeting. Ms. Flicker's comments were primarily related to the groundwater monitoring program for OU3.

Judging from the few comments received, the community is supportive of the proposal to eliminate the requirements for: groundwater extraction at the leading edge of the plume, treatment of extracted groundwater, and municipal use of treated groundwater.

Summary of Comments Received During the Public Comment Period

Comments received during the public comment period on the Proposed Plan for OU3 of the New Brighton/Arden Hills Superfund Site are summarized briefly below.

1. Ms. LeEtta Flicker, resident of New Brighton, submitted two written comments about groundwater monitoring at OU3. She suggested a change in the monitoring frequency for monitoring well 04U861. She also asked about vinyl chloride analyses of groundwater samples.

Army Response: The USEPA, MPCA, and Army review the OU3 monitoring program annually, and modifications to the monitoring program are considered to ensure complete coverage of the aquifer. The results of this evaluation are reported in the Annual Performance Report. The increasing trend at 04U861 will be monitored and evaluated in future Annual Performance Reports along with data from all wells. That being said, the trends at well 04U861 indicate neither a failure in the system or an increased risk to human health and the environment. The surrounding Unit 4 wells show a downward trend and the lower Unit 3 well nested with 04U861 (03L861) has been below action levels since 1991.

The Army recognizes and appreciates that the breakdown of a parent compound to another hazardous chemical is not protective nor is it desirable. Deep groundwater samples from OU1, OU2, and OU3 have been analyzed for vinyl chloride over the past fifteen years. To be clear, every groundwater sample has been analyzed for vinyl chloride. This chemical has been virtually absent in thousands of samples analyzed. While it is true that trichloroethene can biologically decompose to dichloroethene and vinyl chloride, the groundwater environment at TCAAP is not conducive to the formation of vinyl chloride.

Contaminant concentrations in groundwater at TCAAP are declining due to a combination of pumping at the source areas, the TGRS containment system, and non-biological natural attenuation processes. It has been demonstrated at TCAAP that trichloroethene and dichloroethene are indeed breaking down in the groundwater. This was not known at the time the PGRS was constructed. However, the Army feels certain that vinyl chloride or other hazardous compounds are not being generated.

2. The City of New Brighton's comments supported the decision to discontinue groundwater remediation in OU3, agreeing with the USEPA, MPCA, and Army that the remedial facility has fulfilled its goals. They further commented that the Proposed Plan should offer specifics on the procedure and financial responsibility for decommissioning the remediation facility. Ms. Flicker also commented on the responsibility for decommissioning the remediation facility.

Army Response: Comment noted. While an important detail to be worked out, the end use of the remediation facility is not relevant to the decision of whether pumping is still needed for the remedy as outlined in the Proposed Plan and Record of Decision Amendment.